THE

# PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

# PROGRESS OF PHOTOGRAPHY.

VOLUME VI.

EDITED BY G. WHARTON SIMPSON.

" *Nulla recordanti lux est ingrata.*"—MARTIAL.

LONDON:
PRINTED AND PUBLISHED BY THOMAS PIPER, 32, PATERNOSTER ROW.

1862.

# PREFACE.

In completing our Sixth Volume, we have the pleasure of addressing some hundreds more readers than we did at its commencement. This is, to us, a circumstance especially encouraging, as affording the best practical assurance that our earnest desire and continual efforts to render the Photographic News a worthy exponent of the Photographic Art, and the recognized organ of Photographers, have not been fruitless; and suggesting the certain hope that continued exertion in the same direction will meet with like appreciation and similar success.

As each year's record of progress is completed, each year's history chronicled, we feel deeply impressed with the growing importance of the Art we represent. During the year which has just passed, Photography, in its every phase, has been pre-eminently successful: its processes have been improved; its art results have assumed a higher character; its applications have been vastly extended; its commercial prosperity has been unprecedented. The success of the Art, whilst it makes the labours of the journalist more satisfactory, also renders them more responsible, and claims a more conscientious and sole devotion to their right discharge. The growing experiences, discoveries, and suggestions of Photographers throughout the world, have to be collected, winnowed, verified, condensed, garnered. Whatever tends to the advancement of Photography, either in science or practice—whatever tends to its elevation as an Art, whatever tends to extend its scope and applications, and thus increase its economic value and commercial success—demand from the Photographic Journalist not simply record, but advocacy and encouragement.

In the prosecution of our task, we have preserved an abiding sense of the responsibility attached to it; but we must add that this consciousness has not made it the less a labour of love, into which we have entered heart and soul. Our task has also been cheered and lightened by the augmented confidence of our increasing constituency, and the aid and information we have received from every quarter. To a large number of friends and correspondents we here tender our thanks for very material and constant assistance in advancing the Art in various ways, and enabling us to present, in the Volume for 1862, a complete record of everything worth remembering in the year's results.

We need to add but few words as regards the future. Where mutual confidence exists,

but few pledges are necessary. Where we have striven to be the pioneer of progress, either in the artistic or scientific aspects of the Art; where we have aimed to initiate improvements, as well as to record them and give them publicity; where we have maintained the interests of Photography and Photographers in every way in which we could perceive their advancement was possible, we shall "walk by the same rule, and mind the same things." No existing feature of interest in the PHOTOGRAPHIC NEWS shall be removed or diminished, and no opportunity shall be neglected of adding to its usefulness to Photographers—professional and amateur. We conclude these brief after-words with wishing to all our readers a joyous Christmas and a prosperous and happy New Year.

32, PATERNOSTER ROW, *December* 24, 1862.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 174.—January 3, 1862.

## A GLANCE AT THE PAST YEAR.

In glancing at the progress of photography in the year 1861, we cannot exclaim *annus mirabilis!* There have been no wonders to chronicle; no startling discoveries to reveal. But the year has been, nevertheless, one of progress in the more important aspects of the art. There has been a decided improvement in the quality of the pictures produced, and a higher standard of excellence is obtaining recognition amongst photographers generally. Better pictures are appreciated, better pictures are aimed at, better pictures are obtained. A better understanding prevails of what pictorial excellence demands, and a more perfect mastery over the means to that end, is gradually being attained.

A few years ago, if a picture were clean, and sharp, and brilliant, it was unhesitatingly deemed to merit praise as "excellent photography." If it were out of focus, blurred, hazy, and not all made out, it was deemed "artistic and suggestive." Now, however, a picture to merit the praise of being good photography, or of being artistic, must be something more than either of these we have described. A photograph to be good and artistic must be soft and properly graduated, as well as sharp and brilliant; it must be made out, and properly defined in all its parts as well as atmospheric; it must be harmonious in tones, and balanced in forms. No immense patch of white paper for a sky, cut from the landscape by a hard horizon, will now satisfy the aspiring photographer. Natural clouds if possible, or at least a tint with some suggestion of atmosphere must now supply the bald white space we used to see. The increased number of good pictures we see produced, the still more increased interest in, and desire to produce such pictures, gives us strong assurance of the great artistic progress of photographers and photography.

Another phase of the progress of artistic photography is to be found in the increased production of instantaneous pictures, especially of marine and atmospheric effects. That such effects were amongst the first productions of the collodion process we well remember. But the effects attempted, the results obtained, and the proportion of successes were not to be compared with those of the present day, in either number, variety, or excellence. The daring and exquisite effects of Wilson, in sun, and cloud, and water, and atmosphere, no longer stand alone; but have been produced by so many amateur and professional photographers, and in some cases with such success, as to render it necessary for Mr. Wilson to look to his laurels, or content himself with the credit of initiating what others are now successfully imitating. We have before us at this moment some slides, which for grand effects of atmosphere and chiaroscuro we have never seen surpassed.

Another question which has reference almost entirely to artistic effect, has recently occupied the attention of photographers, we refer to the wide angle in landscape pictures. If no other result were to arise from the discovery of the panoramic lens, it has at least done good service in originating the discussion on the value of a wide angle of view. That there are many cases in which the beauty of the scene can only be rendered by including a wide angle we have already affirmed, and that for the production of such landscapes there is no doubt the panoramic lens will come into use; but apart from its own special advantages, we repeat, the discovery of the panoramic lens has rendered good service to photography in showing the possibility and the excellence, on many occasions, of securing something more than an angle of forty degrees, and suggesting the production of such exquisite photographs as the recent 7 by 5 landscapes of Wilson, which include an angle of nearly sixty degrees.

No great optical discovery has been made during the year; no especial novelty has been introduced. But we conceive there is decided tendency to the improvement in the lenses used. Instantaneous photography demands quick acting lenses; album portraits demand a flat field, with perfect definition and quick action; a wide angle of view demands lenses with excellent marginal definition: and from the perfection of the results we have seen during the year, we conceive that these characteristics in lenses have been secured by the best makers in a degree not before attained. We also notice that the improved taste amongst photographers generally has created a fresh and increased demand for appliances of the best quality, the users and producers thus reacting beneficially upon each other.

We have been somewhat disappointed in the tardy progress made by the solar camera, or other means of enlargement. That the system of producing large proofs from small negatives will eventually become popular, we have not a doubt. The facility for producing perfect instantaneous small negatives, either in portraiture or landscape, and the pictorial value of such pictures, when well enlarged, possess advantages too palpable to be lost sight of. To what cause the slow progress of the enlarging system is due, in this country, we cannot with certainty say; the absence of direct solar light during a great part of the year, most probably. Be that as it may, it appears certain that we are far behind our continental neighbours in this respect. We have not anything like the productions of Ghemar of Brussells, or of Disderi, or Alophe, in Paris; and if a tithe of what we hear be true, we shall in this respect, at least, have to hide our diminished heads at the forthcoming International Exhibition.

In the chemistry of photography comparatively little discovery has been made. In the wet collodion process the chief noticeable fact is the all but universal use of bromo-iodized collodion, iron development, and intensifying processes. During the spring some hope was raised of the possibility of dispensing with a nitrate bath by combining the sensitive salts of silver in one vehicle, by which means a plate would be ready for exposure as soon as it was coated. A similar idea had been mooted in these pages during the preceding year, but had not been vouched by results.

The first intimation of the discovery by Captain Dixon, was accompanied by two or three excellent negatives as specimens of the process. *If* the negatives shown to us were produced by the method then described, and subsequently patented, the discovery was a most important one. All the subsequent results shown to us, were, however, decidedly inferior to what we ourselves produced in the same manner. The patent was abandoned, and the process belongs to photographers generally, or such of them as may be disposed to experiment further in the matter. Captain Dixon's method simply consisted in adding a small quantity of nitrate of silver, dissolved in alcohol, to iodized or bromo-iodized collodion. All questions of exact proportions remained undecided. The pictures were developed either by iron or pyrogallic acid. In our own hands the chief difficulty was to obtain sufficient density without fogging. We found no difficulty in making and keeping a preparation sensitive to the action of light, which yielded an image in the usual time. The process being patented deprived it of sufficient interest at the time to induce us to continue our experiments;

but we believe the matter is well worthy of further attention, M. Gaudin also gave some attention to the subject, with, as he announced, successful results. The conditions on which his success depended have not been published.

In dry processes we have had many modifications and novelties suggested, some of which have been worthy of attention, but all have left something to desire. The points which remain to be secured are rapidity and simplicity. With the exception of these qualities we think everything as regards excellence and certainty are to be found in the collodio-albumen process as practised by Mr. Mudd. The chief objection consists in the number of operations involved in preparing the plates. Even rapidity may be obtained by the use of hot developers. If the same quality and certainty of results could be obtained with more simplicity, the process would be perfect. The tannin process, invented by Major Russell, is a great stride in the direction of simplicity, and the results are of excellent quality. Photographers are highly indebted to such men as Major Russell, who, with the ability, leisure, and means necessary, steadily apply themselves, month after month, without weariness or impatience, working out definite results by careful experiment, and then unhesitatingly laying them before the public for the benefit of photographers at large.

Perhaps one of the most important steps towards the improvement of existing dry processes is the new mode of development suggested by Mr. Wardley, and that by M. Roman. The use of hot solutions of pyrogallic acid for developing, as suggested by the latter gentleman, was not, indeed, a novelty, but its great value in reducing the exposure had never before been so fully brought under public attention. The development, without free nitrate of silver, was quite a new idea, and its value in securing softness and detail cannot be overrated. As our readers know, we have been successful in applying the principle to plates by several dry processes, and have reason to believe it is available in the majority, if not in all cases.

In apparatus generally, a variety of improvements have been made, and some novelties introduced, but none of sufficient importance for recapitulation here.

We believe on the whole the commercial aspects of photography have never been better. Although some branches have suffered, considerable impetus has been given to several others by the rage for what, although never used for the purpose, people will insist on calling *cartes de visite*. We believe, moreover, that better, softer, more delicate photography has been rendered necessary by these pictures than used to suffice in the eyes of many for larger portraits.

The applications of photography have not been in any way notably extended. The processes which would aid this in some directions, such as photo-lithography, carbon printing, &c., have not made such advancement during the year. One of the directions in which the application of the art has been extending is to us a source of regret rather than of congratulation. We refer to book illustration: many of the recent attempts of that kind, although bearing the names of good men, have been simply a disgrace to the art. Bad reproductions of imperfect photographs can never do the art any credit.

Perhaps no subject has excited more attention during the year than the probable position of photography in the forthcoming Exhibition. It would be worse than repeating a thrice told tale to recapitulate the history here. As all our readers know, the thing has been badly managed; it has been one huge blunder. The only thing which now can be done, is for photographers to endeavour, as far as possible, to retrieve the error they could not prevent. They will very shortly receive, what all other trades and professions have long since received, the notifications of space allotted. They will be required, we believe, to state positively whether they can undertake to fill the space allotted to them, and also to nominate gentlemen in whose judgment they can rely as jurymen in their department. We trust every photographer will now do his best to aid in producing a successful issue.

There have been a few losses by death from amongst the known ranks of photographers, and two valued gentlemen have publicly withdrawn. We trust, however, that every year we gain—it is impossible to speak of the devotees of the art except as a fraternity, with the strongest bond of a common interest and sympathy—some fresh enthusiastic, able, earnest recruits to aid in forwarding the perfection of the art in all its branches. Such men are needed. Let us all put our shoulders to the wheel.

## A NEW RAPID DRY PROCESS.

In another page will be found a communication from an old and valued correspondent, Mr. Bartholomew, of Fareham, in which he gives the formula of three new dry processes. The two first involve nothing new in principle, but claim attention on the score of simplicity, and, we believe, efficiency. The third process involves, however, the recognition of a novel principle in photography, and claims a rapidity equal to that of wet collodion.

The conditions for which Mr. Bartholomew challenges recognition are, in several respects, antithetical to those deemed imperative in the wet process. For the most successful operations with wet collodion we require the absence of organic matter, acid reactions of bath, &c., and the presence of free nitrate of silver. In the dry process proposed, the absence of free nitrate of silver, the presence of organic matter, and *alkaline* reaction, are laid down as the bases of success. The last-mentioned condition is, of course, contrary to all experience. The plentiful use of acetic acid has always been, with dry operators, a *sine qua non*. There is no reason, however, why the new suggestion should not receive a careful trial. Mr. Bartholomew says it has proved eminently successful. We can readily see how immunity from the chief evil of an alkaline reaction is avoided. As our readers well know, alkalinity is favourable to sensitiveness, but it is, unfortunately, at the same time, the sure source of fog from unrestrained reduction. Fog, however, is generally, if not always, surface deposit, and arises from the too rapid reduction of the free silver present. If, then, the development proper be effected without the presence of free nitrate, the danger of fogging is removed, and the rapidity of an alkaline condition secured, whilst the evil is avoided.

Assuming for the present that this principle will work, its applications may no doubt be varied, and it may lead to very important results. It at once suggests the value of the notion, originating with Mr. Wardley, to the working out of which we have recently given some attention, namely, development of dry plates without the presence of free nitrate of silver.

Mr. Bartholomew is, as we have said, an old and intelligent correspondent, and our readers are indebted to him for many valuable suggestions, amongst which we may mention the use of silver in the albumen solution for Fothergill plates, recommended about the same time, independently, by Mr. Hannaford. The latter gentleman and Mr. Bartholomew are always associated, in our minds, as typical of a valuable class amongst photographers, whose communications, however short, always contain important hints and pregnant suggestions.

## IRREGULAR TONING.

There is no evil which has caused more annoyance to the photographer of late years than the mealy, mottled, irregular result which some samples of paper yield under the action of the alkaline gold toning bath. An irregular mixture of slaty grey and reddish brown spots cover the print, and in the case of delicate pictures, such as album portraits, ruin the effect. Various suggestions have appeared in our columns from time to time for the removal of this annoyance, and the use of acetate of soda in the toning bath has, in many hands, either entirely or partially removed the defect. We have just had out attention called to what is styled a "perfect cure." In the Photographic News for Dec. 6th, a letter from "A Cure" appeared suggesting that, before immersion in the toning bath, all free nitrate should be converted into acetate of silver by submitting the print, for at least ten minutes, to a bath containing four drachms of acetate of soda dissolved in ten ounces of distilled water. Mr. Samuel Fry, whose letter will be found in another page, recently showed us two prints from the same sample of paper. One was as bad a case of mealiness as we have seen, the other entirely free from this ruinous defect, its immunity being solely due to the use of the acetate of soda bath he had seen recommended in the letter to which we have referred.

We shall not enter into the matter further here, as Mr. Fry has promised to bring the subject before the next meeting of the South London Society, when it will, doubtless, be fully discussed. The matter is, however, of so much importance to many of our readers, that we feel it important to call their attention to a remedy so simple, for an evil so disastrous, without loss of time, and shall be glad to learn the results of their experience on trial.

## SOME ADDITIONAL HINTS ON THE TANNIN PROCESS.

BY MAJOR RUSSELL.

The following results of a recent investigation of various means of fixing the collodion film for use with tannin may be of interest to some of your readers. Two methods appear to be quite satisfactory:—

First. Coating the glass with gelatine solution, prepared with acetic acid. This solution is much improved by adding for every 10 grains of gelatine, 2 grains of iodide of cadmium, 1 grain of bromide of cadmium, and a very small quantity of iodine, dissolved together in a few drops of water. Besides other advantages gained by this addition, the gelatine film is protected from fungus, and the gelatinized plates may be kept without any extraordinary precaution against damp. Gelatine prepared in this way does not in my hands diminish sensitiveness. No alcohol is required in the solution.

Second. Using a thin solution of india-rubber in the following manner:—Soak thin slices of raw india-rubber in benzole, one grain to each fluid ounce, for twelve hours, or as much longer as is convenient, and filter. After cleaning the glasses, warm, to ensure dryness, and allow to become cold again. Then pour the solution in the same manner as collodion, and before the liquid has ceased to drip, hold vertically at a short distance before a fire. As soon as the plate appears dry, it may be set up before the fire, near enough to keep hot and complete the drying whilst others are coated. The film thus produced is so bright that it is almost impossible to tell by inspection which side is coated, and no lines or irregularities are formed. Collodion does not flow so freely on india-rubber as on gelatine, but well polishing with a velvet rubber much improves it in this respect.

This thin film of india-rubber does not, like a thicker coat, cause cracking of the collodion, but it will not always secure sufficient adhesion, unless diluted alcohol is used instead of water to moisten before development.

The treatment with alcohol so much diminishes the tendency to loosening of the film, that most collodions may be used in this way without any previous coating, but not quite satisfactorily, as the film sometimes becomes loose, and breaks in the final washing. I am indebted to a correspondent of the Photographic News for a knowledge of this valuable property of alcohol. One part of ordinary alcohol (not methylated) to two parts of water, or equal parts of each, answer well; the exact proportion does not seem to be material. The liquid flows so freely that it may be poured on the plate and spread over it by blowing gently. The same portion may be used for many plates. After pouring off, distilled water should be poured on and off till oiliness is removed. A film on india-rubber treated in this way is not detached even by a boiling developer.

Old collodion may be much improved by adding ten or twenty drops of benzole to each ounce, or as much as can be used without rendering the film too impervious. After adding the benzole, shake up well, and introduce some slices of raw india-rubber to digest a few days before use. This treatment does not seem to alter the sensitiveness, but by hardening the film renders old collodion available for printing transparencies, or other purposes where quickness of action is not necessary; no previous coating will usually be required if dilute alcohol is used to moisten for development.

Complaints are often made that tannin plates are insensitive, generally, I think, because an unsuitable collodion is used; one sign of this may be mentioned—the appearance of the sky before development; this never occurs in my experience, on a properly exposed plate, when the collodion is even moderately sensitive.

## Scientific Gossip.

The eclipse of the sun—total in some parts of the world although but partial in England—which happened on Tuesday last, the 31st of December, has not attracted the attention which such an occurrence seems to deserve. In London it commenced at nine minutes to two in the afternoon and ended at eight minutes to four; the time of greatest phase being at seven minutes to three, when nearly half the sun's diameter was obscured by the moon's intercepting body. Being small compared with several eclipses that have lately occurred it has been little thought of; it is one, however, of considerable interest to science, and it is to be hoped that some of our readers will not have allowed to pass so favourable an opportunity of showing the eminent adaptability of their art in recording, permanently and unerringly, a photographic record of this important natural phenomenon. In other parts of the world the eclipse was total, the line of central shadow having passed, successively, over the Carribean Sea, the Island of Trinidad, and the North Atlantic Ocean; entering the the west coast of Africa, near Cape Verd, traversing the Sahara or Great Desert, Tripoli, and the Mediterranean Sea, but having been lost in sunset just before reaching the Morea. It will thus be seen that although the totality was invisible to all the great observatories and centres of civilization, it passed over several spots where ready access could be gained by astronomers and photographers, or where they were already located. At Trinidad, one of the first places where the totality would become visible there are many amateur photographers, and the important West India Islands are not very far distant for an astronomical excursionist, considering the importance of the object. The next land which it would touch would be near Cape Verd; this is readily accessible from several flourishing settlements on the coast, and also from the Islands of the same name; whilst it would scarcely be considered too far by sea from Teneriffe, the scene of Piazzi Smyth's important labours in physical astronomy. Perhaps, however, the most important station to Europeans is Tripoli; a short sea voyage from Malta, and also readily accessible from the important cities and states bordering the Mediterranean, this town would offer peculiar faculties for the observation of the phenomena of totality, whilst it would not occur at too late an hour in the afternoon to render its observation, both astronomically and photographically, a matter of difficulty, owing to the low altitude of the sun; we understand, indeed, that arrangements were made to observe it in this neighbourhood by the Moorish astronomers, who so carefully noticed the phenomena of the eclipse of July 1860, in the same country. We may, therefore, anticipate with confidence that this total eclipse will not have been allowed to come and go without having been amply scrutinized by competent scientific observers.

Reichenbach has lately shown that phosphorescence, or the continuous emission of light in darkness, is a much more common phenomenon than is usually supposed. His experiments tend to prove that phosphorescence is a usual consequence of all molecular phenomena, and not the result of combustion or oxidation. This last point has been previously proved by Dr. Phipson. According to Reichenbach, there is phosphorescence during fermentation or putrefaction, crystallization, evaporation, condensation of vapours, the production of sound, and the fusion of ice; a considerable glow is remarked when a galvanic pile in activity, a block of ice undergoing fusion, or a solution of sulphate of soda in the act of crystallizing, are observed in the dark. The human body itself is not devoid of phosphorescence; in a healthy state it emits a yellow glow; when in ill-health the glow becomes red. The author considers that this observation may possibly be of use in diagnosis. To perceive these phenomena, the eye ought to have been previously rendered sensitive by remaining some hours in perfect darkness; and even then all eyes are not equally impressionable. But if several persons unite in performing the experiment together, there will always be a certain number who are able to see the phenomena. Some of our readers will doubtless be reminded by these observations of the strange announcements mode some years ago by the same author, of the existence of a new force in nature, which he termed the Odylic force, and which apparently formed a connecting link between physical and vital forces. It was stated to be seen by some persons only in the form of a luminous glow, issuing from the poles of crystals and magnets, and streaming from the fingers and other parts of the body. Little credit was given at the time to these extraordinary statements, although made by a man of established scientific reputation, and the subject seems to have since been quite forgotten. Probably it will be found upon reinvestigation, that the phenomena of phosphorescence, which are known to be general, will account for most of the luminous glows said to be seen by Reichenbach's patients. These "occult" researches well deserve further investigation, and would doubtless reward an enquirer. Amongst others, we remember a fact which photographers might easily verify; a horse-shoe magnet was placed in a box, and opposite to its poles, near, but not touching, was arranged a sensitive daguerreotype plate. The whole was then enclosed in a feather-bed, or some such contrivance for keeping it in perfect darkness, and it was put away. After the lapse of some considersble time (whether weeks or months we do not remember), it was examined, and the daguerreotype plate developed with the vapour of mercury. On the spot opposite to each pole of the magnet there appeared a white patch, which Reichenbach considered was due to the light issuing from its poles. This experiment could be repeated at the present day with more chance of success than at the time it was tried by Reichenbach, inasmuch as the exquisite sensitiveness of the collodion film would be likely to record any action in much less time than would the metal plate. Even if the result were found to be the same as described above, it would by no means show that it was due to *light* issuing from the poles of the magnet. The different conditions in which the various parts of the sensitive plate were in, with respect to *heat*, consequent upon the contiguity of a mass of iron, might in time cause one part of the plate to darken under the reducing agent; and, moreover, it is not improbable that magnetism itself might have a disturbing action on the exquisitely balanced affinities in the sensitive collodion film.

An interesting fact is mentioned in the transactions of the Physical Society of Bombay, just published. In a typographical and geological sketch of a portion of the province of Jhalawan, the writer took with him a photographic apparatus, stereoscope, and slides. The instrument was, as might be supposed, a source of extreme wonder to the people. The Marwarree Sidar of Kholwar, coming one day to obtain medicines for his sick son was shown some stereoscopic pictures of the neighbourhood. He was vastly astonished and delighted, and not a little mystified as to how it was managed to get the fortress of Gwujjuck shut up in so small a space as the stereoscope. The author states that there is a vast difference with the natives as to their capability of understanding pictures. A man, to whom a stereograph was shown and who had never seen a picture of any sort in his life before, detected at once the little figure of a man standing at the door of a Mosque; while an intelligent native officer, on being shown a large portrait of her Most Gracious Majesty, naïvely asked if it were a camel.

In a previous "gossip," when giving the results of an examination of some coloured glass in the spectroscope, we took occasion to suggest that photographers should not confine their attention solely to glass, but should endeavour to find some other illuminating medium less liable to fracture and equally efficacious in filtering off the chemical rays of light. Acting on this suggestion, a correspondent, W. R., has forwarded to us three pieces of coloured fabric, which appear from our examination to be a considerable advance in the right direction. They apparently consist of muslin, thoroughly saturated with a hard, dry varnish, and coloured with different shades of orange red. No. 1 is too pale to be of service, as it allows large numbers of the active rays to pass through, the green, blue, and indigo rays suffering but little obstruction. No. 2 is the darkest of the three, it cuts off in a most perfect manner all the active rays, but unfortunately obstructs the greater part of the light at the same time, so that to properly illuminate the dark room it would require a considerable area of this translucent material. No. 3 is intermediate in colour between Nos. 1 and 2. In the spectroscope it is seen to allow the red, orange, yellow, and some of the green rays to pass through whilst it cuts off all above. In very brilliant light we have been able to detect a few struggling rays of the upper green (active on bromide of silver), which passed through; but these were very feeble, and for all ordinary purposes might be safely disregarded. The medium is tolerably translucent. and would suit admirably for the windows of the photographic laboratory. It is, however, open to two objections, being extremely brittle, and also (as the colouring matter is organic) likely to fade on long continued exposure to sunlight. We shall add a few words on the method employed in the preparation of these samples in our next.

## THREE NEW DRY PROCESSES.

BY WM. BARTHOLOMEW.

Dear Sir,—On a former occasion you were good enough to publish a formula of mine in the Photographic News, so I again send you some more, which, I believe, have the merit of novelty, and will be found upon trial to be worthy of the attention of your readers.

I have three separate dry processes to describe, one of the usual sensitiveness, and two of unusual rapidity. To begin with the first:—

*First.* Coat a perfectly washed and sensitive collodion film with a solution of caramel; the exact strength is immaterial; I have used it about the tint of brown vinegar, or brown brandy; dry, and expose as for a tannin negative, moisten, and develop with pyro and water, then with pyro, acetic acid, and silver; this formula produces clear, vigorous, rich brown negatives, with a good stable film.

*The Second* formula is to finish the preparation of a Fothergill plate with a coating of the same solution; dry, and expose for about one-sixth the usual time (according to my calculation), and develop as usual; the like results, or nearly so, are produced with Petschler and Mann's, the hot-water, and I think, the collodio-albumen, and very likely the albumen simple processes.

*The Third* formula involves the recognition of a principle in dry plate photography, which has hitherto not been noticed: it occurred to me that if in the wet collodion process we require free nitrate of silver — acid reaction — and no organic matter; so probably in the dry collodion process we require—*no* nitrate of silver —alkaline reaction—*and* organic matter. I forthwith put it to the test, and was gratified to find that the applica- of this principle enabled me to produce a plate, which when dried, is as sensitive as *wet collodion*. I have selected gelatine as the most suitable organic compouud, and soda as the most suitable alkali, although other organic substances answer, and you can obtain a picture with potass, solution of magnesia, lime water, &c. I have not tried the *alkaloids*, and cannot state their effects. It appears to me that this principle can be successfully applied in a variety of processes, for instance, for solar camera pictures. the waxed paper process, washed calotype papers, and I am sanguine enough to believe that by its means *dry* plates will, ere long, be prepared far more sensitive than *wet*. I have not tried it on chloride of silver in place of free nitrate, but it deserves a trial. I think I will now state my formula.

Gelatine, 1 drachm, distilled water, 10 ounces, dissolve and filter; coat an unlimitedly washed sensitive collodion film with it: dry, and apply a solution of carbonate of soda (sub-carbonate); I have used from two to ten grains to the ounce; dry and expose as for wet collodion, well moisten the film, and develop with iron and acetic acid, with some acid nitrate of silver added on using. Intensify, if required, with pyro and silver, *sec. art.* The alkali can be dissolved iu the gelatine solution, and will produce the same results; but reasoning theoretically, the film would appear to be less liable to disturbance, by adopting the second wash.

I hope you will pardon such a long letter, for I have endeavoured to state what I wanted in as concise a manner as possible, and, in conclusion, allow me to assure you that there *is* a certainty of success in either of the above processes, if carried out as I have described.

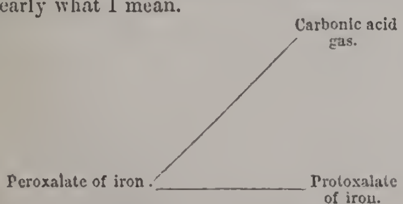
*Fareham, December* 21*st*, 1861.

## ON A NEW IRON PROCESS OF PHOTOGRAPHIC PRINTING.

BY EMERSON J. REYNOLDS.*

In the commencement of the present year accideut led me to the study of the composition and properties of the oxalates of iron. In the course of my experiments, I observed the peculiar power which light exerted on them, namely, that of reducing the oxalate of the peroxide of iron to the state of protoxalate. On this property, possessed by these compounds, I have based the process for photographic printing, which I propose to have the honour of bringiug before you this evening. Before entering ou the description of the process itself, you will allow me to speak briefly of the mode of preparation of some of the leading characters of two oxalates of iron—the proto and per-oxalate. In this way I hope to render what will follow more intelligible to you.

For our preseut purpose, then, it will be sufficient for me to say that two oxalates of irou exist which are convertible one into the other under certain conditious. The oxalate of the peroxide may be prepared by dissolving hydrated peroxide of iron in a solution of oxalic acid; when excess of acid is present, a very soluble salt is formed, the solution of which has a sweet taste, and when exposed to the action of the solar rays, is decomposed into carbonic acid gas, which flies off, protoxalate of iron being simultaneously deposited in the form of a yellow powder. The following diagram will explain more clearly what I mean.




* Read before the Dublin Chemical Society.

This yellow oxalate appears to be identical with the salt produced by adding oxalate of ammonia to a solution of proto-sulphate of iron. Now, let me direct your attention to the fact, that the peroxalate of iron is very soluble, while the protoxalate is insoluble, or nearly so. To apply this principle to the purpose of printing by light, all that requires to be done is to saturate paper in the ordinary way with a solutiou of peroxalate of iron, to dry it in the dark, and expose it under a uegative photograph. When sufficiently exposed, it may be removed from the printing frame, and on being examined will be found to have acquired a *dark* colour wherever the light has acted, that is, in the shades and semitones of the picture. It may be remembered, as I stated before, that the colour of the protoxalate of iron, which is the result of the action of light, was yellow. Then, it may be asked, how is it that this deposit is of a dark colour? The auswer to this is very simple. Protoxalate of iron, when formed uuder the influence of light, without the presence of moisture, is deposited in the anhydrous state; when in this condition, it has a dark colour, but the moment it is brought into contact with water, the light yellow hydrated salt is produced; it is precisely the same with a picture; for the moment it is immersed in the water the dark outlines disappear, and instead, there is a yellow impression observed. So far, however, the picture is almost invisible, consequently some means must be had recourse to in order to develop it. There are several ways in which this object can be accomplished; perhaps the simplest is by the use of the red prussiate of potash or ferrocyanide of potassium. When the picture is immersed in a solution of this salt, the parts exposed first become green and then blue, of course the deposit is prussian blue. Although this reaction was useful, in the first instance, for the purpose of showing me how far the actinic action had gone, yet it is evident that the colour produced would not do for the production of regular pictures. Hence I was obliged to find some other developer by means of which a grey or black photograph could be obtained. After some search I fouud a developer which accomplished everything I wanted, and this was, ammonio-nitrate of silver. By treating the print with a solution of this salt, I get a deposit containing metallic silver in a finely divided state, which being black, gives the picture its proper intensity of tone. All that now remains to be done is, to wash well, dry and mount, when the picture is finished.

I have now given, step by step, the various means by which I have worked out the process; there are some modifications which I have since introduced that I will now proceed to notice.

I frequently observed that the prints produced by the process I have just described, were wanting in the beautiful accuracy of detail, observable in pictures priuted by the chloride of silver process. I immediately set to work in order to find out the reason of this, and at last came to a correct conclusion as to the cause of failure. I found that a solution of the peroxalate of iron was capable of dissolving a very considerable quantity of the protoxalate. Here lay the solutiou of the difficulty. The explanation was just this—when the print was immersed in water after coming out of the printing frame, the peroxalate is dissolved, which in turn attacks the finer and more minute deposits of protoxalate, dissolving them before it gets too much diluted to exert its solvent power. The question now arose as to the best measures to be taken iu order to prevent the details from being lost in such a manner. After a great number of experiments, I found that the difficulty might be overcome in either of two ways—one being to substitute the combination of peroxalate of iron with oxalate of ammonia for the plain peroxalate, this compound salt not having any action on the protoxalate. The second way was to wash the print immediately on coming out of the printing frame, with a solution of acid oxalate of ammonia, which immediately formed the double salt above referred to. By either means the desired ends may be accomplished, and pictures obtained with their full amount of detail. It is almost needless for me to add that the picture can readily be toned with gold by means of the alkaline gold toning, both generally in use amongst photographers. There now remain some questions to which I wish to draw your attention. In the first place, a query which naturally suggests itself is, whether prints can be produced as rapidly by this process as by the old one. I can easily give an affirmative answer to this question, for I have repeatedly taken prints from a negative on a fine day with as short an exposure as if I were employing a sensitive surface of chloride of silver. I have compared the relative action of the solar spectrum on paper prepared with a solution of peroxalate of iron, and with the usual sensitive surface of chloride of silver, and I find that the oxalate is acted on from the green up to a considerable extent beyond the visible violet rays; in this respect somewhat resembling chloride of silver.

Now from what I have said, you will see that my process possesses two great advantages over the ordinary one, in being both very cheap, and the prints produced by its aid requiring a very slight amount of washing. The same operation of washing has been the bane of photographers ever since the art was discovered. We may form some idea of the trouble incurred in producing, or endeavouring to produce, a stable picture, when an eminent writer on the subject states that no picture can be considered at all safe unless it has undergone at least eight or ten hours continuous washing with running water. I think no one will deny that my process contrasts very favourably with this, when I state that a picture, by its means, can be printed, developed, washed, dried, and mounted, all within two hours, on a fine summer's day. So far as their permanency is concerned, I can only say that I have exposed a picture during a period of three months, on every opportunity, to direct sunshine, and up to the present time I have not observed any indication of fading. I may remark that the cost of the production of a hundred pictures, by my process, is something ridiculously small when compared with the considerable outlay incurred in printing the same number of pictures in the ordinary way.

In conclusion, I may say, that I trust photographers will try this process for themselves, and ascertain whether it is worth following or not. It must be remembered, however, that it is as yet in a very imperfect state; but I hope in the course of the ensuing spring and summer to be enabled to continue my experiments in this direction, and if it is not found to be capable of practical application, at least it affords a curious instance of the use to which the knowledge of an apparently abstract scientific truth may be applied.

The society then adjourned.

## THE ORIGINAL FOTHERGILL PROCESS.

BY S. BOURNE,*

Perhaps no process in photography has had more said or written about it than that which we term the "Fothergill process." At one time the journals were filled continually with papers, discussions, and correspondence in reference to this popular discovery; and I confess that I am most reluctant to add to what has been written, and to trouble the Society with another paper on this almost threadbare subject. But as I was requested to do so by our worthy President, and as Mr. Hill would not let me escape, I must make the best of it, promising that if any member should feel disposed to compose himself for a comfortable nap until the reading of it is finished, I will not disturb him. *Apropos* of this I may remark, *en passant*, that a photographer living in the provinces, and unaccustomed to attend the meetings of any photographic society, has doubtless an imperfect idea of the feelings which sometimes pervade these meetings. The reports in the journals, I fear, do not always give a correct notion of the kind of reception a paper meets with; and the intimation at the end that a vote of thanks was passed to Mr. So-and-so, for his "interesting paper," gives but a faint idea of the inward grumbling and uneasiness, the gaping and listlessness, manifested by the majority while this same "interesting paper" was being read. In such a case the author of a paper has an advantage in being absent, since he is likely to gain a more flattering idea of the reception it meets with from reading the report of the meeting in the journal than he would have done had he been present. But if I may be allowed such a digression, I should like to wake up some of the gentlemen who attend meetings simply as critics or listeners, and ask how it is that they do not take a more active part in furthering the progress of our art? How is it that, in a Society numbering over a hundred members, photographers in the country get the impression that it contains only some twelve or fifteen? Why are the names not seen, nor the voices heard, of the great majority? Has nothing occurred in *your* photographic experience capable of interesting or benefitting your fellow students? Why not, then, throw it into the common stock, and instead of ceaselessly ringing the changes on a few well-known, cherished, but over-worked names, step forward yourselves and put a shoulder to the wheel, and you will not only receive the thanks of President, Secretary, and Committee, but of hundreds whose isolation from all photographic intercourse causes them to look forward to the proceedings of these meetings with great interest.

The object which, in this paper, I have specially in view, is not to introduce a new "modification," or to carry you through a labyrinth of experiments to determine the value of this or that "suggestion." My object is of a mere practical and, I hope, useful character. It is simply to describe the exact method by which the specimens now before you were produced, and which method, I think, will be found to differ little from the simple and excellent formula originally published by Mr. Fothergill.

In these days, when so-called photographic discoveries succeed each other with such startling rapidity, we have scarcely time to test the value of each new candidate for our suffrages before we are summoned with a great noise to throw it up and pay our devotion at the shrine of one more worthy than all, and guaranteed to give universal satisfaction. If we are young enough in photographic experience, and green enough to obey the call, it is, most probably, to find ourselves in a short time perfectly ready to relinquish even that for the next new comer. Amidst this ceaseless change and accumulation no wonder that the old and generally best processes lie buried, if not forgotten. Such being the case, if one can be found who, through all this change and universal thirst for novelty, has remained faithful to an old, tried, but now neglected favourite—and who, when the new dodges begin to pall on a satiated public, comes forth and disentombs it, and exhibits its sterling worth before his perplexed and disconsolate contemporaries, confers as great, yea a greater, benefit upon them than the hero of some new modification. If the writer of this paper can, in some measure, succeed in accomplishing this to-night as regards the process in question, he fancies that neither his nor your time will be thrown away, and that some at least will not regret that they listened to yet another paper on this "dry" subject. You will judge, then, that I am not about to describe a process that I have only just taken up. My connection with the Fothergill process dates from the day of its publication in *The Times* by its discoverer, and since then I have attentively watched its history, have tried it under a great variety of conditions, have now by me more than 200 large negatives taken by it—many of them excellent, and all, I believe, tolerably good—and up to this hour I have never felt, nor still feel, any wish to change it for another, or for any of its recent modifications. My method of manipulation is as follows:—

I always use patent plate glass on account of its superior flatness and smoothness of surface—indeed, for *large* pictures, it is indispensable unless you choose to incur the ceaseless risk of breaking your negatives in the pressure-frame. I always use for this, as I would for all other processes, a bromo-iodized collodion. It possesses two advantages over the simply iodized, viz., it will bear a more thorough washing without materially impairing its sensitiveness, and it is more impressible to feeble rays of light. That which I almost invariably use, and which produced the pictures in question, is Perry's, of Sheffield. It may not, perhaps, be better than some others, but when it has been iodized two or three months, it appears to be the exact thing required, of a consistency suitable for large plates, producing a film perfectly uniform, and while sufficiently porous in structure, adheres firmly to the glass. I may here remark that in my humble judgment collodion should never be used soon

* Read at the North London Photographic Association, Dec. 16th, 1861.

after iodizing, especially for a dry process. When it has had time to settle and become clear as sherry, it not only works free from all specks and comets, but far more cleanly and vigorously. The silver bath is of the strength of forty grains to the ounce, and in precisely the same condition as required for wet plates—faintly acid, with acetic acid. Here an advantage is possessed by this process over some others; if you wish to take the portrait of a friend, you do not require another bath. I frequently take both positive and negative portraits with the one I use for Fothergill plates. In preparing a batch of plates, I first of all put my operating-room in the best possible order, having a place for everything, and everything in its place. This having been done, the bath filtered, the washing-bath filled with distilled, or rain water, by its side collodion carefully decanted, clean blotting-paper arranged on the drying shelves, muslin tied over the tap to regulate the force of the water, and all *intruders* shut out (if any be present), I commence operations. The plates, of course, have been cleaned and polished in another room, with a mixture of ammonia, spirits of wine, and tripoli—no water being used. When the plate is attached to the pneumatic holder, I take a broad camel-hair brush, kept for the purpose, and remove every particle of dust from the surface, coat with collodion, and sensitize in the usual way. After draining well on the dipper it is immersed in the washing-bath. For this purpose I use a vertical bath, precisely like the one containing the silver solution, as this is by far the most convenient, there being no necessity to remove the plate from the dipper. As to the amount of washing required, I have always contended that it should be regulated by the time the plates are required to keep. I generally, in the summer, take out a large number of plates for a fortnight's excursion. I begin the preparation of them a week or more before starting, and another week elapses after I return before they are all developed. Here you see they are required to keep at least a month—a fortnight before and a fortnight after exposure. Now in the heat of summer no "four drachm" system of washing will do this; and even for shorter keeping no advantage is gained, but great risk incurred of stains and decomposition. I formerly washed the plates under a tap as freely as in the collodio-albumen process, and the negatives I obtained, though requiring a little longer exposure, were of a very clean and vigorous character. But the plan I now adopt, while being more convenient and taking less time than the tap-washing, possesses all its advantages with increased sensitiveness. It is simply immersing the plates in the vertical bath as described above, moving up and down until the water flows freely, and changing the water after every six plates.

The plate having been thus washed and allowed to drain the albumen mixture is poured on. This is composed of white of egg, one ounce; distilled water, two ounces; ammonia, eight minims; chloride of sodium, two grains. The whole is beaten into a froth and allowed to subside, and, when bottled, will keep for any length of time—the older it is the better. I am aware that many operators use albumen much more diluted than this, while others adopt Mr. Hannaford's modification of adding nitrate of silver to it. The advantage of using a somewhat concentrated solution of albumen consists in the tenacity and binding effect it imparts to the film, making it almost as hard and indestructible as a Taupenot plate. I shall not contest the matter with Mr. Hannaford as to the advantage of adding silver to the albumen. I have but little opportunity for making experiments, and when I have become familiar with the formula which succeeds to my satisfaction I have little disposition, as I said before, to change it; and in this instance, not having experienced any of the drawbacks which Mr. Hannaford proposed to remedy, I must own to not having tried his suggestion. I am somewhat undecided as to the beneficial effects of a chloride in the albumen, having obtained equally good pictures without it. The chief advantage, perhaps, lies in its imparting additional keeping properties, by converting the unstable nitrate of silver left in the film into the more stable chloride. I formerly thought it increased the density of the image, but longer experience inclines me to believe that it rather diminishes it, and gives a softer picture. To proceed with the manipulation:—When the albumen has been made to flow well up to every edge of the plate for about a minute, it is washed off freely under the tap. For a 12 by 10 plate I continue this washing about three minutes, holding the plate by the corners. The more thoroughly this operation is performed the better; and the reason why so many find these plates slow in developing is attributable to the preservative not being sufficiently removed. Washing in a dish in two or three changes of water will not do: a moderate force must be employed either from a tap or jug. The plate is then set to drain on one corner, and removed to fresh blotting paper in ten or fifteen minutes, after which it should not be removed until quite dry. Any irregular action in drying—such as completing the operation by artificial heat when the surface is partially dry—will leave a spoiling mark between the two actions, soon rendered visible by the developer. I do not know that I need describe my mode of developing. It is done in the usual way. I use pyrogallic acid, 1½ grains; citric acid, ¾ grain; and 1 oz. distilled water—adding the smallest possible amount of silver, until the details are all out, when I intensify to the proper extent. This plan is analogous to that described by Mr. Simpson at the last meeting, while I think it has an advantage in reducing the time. So much, then, for the manipulation.

It will be observed that the process, as I have described it, differs not from that originally published by Mr. Fothergill, and, as I hinted before, I more than question whether any of the "modifications"—or, perhaps, more correctly, complications—since published are any improvement on his most simple and excellent formula. I have tried several myself, but have always gone back to my "first love;" and, until something turns up in dry processes altogether different from what we have at present, I shall not forsake it again. I do not wish to disparage other dry processes, and there is little fear that those who, like myself, are accustomed to work one in particular, and succeed, will change it through anything I may say; but I cannot help remarking, for those who are undecided, that no process appears to me so simple as this—none can give finer results when properly manipulated, and it possesses advantages which some others cannot claim. I have already mentioned one or two, such as no special silver bath or collodion being required; and I may mention, in addition, that none of the horrid blisters which sometimes disgust one with the otherwise excellent process of Taupenot ever show themselves here, and its keeping qualities are greatly superior. Over its new rival (the *tannin*) it still holds its place. It is more sensitive, and there is no fear of beholding your beautifully-chosen and developed picture meet with instant destruction in the final washing; neither have you to give the plate a preliminary coat of gelatine to avoid it—a most undesirable and uncalled-for operation. The possibility of seeing the picture, after all the labour and anxiety it has cost, leave the glass, piecemeal, in the very last operation, is to me a fault of such magnitude, that I would never have anything to do with a process, however excellent in other respects, that rendered one liable to this contingency: hence the great recommendation possessed by those processes in which albumen is the chief preservative agent. But I fully concur in the statement we often meet with in the journals, in "Answers to Correspondents," that it is not in the *process* but in the *man* that the cause of non-success must be sought for. It is undoubtedly true that good, if not equally good, pictures may be produced by any sensible dry process, when worked with intelligence and careful attention; but it is equally true that the most simple and certain of them must fail in the hands of many—shall I be wrong in saying the majority—of those who dabble in them. From what I have seen of the manipulation of amateurs generally, I frequently wonder how most of them ever get a presentable picture at all. The dirty, slovenly, *unthinking* way in which they go about their work is most unpardonable, and becomes ridiculous when it is expected that from such an abuse of all that has been written on photography, and such a transgression of its delicate and inflexible laws, they shall produce something worthy of admiration. I must confess that I have often been disgusted at the sight of negatives that have come under my observation, and from persons, too, who had the reputation of great achievments, and whose frequent communications to the journals led one to suppose that they at least had attained an eminence beyond the reach of ordinary aspirants. It is no uncommon thing to see negatives marred or spoiled by long-tailed comets, caused evidently by dried pieces of collodion falling from the mouth of a dirty bottle when coating the plate; others defaced by a huge stain or two from the corners, caused by dirty fingers; in others, an inch or more of the picture lost by the thumb-hold; others covered with black specks and sundry embellishments (the sure products of an unfiltered bath); some even varnished before the iodide of silver has been removed; while, to crown the whole, some adorn their negatives with a few beautiful scratches, and, if the improvement be not sufficiently marked, dab a few touches of black varnish on the same places, which give to the resulting priut fine coutrasts of black and white. The pictures which I have the pleasure of presenting to the Society, I believe will generally be found free from theso defects, and on tho whole, perhaps, equal to the average of dry collodion pictures. One fact about their production I must not omit to mention, and that is that those measuring 12 + 10 inches were taken with one of Grubb's lenses for 10 + 8 pictures. Wishing to get a much wider angle of subject than usual I procured one of these lenses, and was pleased to fiud that with it I could cover a 12 + 10 plate very satisfactorily, and that, too, with a ⅝-inch stop. Unfortunately these specimens do not exhibit the capabilities of this lens to the best advantage, as most of them were taken in dull and even wet weather, which, of course, greatly interferes with the sharpness as well as general excellence of the pictures.

This paper, I fear, has already extended beyond the usual length; but if in closing I might be permittad another remark, it would be this: that although I have to-night been describing, and in somo measure advocatiug, an excellent and useful process, I would prefer to advocate one capable of producing still better results. The day, I think, has arrived, when all our dry processes aro weighed in the balance and found wanting. However much we may admiro the beautiful productions which some of them havo wrought in the hands of skilled workmen, we have seen some yet far above them, and of such surpassing excellence as we can never hope to attain by any dry process as at present known. Those who have seen the marvellous productions of Mr. Wilson—who have been thrown into ecstasies of delight as they beheld the wondrous beauty, the delicacy, and harmony which characterize nearly all of them—who have felt as if transported amid the real scenes there depicted, as they saw the charming landscapo spread before them, and its distant horizon melt almost imperceptibly into its own natural sky, or the flood of mellow light which beamed from behind the golden cloud in which the sun was sinking to its rest—who have felt a pensive silence as they stood by the shores of an Aberdeen lake as the shades of evening fell upon, and wrapped all surrounding objects in its deepening gloom—must have turned from the contemplation of such pictures, or rather I should say such realities, to their own poor productions, with a feeling of dissatisfaction and almost disgust. These have now lost their charm and their power to please, and henceforth we can be content with no process that does not give us all the gradations of a distant landscape in true and softened perspective—that does not reproduce on the sensitive tablet every cloud that may adorn the sky the moment our view is taken—that does not fix the dashing waves and rising spray of the ocean, and at the same time carry our eye over its wide expanse, till it rest on the diminutive bark which serves to mark the otherwise imperceptible horizon as it touches and merges into clouds—and which does not catch those transient beauties which frequently flit over the face of nature like smiles o'er the features of a beautiful damsel. When a dry process can accomplish this we will not bo undmindful of its claims; but with anything short of this Mr. Wilson has taught us to be dissatisfied.

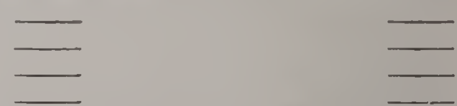
## ON AN IMPROVEMENT IN THE LENTICULAR STEREOSCOPE.

BY PROF. E. EMERSON.*

The lenticular stereoscope, in its common form, has certain imperfections as an instrument which more or less detract from the pleasure which would otherwise attend its use. Nor are these imperfections of such a character as only to be recognised by adepts in its use; on the contrary, they are well known to almost every one who possesses one of these popular and iustructive instruments. The causes of these imperfections are not so generally known. A common result of one fault is the difficulty which is experienced in endeavouring to unite the dissimilar right and left pictures; this is, indeed, sometimes quite impossible, and the observer, after a series of exercises, exceedingly straining to the organ of vision, gives over the effort in despair. Another imperfection is the inability of the instrument to exhibit a stereoscopic view of pictures much larger than those ordinarily furnished by the dealers in Enrope and America. Negatives including a much larger angle are readily obtained, but the positives taken from them are either reduced in copying, or the negatives are cut down to the size of the ordinary stereoscopic picture, when they are printed by contact; thus, oftentimes, some of the most beautiful details in the view are absolutely sacrificed.

We propose, in the present article—1st, to account for these imperfections in the stereoscope, and 2nd, to describe a simple modification of the instrument, which will remove them completely.

The difficulty experienced in uniting the right aud left pictures of certain stereoscopic slides may be occasioned either by the lenses being improperly mounted; or the picturesbeing arranged on the slides at improper distances from each other; or because the eyes of one observer are naturally wider apart than those of another, and therefore the same instrument fails to afford an equally good view to each. Let us examine briefly each of these cases. It sometimes happens that the lenses are so adjusted or cut as to occupy improper positions; as a consequence, one of the pictures is thrown a little *higher* than the other. If this defect operated only in a horizontal position it would not be so serious, as, within certain limits, the eyes can accommodate themselves to a horizontal strain; which accounts for our ability to see certain views, after a considerable effort, which at first gave us more or less difficulty. But when the discrepancy is one measured on a perpendicular line, it is much more serious; the eyes are not accustomed to move in this direction independently of each other; so that if the imperfect mounting of the lenses causes a variation on this line of from one to two-tenths of an inch it will be almost impossible for the observer to unite the views. An easy method of testing an instrument for this fault is to draw upon a piece of white paper, the size of a stereoscopic slide, two series of short lines, each series being 2·6 inches from the other, aud the lines in each series being drawn at corresponding distances from each other, thus:—



Upon placing this in the stereoscope, and looking at it, if the lines unite instantly with no variation, it proves the absence of this fault; but if, on the contrary, we obtain as a resultant a view of more thau than four lines, thus:—

we may be certain that the lenses are not properly mounted, aud will give in usage little or no satisfaction. The instrument, however, may be perfect as to its lenses, and a difficulty still be experienced as to certain pictures or by certain persons. When the imperfection consists of a want of proper relation between the lenses and the slide, it usually results from the complementary pictures beiug mounted at too great a distance from each other for the power of the fixed lenses to unite them; but the same result may be the effect of an individual peculiarity in the observer, the eyes being naturally wider apart than is common.

The variation in the mounting of stereoscopic pictures is very great. In carefully measuring a lot of nearly three hundred different views, on glass and paper, French, English, and American, the actual variation was over an inch between the extremes; some being mounted only 2¼ inches apart, and not a few of them over 3¼ inches from

* From *Humphrey's Journal.*

each other. Moreover, as might be expected from the variation in practice, there is considerable difference in opinion, among those who have endeavoured to settle this point, as to what should be the standard distance between the right and left pictures. Some say "the same distance the eyes are separated;" others, "2·6 inches," and a recent writer, Mr. Shadbolt, says — "There being two variable quantities involved, viz., the width between the eyes of different observers, and the lateral displacement of rays by the prisms used, it is necessary to obtain something like an approach to an average of the amount of these inconstant qualities, and, after careful consideration of the matter, we fixed it at 2·75 inches." The same writer, however, finds the distance required by Smith and Beck's achromatic stereoscopes very constant at 2·8 inches. It does not seem that there is a clear apprehension of the truth in regard to this point, which is, that the distance the pictures should be mounted apart will depend entirely upon the deflecting power of the lenses employed to unite them. And as there does not appear to be any standard for this power of the lenses, there is, consequently, none to regulate the distance the right and left hand pictures should be separated. It is easy to see, therefore, that a stereoscope which will enable us to see, equally well, different views which vary more than an inch in the mounting is a desideratum.

The lenses of the ordinary stereoscope are so mounted that the eyes of the same observer always look through the same portion of each lens, which, of course, always causes the same amount of deflection, and answer perfectly to unite pictures which are separated from each other a certain uniform distance.

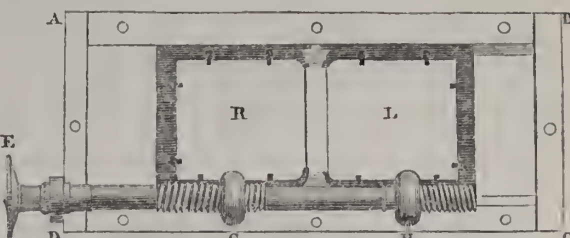
In order to measure this distance for any particular instrument, take ten or fifteen pieces of white paper or cardboard, the size of a stereoscopic slide, and upon the first draw two lines one quarter of an inch in length, perpendicular to the lower side of the card, and parallel to each other, thus :—

increase the distance between the lines upon each successive card one-tenth of an inch until the lines upon the last card are three and one-half inches apart; now look at each of these in the stereoscope with a rather hasty glance, and it will be easy to determine at what distance the lines should be apart to coalesce perfectly and instantly. This will be the distance the centres of the right and left pictures should be separated *for that instrument.*

But further, the ordinary lenticular stereoscope does not permit the view of a picture measuring over three inches from one side to the other; *i.e.*, it affords a view of nine square inches as a maximum.* Sir D. Brewster, in his work on the Stereoscope, pp. 162, 163, declares that—"the *size* of the picture is determined," that nothing can be gained by using larger pictures," &c., &c. This is true with regard to the ordinary form of the stereoscope. But this renders it, none the less, a very desirable thing to be able to see larger pictures: and by larger pictures we do not mean the same pictures magnified, for then, indeed, nothing would be gained, but pictures including a larger angle, and affording a view of more than twenty square inches as a maximum.

Before proceeding to a description of an improvement which accomplishes this result, it will be necessary briefly to remind the reader that the lenses employed in the stereoscope, while they are constant as to their focal length, vary exceedingly as to their power of deflecting a ray, increasing it regularly as we proceed, from the centre of the lens to its thin edge; so that pictures which can be easily united when seen through the thicker or central portion of the lenses, require to be separated more and more from each other as we separate the glasses, and thus force the eyes to use a more highly deflecting portion of the lenses. The modification we propose, in order to give the instrument a general character and adapt it to all sorts of views, is an adjustment by which the lenses are rendered moveable in a horizontal direction, so that they can readily be approached near to each other until the edges touch, or separated from each other as far as the distance between the eyes will allow; *i.e.*, the distance travelled by each lens will be measured by the distance between the thickest and thinnest portion of that lens, which will be a little over an inch.

To operate properly the lenses should move simultaneously, at uniform rates and in opposite directions. As the right lens moves towards the right, the left lens moves towards the left, and *vice versâ.* By this means the lenses are made equivalent to prisms with variable angles. An easy method of accomplishing this is shown in the following diagram exhibiting the *under side* of the lenses and their mechanical attachment.




This apparatus takes the place of the lenses in the various forms of the lenticular stereoscope. We have adjusted our own to a common hand-stereoscope merely flanging the sides so as to afford a view of glass and paper slides measuring ten inches in length by four in width.

By means of this instrument, whatever the distance between the eyes, pictures may be easily and perfectly united which are mounted at any distance apart between two, and four and a half, inches from centre to centre; and this, too, with the ordinary stereoscopic lenses; if achromatic lenses are used, it is quite practicable to unite pictures which measure five inches from centre to centre, affording a view filling twenty square inches, which is considerably more than twice as large as the ordinary slides.

* The reflecting stereoscope of Wheatstone will exhibit larger pictures, but it is not adapted to popular use.

## Photographic Tourist.

### PHOTOGRAPHIC PENCILLINGS OF AN EASTERN TOUR.

Taking a pleasant, hurried, final leave of my few good friends and true, one briskly invigorating, and hearty December morning, after duly superintending the stowing away of luggage, I sprung into the railway carriage, and away I went, feeling that I really was, *at last*, on my way to quit dear old England for a long-promised tour amid scenes associated with so much that is dear to the Christian's heart. That night I stowed myself away, horizontally, in one of the berths on board the boat which conveyed me across the channel, and woke up to go ashore and be horridly annoyed by the suspiciously overhauling of my various traps, especially the photographic. This trouble over—I had to pay duty, by-the-bye, for such glass as I took with me—I was speedily in the streets of Paris.

Paris is said to be the home of art, and I have seen, in the pages for which I am now writing, that photography is regarded as superior in artistic quality there than here. Now I am no artist myself, although an amateur photographer, but I must say that while no one can deny that art is more widely understood and appreciated in Paris than in London, French art, in all its applications, including photography, is, after all, wanting in the elements which we English best understand. It is brilliantly attractive in all the more popular qualities, but does not indicate much thought or feeling. Its paintings are almost gaudy in colour, and their subjects seem always to be more or less melo-dramatically treated; and as to its photography, I have no patience with those who would compare, detrimentally, the productions of Robinson, Heath, Mudd, Bedford, Rejlander, and other eminent English masters, with works of a similar character by their French representatives. With reference to portraiture, however, although I think we have as many *good* photographers devoted to this branch of the art in London, whose pictures at least equal those of their French brethren, I certainly think the French have not so many of those hideous libellers of "the human face divine" as we, unfortunately, tolerate or encourage. In France, as a rule, the people would laugh to scorn productions which here find admirers and imitators. In short, while *their* art is more widely spread, *ours*, to my thinking, at least, has greater depth, or, in other words, while the French have less bad art, we have most good art.

I was very much struck, during the few days I remained in Paris, with its numerous street improvements, apparent in every direction. Grand new boulevards seem to have sprung up with magical rapidity, and although but a few years had elapsed since my previous visit to this mighty city, the changes and improvements were something to wonder at. I looked in vain for many of the narrow streets once so numerous beside the Seine, and with no little interest upon the many new *cités* reared by private speculation encouraged by Government aid.

Starting by the Lyons railway, I was duly conveyed to Marseilles, from whence I embarked for Malta. I will not say much of the voyage. I did not see much of our progress; the more prominent memories of those days at sea are not pleasant ones—in fact, humiliating though the confession may be, I—wasn't *quite well.* I certainly have certain indistinct remembrances of a swaying and rolling, a creaking and jolting, a rising and falling of the vessel; of a torpid state of mind, and a limp colapsible state of body; but can recall little else until we reached our destination, and, to my inexpressible satisfaction, I landed and found myself in the streets of Valetta. I thought, as we entered the blue waters of the harbour (containing vessels from most of the nations of the world), and looked upon the pale-faced, strongly-fortified rocks, caught glimpses of the imposing-looking city, gazed upon the grand fort of St. Elmo, and perceived the other fine buildings reposing under a bright clear sky, I had seldom seen a more pleasing sight.

The day of my arrival being Sunday, I attended divine service in a large plain-looking church, erected by the late Queen Adelaide, the congregation being largely composed of the civil and military officials of the Government.

The streets of this fine city are very picturesque, and although I had not intended to unpack my apparatus here, I was unable to withstand the temptation they offered. So I secured several views, including the ancient palace of the Governor, which of old was that of the Grand Master of the Knights of Malta, and one or two of the somewhat dilapidated, but still stately and grand, old *Auberges*, together with some of the forts; one of a little road-side chapel, stumbled over on my ramble to the reputed scene of St. Paul's shipwreck (situated five miles from the city), &c. &c. The houses and streets combine favourably in a picture, but the latter are very frequently far more pleasant to an artist's eye than an artist's legs, a walk up some of their steep ascents being verily "sich a getting up stairs." But these streets of stairs, and the novel aspect of the houses, which, although of nearly equal height, are of the most varied and irregular kind of architecture (chiefly Moorish), and have a variety of huge overhanging balconies, with projecting windows of ornamental sand-stone, giving all that variation of line and chiaroscuro which we seek in making pictures. My street views are also most agreeably enlivened, where instantaneous, by the variety of costume among the figures and groups they contain, and in other cases by a carved stone fountain or two, none the worse in my negatives for being time-worn and dilapidated. I have two of these photographs now before me, one in which may be traced the sombre figures and curious triangular turned up hats of a couple of priests, the negligently worn caps of some labouring men, sitting and talking on the steps, a monk, an English soldier, some women with their heads by no means ungracefully draped in the folds of their mantillas, and a party of Greek seamen, quite dramatic looking characters, sauntering indolently on their way; the other is of a more crowded and animated character, and was taken from the water-gate, with its stairs, and stalls, and its thickly crowded variety of men and women in all sorts of widely different costumes. Beggars, and boatmen, soldiers and sailors, monks and priests, fish-stalls and fruit-stalls, half-naked vendors of all sorts of eatables, some dirty makers and street-vendors of cigars, may all be traced in the latter photograph if you have patience, and eyes good enough to separate the component figures of this confused crowd of forms and figures which make one of the most interesting and successful mementos of my visit to Malta. M. H.

(*To be continued.*)

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 1st January*, 1862.

THREE proofs of large dimensions, obtained by M. Fargier's process, were lately exhibited at our Photographic Society, accompanied by positives obtained from the same negatives by the ordinary process with salts of silver. It was remarked, that the proofs obtained by M. Fargier's process, although obtained from the same negatives, were evidently of much smaller dimensions than those furnished by the salts of silver. This effect is easily understood, as it is due to the shrinking of the gelatine in the several baths communicating to the carbon proof a remarkable degree of sharpness. M. Fargier has made some important modifications in the original process; he found the sensitiveness of the bichromate of potassa so great, that one or two seconds exposure was sufficient to solarize the proof; he then substituted nitrate of uranium, bichromate of ammonia, &c., for the salt of potassa, and then obtained better results. The exposure could then be prolonged several seconds without danger. The manipulation of the collodion films is also performed with much more freedom.

It was announced, a few months ago, that M. Wothly, of Aix-la-Chapelle, had discovered a method of obtaining positive proofs without the use of salts of silver. He recently sent some specimens to Paris for presentation to our Photographic Society, accompanied by a note in which he stated that these proofs are obtained by means of chlorides of copper, of iron, of molybdenum, of cyanide of potassium, of ferrocyanide of copper, and of a substance which he designates under the name of catechu acid, encountered in certain varieties of catechu, and which is analogous to tannic gallic, and pyrogallic acids; he concluded by remarking that this process realized, upon the ordinary method, an economy of ninety per cent.

The administrative committee, struck with the extreme beauty of many of these proofs, and of the analogy of the tones they exhibit with those obtained with silver, requested M. Girard to make a summary examination of them with regard to their chemical composition. He recognized that these beautiful proofs contain no salt of silver, and that they appear formed principally of ferruginous compounds; but this composition is not satisfactory to him with respect to permanence. In observing the extreme facility with which these proofs disappear, not only in the mineral acids, but even in acetic acid, M. Girard could not omit to remember that proofs of analogous composition alter very readily by contact with the atmosphere, especially in the half tones, in consequence of the transformation of the ferruginous compounds into carbonate of iron.

The Tremont prize for 1861, has been unanimously awarded by the commission to M. Niepce de Saint Victor, in preference to the claims of other candidates, for the following reasons:—

The *debut* of M. Niepce de Saint Victor was very remarkable. The object of his first effort was to take copies of engravings or of designs in black on a white ground, by exposing these engravings or designs to the vapour of iodine. The iodine attaches itself to the black lines of the engraving, &c., and when the design so iodized is placed in contact with a sheet of starched paper, the lines of the engraving &c. are produced in blue on the paper, because the iodine abandons the black lines of the engraving, &c., to unite in preference with the starch of the white paper.

M. Niepce gave a considerable impulse to photography by his application of iodized albumen to glass plates: when this film becomes dry, he immersed it in a solution of aceto-nitrate of silver, and then exposed it to the action of light in the camera. He thus obtained a *negative* proof from which any number of positives could be afterwards taken on surfaces impregnated with substances sensitive to the influence of light.

M. Niepce demonstrated the remarkable fact that certain bodies receiving the rays of the sun, possess the faculty of afterwards acting in the dark upon matters sensitive to light, as if the first bodies were themselves luminous, the sun communicating to them a power of action which they retain for entire months in the dark.

M. Niepce starting from the beautiful researches of M. Edmund Becquerel on the colouration of matters sensitive to light, also recognized a very remarkable action in chloride of lead, under the two-fold relation of the whiteness, and of the duration of the colour of the image submitted to the influence of light. This discovery M. Niepce will soon lay before the Academy.

M. Niepce is an example of what a decided vocation can accomplish. Educated at the cavalry college of Saumur, he early made himself a name in science, by researches marked by originality; the academy always received them with sympathy, independently of the interest inspired by the author of them, then a stranger to every scientific body, and whose first researches, commenced at a distance from the capital, were successfully carried on in a barracks, amid the distractions of military duties, always faithfully performed. When M. Niepce generously abandoned his discoveries to the public, he never entertained the idea of deriving the least personal advantage from them, and he executed most of his researches at his own expense. Therefore the commission unanimously award him the Tremont prize of 1861.

Attention has been directed to a new principle, extracted from the *pinus larix*, which Dr. Stenhouse calls *larixinc acid*. This substance is remarkable for its resemblance to pyrogallic acid. It is obtained by digesting the bark in water at 176° F., and evaporating this infusion to a syrupy consistence. The residuum is submitted to distillation; the larixine acid passes over with the aqueous vapour, one portion crystallizing on the sides of the receiver; the other portion, the largest, is found dissolved in the aqueous liquor, from which it may be withdrawn by cautious evaporation. When purified, the acid appears under the form of beautiful white crystals, possessing a peculiar odour, which sublime at 200°. The solution of this acid precipitates neither lime nor acetate of lead, nor the salts of potassa or silver. But at ebullition it reduces nitrate of silver: it colours the persalts of iron purple, and, like pyrogallic acid, it readily oxidises in contact with the atmosphere, or an alkali.

Chloride of lime is particularly obnoxious to insects and vermin. A small quantity of the chloride spread on a board in a stable drives away all the flies which are so troublesome and irritating. Gardens watered with a solution of chloride of lime are freed from caterpillars, bugs, moths, snails, etc. If a ring be formed round the trunk of a tree, of a mixture of chloride and fatty matter, insects will not pass it. It has been remarked that rats and mice quit places where chloride of lime is kept.

## ON MOUNTING PRINTS.

Sir,—Seeing the many enquiries about mounting in your interesting periodical, I take for granted that some of your amateur photographic correspondents are unacquainted with the ordinary artist's sketching frame, by the use of which they would effectually avoid all chance of cockling in their mounted prints. To those who have never used such an useful and simple article, I would say, that they have only to thoroughly damp the mounting paper on both sides with a sponge or large hog's-hair tool and cold water, and to press it tightly into the frame on the central board. Having previously dissolved some gelatine in hot water, give the back of the proof a coating of it, lay it on the stretched and damp sheet, and press it down firmly with a large sponge, squeezed tolerably dry from water as hot as it can be borne by the hand, and the thing is done. Of course the proof may be mounted with the help of any other adhesive material, if thought more desirable. The picture should now remain in a warm room until quite dry, perhaps four-and-twenty hours, and there will be no more trouble experienced from cockling.

The proof should have been previously squared by a T square, which will guard against all risk of its being cut askew or on the squint.—Believe me, sir, yours very truly,

Henry H. Hele.

*Teignmouth, Devonshire, Dec. 30th*, 1861.

## PHOTOGRAPHIC EXCHANGE CLUB.

Dear Sir,—Before the commencement of the third mouth of the existence of this Club, and the second exchange, I wish to address a few remarks to members as to the working. In the first place, I must impress upon members the necessity of numbering or giving some distinctive description to each negative that may belong to a series, thus, "1, 2, 3, 4, 5, 6, Westminster Abbey, &c.," or else, "North view, south view, east, &c.," "North door, west, east, &c." The same remarks apply to "Landscapes, rural scenes, &c.," as "Shady lane, No. 1; Cold Blow Farm, No. 3." In many cases four or five photographs of the same subject (from different points of view) being named or distinguished in the same manner. If no attention is paid to this, great confusion will arise hereafter.

A few words on the financial part of the question. I must beg to inform gentlemen who, remitting *one* postage stamp, are under the impression that because their letter or parcel comes for one penny, I can send it back for the same. That I cannot do; explanatory or admonitory letters, pens, ink, and paper, a book for the entries, &c., are all necessary, which the extra penny is intended to cover.

To avoid sending mounted stereos, if possible, as the same amount which sends fifty or sixty will not distribute them, and send explanatory letters. A little consideration paid to these matters will, I think, make the new rules a great success—Yours respectfully,

Frank Howard.

*December 31st*, 1861.

# Photographic Notes and Queries.

### A Perfect Cure for Mottled Toning.

Dear Sir,—A recent number of your paper contains a "jotting" from "A Cure" recommending a weak bath of acetate of soda, as a remedy for mealiness, and red spots in toning. Allow me to emphatically confirm the high value of the suggestion.

I tried it on an exceedingly bad sample of paper, which with all ordinary toning appliances gave a mealy mottled print. The acetate of soda bath at once removed all tendency to mealiness. It therefore appears to me to ensure a perfect immunity from the above evils, and to be well worthy the attention of practical photographers.—Yours truly,

Samuel Fry.

## Talk in the Studio.

SOME NOVELTIES.—A correspondent forwards us the trade circular of a suburban artist, which he appears to think contains novelties which should not be confined to a small suburb. It runs thus:—"All the new improvements in the science of chemistry, will be found concentrated in the original Photographic Gallery of——. Light and shadow fully developed by the new process, removing from the surface of the picture all superfluous matter. Portraits in memory of, for rings, charms, or brooches, highly finished, commencing at 0s. 0d. each. The Newly Introduced Envelope Portrait, for transmission by post, for birthday or wedding presents, and elaborate works of art. N.B. Families and public institutions waited upon for invalid and group pictures."

PORTRAITS OF PRISONERS.—The aid of photography in identifying criminals has been, for some time, fully recognized, and in many gaols of the country photography is one of the recognized institutions. However convenient to the authorities, it can scarcely be expected that the prisoners themselves enter amicably into the arrangement. The professional thief has an especial antipathy to any proof that he has been "in trouble" before. The bright idea that they can by moving, grimacing, etc., entirely frustrate the aim of the photographer has, however, gained currency amongst them, and the moment the lens is uncovered, a jerk round of the head, or an effectual twist of the features, spoils plate after plate. In this dilemma it has become necessary to adopt a *ruse*, and foil the convict by his own weapons. Every preparation being made the sitter is placed in his chair, and asked to sit still. If he be tractable a portrait is secured without further trouble. If, on the other hand, he attempts to defeat the object of his sitting by movement, he is told that he had better take a seat elsewhere for a short time, so that he may overcome his nervousness, and be able to sit still, and that in the meantime another portrait will be proceeded with. Another sitter takes his place, and he takes the seat indicated for rest. There he watches with deep interest the operations on his fellow, and whilst thus engaged he sits motionless and interested, another camera peeping through a convenient aperture, has its eye upon him, and registers on the faithful tablet the true presentment and natural expression of the unconscious victim, who is exulting in having thus baulked the authorities, and rejoicing in the anticipation of a similar piece of management on the part of his "pal."

BOOK POST TO FRANCE.—Under the provisions of a new postal convention with France, on the 1st of January next, and thenceforward, photographs on paper, commercial and legal documents, as well as other papers in manuscript, not of the nature of a letter, may be transmitted by the post between the United Kingdom and France, or Algeria, under the same regulations, and at the same reduced rates of postage, applicable to printed papers, viz.:—For a packet not exceeding 4 oz., 3d.: above 4 oz., and not exceeding 8 oz., 6d.; above 8 oz., and not exceeding 1 lb., 1s.; every additional 8 oz., 6d. This postage must be paid in advance. From the same date proof sheets, printed, engraved, or lithographed works, or sheets of music, bearing corrections, manual notes, or any writing not of the nature of a letter, may be sent by the post to France or Algeria at the same reduced rates of postage. All the regulations now in force, other than those which prohibit any writing in packets of printed papers, must continue to be observed. The present arrangement is confined to packets addressed to France or Algeria, and does not extend to those addressed to the foreign countries, the correspondence of which is forwarded through France.—By command of the Postmaster-General, ROWLAND HILL, Secretary. General Post Office, Dec. 27.

"PHOTOGRAPHIC WARE BATHS."—We find continual allusion and constant praise given in the American journals to a new material for baths. "At present," observes a writer in *Humphrey's Journal*, "probably, the most popular bath is known as the photographic ware, an invention of George Mathiot, an electrotypist, of Washington. The invention grew out of a want in Mr. Mathiot's business, viz., a cheap ware which will hold acid solutions, and consists simply in soaking the vessels of unglazed and porous porcelain in melted wax. Thus Mr. Mathiot killed two birds with one stone, and did a very handsome thing for photography as well as for electrotype. Such ware costs but a trifle, is neat, handy, and durable. Would not paraffin be a useful substitute for the wax? There is no compound known which is so little affected by corrosive matters."

## To Correspondents.

*** Our readers are informed that the FIFTH VOLUME of the PHOTOGRAPHIC NEWS, containing the whole of the numbers for 1861, will be ready in a few days. Cases for binding the volume will also be ready at the same time. No. 123 is now reprinted.

OXIDE.—As a general rule a chamois leather or wash leather is not sufficiently clean, in the condition in which it is bought, for polishing glasses for negatives or positives. We generally prepare them as we used to clean skins for Daguerreotype buffs; namely, by washing in equal parts of spirits of wine (methylated will do) and water. In drying, keep stretching and shaking the skin until it is dry.

H. W. BALL.—The cause of the stains on the negative sent is the use of a damp or imperfectly cleaned glass. It appears to us that the plate had been used before, and had not been perfectly cleaned before use again. In winter weather we prefer alcohol, tripoli, and a little nitric acid or old collodion for cleaning glasses. If you use water, dry the plate before the fire just before coating it. The use of a collodion with more body would help you in cold and damp weather, as then collodions readily show stains unless the plate is very clean. There is no reason to suppose your bath is out of order. 2. The "Photographic Dictionary," by Mr. Sutton, is out of print at present. We believe a new edition is preparing.

H. COOPER, jun.—Printing by development has never, we believe, been very successful with albumenized paper. The manipulations are the same as for plain paper; but it is difficult to obtain good tones when albumen is present. 2. We do not know where the enamel colours used in M. Joubert's process are sold. If you select some of the tints given by Mr. Hannaford in a recent number, you can probably get the materials at your chemists.

THOMAS CUMBERFORD.—A portrait lens consists of a combination of achromatic lenses. The front lens is an achromatic meniscus placed in a tube with its convex side outwards, the back lens consist of a convexo-concave and a double convex, one of flint, the other of crown glass, not quite in contact with each other. The convexo-concave is placed with its convex side towards the front lens; the double convex being placed outwards. The distance the lenses are to be placed apart depends on the relative foci, &c., of the lenses, and these relations depend on a variety of matters into which we cannot enter at length here. Each optician has his own plan. The focus of the front lens is generally shorter than that of the combined focus of the two forming the back lens; sometimes about half. The construction of a portrait lens is a matter in which you will scarcely be successful as an amateur without being well and practically skilled in optics. For landscapes an achromatic meniscus is considered best, the concave side being placed outwards The moveable tube is used to aid in focussing.

ALPHA.—You do not say at what stage you obtain the white deposit. We presume after taking the proper steps to dissolve the half sovereign in aqua-regia you find this white deposit, which is chloride of silver, formed from the presence of that metal with the gold After diluting the solution this may be removed by filtration.

W. D. B.—Major Russell Gordon's pictures at the Paris Exhibition consisted of large pictures as well as stereoscopics, and each kind were equally good.

UN PETIT GARCON.—The usual size of the "pistolgram" is about one inch square; the camera is about three inches long.—2. The lenses in the pistol camera are more rapid than common portrait lenses. 3. We are not in possession of any particulars as to when the catalogues of the International Exhibition will be ready.

W. R.—You will find a report on your transparent calico in the usual column. 2. We do not think the albumen process so well suited to instantaneous work as wet collodion. We do not know that any advantage is gained by using iron development with albumen plates. Hot gallic or pyrogallic acid is better.

JUSTITIA.—We like the appearance of No. 2 best, but it would require a careful trial to determine absolutely. Possibly there might not be much difference in result, and both are probably good. The chief impurity present in pyrogallic acid would be metagallic acid, which being insoluble would render it necessary to filter the solution to remove it.

S.—The chief cause of the evil in your print appears to be a somewhat fogged negative, which always increases any tendency to "mealiness" in the paper. See letter from Mr. Fry, and article on the subject in another column.

G. L.—The addition of a bromide sometimes improves old insensitive collodion.

N. N.—The chief objection to lenses of very long focus for album portraits is, besides slowness of action, that in thick weather there is so large a space of hazy-foggy atmosphere between the sitter and the camera that it is almost impossible to get a brilliant negative. So far as definition all over is concerned, the long focus is an advantage.

C. H. R. F.—The price for binding the volumes of the PHOTOGRAPHIC NEWS strongly in cloth, will probably be about 2s. or 2s. 6d.

F. G. C.—We prefer for the first washing, in preparing dry plates, a vertical bath with distilled water. After the first washing, common water may be used.

G. C.—The Taupenot process and the collodio-albumen process are the same. The first term is from the name of the originator, and the second describes the materials employed.

N. J. F.—See a recent article on Iron Negatives for strength of iron developers. See also PHOTOGRAPHIC NEWS ALMANAC.

COLEMAN SELLERS.—Mr. Hannaford will be very happy to hear from you as you propose.

ALPHA.—We do not know of any place to which we can recommed you in the neighbourhood you name. The most suitable place for obtaining lessons that we know, is the photographic department of King's College. Mr. Dawson, the lecturer, who is an able photographer, gives private lessons. If you write to him, he will furnish you with terms.

Several correspondents in our next.

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All Letters, Works for Review, and other Communications for the Editor, should be addressed to 32, PATERNOSTER-ROW.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 175.—*January* 10, 1862.

## PHOTOGRAPHY AND THE INTERNATIONAL EXHIBITION.

We have received repeated enquiries of late as to the allotments of space to exhibitors in the photographic department of the forthcoming International Exhibition. Allotments in every other department have been completed some time since; but as yet the committee appointed to take charge of the interests of photographers have made no sign. We fear that the mismanagement which has characterized this department is now about to reach its culmination. We have reason to believe that no allotment whatever will be made; but, instead, an arbitrary selection of such pictures as will be forwarded for exhibition. If the space at present intended to be devoted to our art be not extended, the photography of the world will be displayed in an apartment which would not afford space for the legitimate contributions of a single province. We have not space to say more now. But unless some active steps be immediately taken, the interests of the art and its devotees will, in this exhibition, be betrayed without remedy.—*Verb. sap.*

## DRY PLATES WITHOUT PRESERVATIVE.

One of the greatest boons which could be conferred on photographers would be a dry process which should only require the removal, by washing, of the free nitrate of silver from the exacted collodion plate. If, to this simplicity of preparation could be added extreme sensitiveness, cleanness, brilliancy, and certainty, the boon would be complete, and the process would stand acknowledged as one of the greatest discoveries since that of Archer. For many years past, at intervals, we have been promised at least part of the boon, and on more than one occasion the whole of it. Collodion plates, simply washed, have repeatedly been tried, and frequently with sufficiently good results to justify considerable hope of ultimate complete success. Dr. Hill Norris, whose careful and fruitful researches on the subject of dry collodion are well known, has always maintained that the generally received opinion as to the importance of a preservative forming an organic compound of silver in dry plates, was an error, the only legitimate purpose served by preservative preparations, according to his view, being a mechanical one—that of rendering the film permeable by the developing solution. To this end he recommended the application of preparations of gelatine, gum, &c., to the thoroughly washed film, which permeating its structure and being easily soluble in, or absorbent of, water, allow the ready action of an aqueous developing solution. Some years ago the idea occurred to the Abbé Despratz, of adding to the collodion itself some body which should keep open the structure of the film, and prevent it acquiring the horny and repellant state of dessication. With this view he suggested the use of resin in the collodion, and the process has been pursued with more or less of success by some skilful photographers for years; although how the presence of a resin insoluble in water could keep open the film, so as to allow the more ready action of an aqueous developer did not adequately appear.

How far the position is true, that the organic element is unnecessary in the sensitive dry plate, we do not undertake to determine; but it unfortunately happens in many of the cases brought to prove that it is unnecessary; some organic element is used, and it remains to be proved in such cases that an organic compound of silver is not formed. In Dr. Norris's plates, there is gelatine or gum, in the Despratz process there is resin; and it is worthy of remark that in the latter process it is important that the bath should have the addition of acetic acid. In a paper by Mr. Hislop, recently read at the North London Photographic Society, he advocates the use of simple washed collodion, as giving all the results desirable in a dry process, without the use of any preservative whatever. It turns, however, quite incidentally that although Mr. Hislop applies no preservative preparation to the excited and washed collodion film, he coats the plate with a dilute solution of albumen prior to applying the collodion. This is done with a view to prevent the film leaving the plate, and without any idea that it would play any chemical part in the subsequent operations. The fact, however, that albumen forms a compound with silver readily acted upon by light would at once suggest that the impossibility of the film of albumen remaining inert in Mr. Hislop's plates, and the actual experience of all who have worked in that direction prove that it plays a most important part in the formation of the negatives.

Mr. Hislop's paper has recalled to our mind an interesting letter we received at the beginning of last summer from a very able correspondent, who suggested a similar process, with the difference that much more was claimed by our correspondent for his process, which he affirmed will produce results in all respects equal to wet collodion, with a degree of sensitiveness scarcely at all inferior. The matter was brought under our attention in confidence, in order to learn our opinion regarding its practial value; finally it was placed at our disposal for use in any way we thought proper. Our first experiments were not altogether satisfactory, the matter was laid aside for further examination; and until it was recalled to our mind by Mr. Hislop's paper, it had been overlooked.

We have just received a letter from our correspondent, again referring to the matter, and briefly re-stating the details of his process. We give the letter just received now, and shall probably, if we have space, give some extracts from a former fuller communication in an early number:—

"Dear Sir,—As attention appears to be turned just now to the subject of rapid dry plates, probably some of your readers would like to try the process I mentioned to you about a twelvemonth since. I had hoped to find time to carry out some further experiments before publishing it, but I have lately been exclusively occupied on other subjects.

"The process is of the simplest manipulation. A highly bromidized collodion is required; with this a plate is coated and sensitized in a neutral or slightly acid bath, as for ordinary negative portraits, 30 or 35 grains of silver to the ounce. It is then well washed, and placed for a minute in a 2-grain solution of chloride of ammonium, or of common table salt, to convert all the remaining nitrate of silver into chloride. After another washing to remove the salt, a solution of gallic acid, 5 grains to the ounce is poured over the surface (care being taken that it flows well to all the edges), and allowed to remain upon it for about 30 seconds, when it is poured off, and the plate stood up to dry.

"The plates so prepared are of the most extraordinary sensitiveness, half a second being sufficient exposure to produce a dense negative of a well sun-lighted view with Dallmeyer's stereoscopic lens, No. 2 stop. The pictures are of exquisite softness, and possess a definition of minute detail in the dense shadows, rarely met with even in wet collodion.

"I used to develop with pyrogallic acid, citric acid, and silver, or with gallic acid and acetate of lead, but probably it would be advantageous to use Mr. Wardley's method, which was not published at the date of my experiments. Unlimited washing *after* the application of the gallic acid appeared to rather increase the sensitiveness, but I think that the extreme cleanness and brightness of the picture, which are characteristic of the process, are less certain when this is done.

"These plates have no great keeping qualities. They are often spoiled at the end of a week; but I have kept some good a month.

"Upon the publication of the tannin process, which took place shortly after I had concluded my experiments, I imagined from the analogous nature of gallic acid and tannin, and the manipulations being precisely similar, that the processes would also turn out to be similar in result; but the contrary appears to be the case, as tannin plates I understand keep well, and are slow in being impressed with the image; while gallic acid plates do not keep well, but are remarkably rapid.

"The question which I wished to investigate more fully was the proper kind of collodion to be used, as I have met with some unsuited for the process. But probably all who wish to try these quick plates will find at least one specimen in their laboratory suited to prepare them, as those which are not are the exception.—I remain, dear sir, yours faithfully,

*January 6th*, 1862. F. R. Window."

We may here observe, that in his former communication Mr. Window informed us that he always gave his plates a preliminary coating with dilute albumen. We entertained a decided conviction that the preliminary coating of albumen played some part in the subsequent chemical operations. As that part of the question is an important one, we shall in our next give some interesting details on the subject communicated to us by Mr. McNab, who has much experience in the use of albumen as a preliminary coating.

In the discussion at the North London Meeting, Mr. Martin observed that the point upon which success chiefly depended in using simply washed plates, appeared to be the selection of the collodion. Our own experience entirely confirms this observation, and we believe that it is in this direction experiment will be most successful. We made several experiments last summer after receiving the letter to which we have referred. We did not find much difficulty in obtaining very sensitive dry plates without any preservative, but they were accompanied by some other difficulties, which our engagements at the period did not allow us time entirely to overcome: these were extreme thinness of the image, and stains. Some subsequent experiments led us to believe that these defects were chiefly due to the use of an unsuitable bath. We used a silver bath, which was giving good results, with wet collodion and iron development; but we remembered afterwards that it was an old bath, and contained a little free nitric acid, but no acetic acid. The use of the latter acid we believe to be of great importance in experiments in this direction, and we had reason to believe it would have materially modified the results if we had had time to follow out our experiments.

Soon after the discussion at the North London Society we received an interesting letter from Mr. Ward, of Stratford-on-Avon, stating that he had for some years past used dry collodion plates without preservative, with complete success, adding:—"According to my own experience dry collodion is two-thirds more sensitive than any of the albumen processes, and much less trouble in preparation and development. I have not found that difficulty which some of your correspondents seem to have had in keeping the film on the glass, although I have never used any foundation for the collodion."

Mr. Ward's letter was accompanied by the best of all arguments, a couple of very excellent prints from negatives produced by the process. The pictures are ten by eight, and appear fully exposed. One, a view of Shakespeare's House, was exposed two minutes and a half, with a lens of 15-inch focus and five-eights stop: the other, Ann Hathaway's Cottage, had three minutes exposure. It will be readily seen that the exposure is less than that of most dry processes. The prints were so perfect that we wrote to Mr. Ward asking him to oblige our readers with further details, an application to which we received a prompt and courteous response. We subjoin his letter:—

Dear Sir,—According to your request I forward you my method of manipulating the dry collodion plates.

I use a powdery collodion which will bear almost any amount of washing with ordinary care, and is comprised as follows:—

| | |
|---|---|
| Powdery Pyroxyline *quantum suff.* | |
| Ether ... ... ... ... | 4 ounces |
| Alcohol ... ... ... ... | 4 " |
| Iodide Cadmium ... ... .. | 1 grain |
| Iodide Ammonium ... ... | 2½ " |
| Bromide Ammonium ... ... | 1 " |
| Liq. Ammonia ... ... ... | ½ minim |

In the first place I coat the plate with collodion, when *well set* it is immersed in the nitrate bath of the usual strength, with a large proportion of acid; afterwards well drained and washed in four separate dishes of filtered rain water, and placed on one corner to dry spontaneously, when it is ready for exposure.

After being wetted with distilled water the plate is developed with the following solution;—

| | |
|---|---|
| Pyrogallic Acid ... ... ... ... | 3 grains |
| Citric Acid ... ... ... ... | 1 " |
| Water ... ... ... ... ... | 1 ounce |

and fixed with cyanide or hypo. I prefer the former as it requires less washing afterwards.—I am, dear sir, yours truly,

J. F. Ward.

*Stratford-on-Avon*, 17*th December*, 1861.

It cannot require one moment's argument to prove that if satisfactory and certain results can be obtained by means of a process so simple, the use of preservatives will soon be deemed as unnecessary complications. We shall be glad to learn the further experience of our readers.

## SUBSTITUTES FOR YELLOW GLASS IN THE DARK ROOM.

Since we have undertaken to test the samples of yellow glass of our readers, as to their suitability for dark room windows, we have received for examination, from time to time, samples of varnished silk, muslin, &c. The mode of preparing the various specimens of translucent fabric has not generally been stated. This is to be regretted. In our reports upon various samples of glass, the chief gain is to individuals, the only advantage derived from their perusal by the mass of our readers is the incentive to examine their own arrangements, seeing that those of so many are defective in this respect. Where the method of preparing a translucent fabric accompanies a sample, the report upon it may become valuable to every reader of the paper.

In our last we reported upon three samples of varnished muslin, with the mode of preparing which we are furnished. Two of the samples were prepared by coating muslin with glue, described as of a consistency about half as thick as that used by carpenters. To this solution of glue, nitrate of silver was added. In one sample the proportion was one-eighth of a grain of nitrate of silver to each ounce of solution. This sample was too light in colour to be efficient; many of the actinic rays passing without difficulty. Another sample contained one grain of nitrate of silver to each ounce of solution. This was perfectly efficient in repelling the actinic rays; but it cut off a large portion of the illuminating rays as well. It is probable that a proportion of nitrate of silver midway between the two, say two-thirds of a grain might be efficient in obstructing the actinic rays, without reducing the amount of light to an inconvenient extent.

A third sample, also prepared with glue, appeared to be tolerably efficient, not cutting off too much light, and yet repelling the greater part of the chemical rays. It was, however, coloured with annatto, and would, we fear, be liable to fade on exposure to sunshine.

There was one other objection to these samples, which might, however, be easily remedied: they were very brittle, arising from the large quantity of glue used. The mode in which the muslin was prepared, was by applying repeated coats of the solution of glue, and finishing with a coat of varnish. Possibly the second sample would have been just right, with fewer coats of glue, and two coats of varnish; it would not have been so dark nor so brittle. Another mode of rendering glue less brittle, is to add a little treacle to it, assimilating it to the elastic composition used by printers for making rollers.

Muslin or silk, treated with a coloured varnish of boiled linseed oil and orange chrome, would probably be very efficient.

The frequent complaints we have heard made of the difficulty experienced in getting suitable samples of glass, renders it worth while, we think, to endeavour, if possible, to find a simple, certain, and efficient substitute. We shall be glad to receive and report upon the experimental samples of non-actinic translucent fabrics of our readers.

## THE ACTION OF IODIDES ON EXPOSED PLATES.

It has been commonly maintained that in preparing collodio-albumen plates, the first part of the process—coating with collodion, sensitizing, and washing—might be performed in daylight, as any action produced by white light would be obliterated, and sensitiveness restored in the subsequent operations, either by immersion in a solution of an alkaline iodide, or by the application of the iodized albumen. This position has, however, often been combatted by skilled operators in this process. Some years ago we remember Mr. Sidebotham stated in the Photographic News that a slight amount of fogging was the general result in his practice, of white light falling on the plate after it left the first silver bath. Mr. Wardley, in a recent paper on the collodio-albumen process, read before the Chorlton Society, maintained a similar view, stating that the effect of white light falling on a sensitive collodion film could not be obliterated by the after application of an iodide solution, nor by the action of the iodized albumen. A contemporary editor slightly demurred to this statement, referring to the action of iodine in restoring an exposed daguerreotype plate to its sensitive condition; and adding that a solution of *iodine* had a similar effect upon an excited collodion plate. *Prima facie*, he should have anticipated, he stated, that an actinic impression would have been removed by an *iodide* also, and invited Mr. Wardley to detail the experiments upon which he based his conclusion.

As the subject is an interesting one, we subjoin Mr. Wardley's statement at a recent meeting, as reported in the organ of the society. He says:—

The question at issue is:—Can the action of a ray of white light be obliterated from a sensitive collodion film by means of an alkaline *iodide*, provided such film be free from organic matter, except that which may be contained in any ordinary collodion bath solution? In consequence of an offer made to publish my experiments to prove the position I took, I now respond to the call; but bear in mind that these experiments were not intended to be applied to photography generally, but simply to have a bearing upon the successful working of the Taupenot process. During my long practice of this process, I have been assailed by various operators declaring that the first preparation could be conducted in open day-light. I therefore tried several lots of plates so prepared, but I must confess I never obtained a satisfactory negative upon any one of them: all were more or less foggy and stained: some would not yield any kind of picture. In consequence of my non-success, I went in for a series of experiments, one or two of which were so conclusive that I discontinued them. In the first experiment I coated a plate with collodion, sensitised it, exposed one-half to daylight, carried it to the dark room and washed it well with water, immersed it in a solution of iodide of potassium for two or three minutes, drained and albumenised it in the usual way, and dried. This plate was then sensitised in the acid silver bath, washed, dried, and exposed in the camera. When developed, the two halves of the plate exhibited a great difference. That portion which had been exposed to light during the first preparation was foggy and stained; the other half, which had been protected from white light, was bright and satisfactory. This experiment may not be conclusive or correct, owing to the presence of organic matter: to meet that objection I tried another plate *without* the albumen. The transparent slide before you was coated with ordinary collodion, sensitised and exposed, then removed to a dark room, well washed with water, solution of iodide of potassium poured on half of the plate, the excess removed with a little water, and afterwards developed in the ordinary way. I think you will say the iodide has *not* had the least influence upon the image to which it has been applied. You see it is equally intense, and as full of half-tone as that portion which has been treated with the solution of iodide. This fact was published years ago. I am afraid that photographers of the present day are apt to underrate the value of papers written by men whose names have disappeared from the pages of our present photographic publications. On looking over the photographic literature of our day we are often startled by some grand new process or invention. Some of these may be of great value, and not a few can be traced to early experimenters. Pardon this digression; and in conclusion, and in support of what I have to-night advanced, allow me to quote from a paper by Mr. J. G. Berry, *On the Theory of Photographic Development*, published in *The Liverpool Photographic Journal*, February, 1855:—"We will take a plate of glass, collodionize and excite in the usual way; we will wash it in water, to remove the free nitrate of silver; we will then expose it in the camera; we may again plunge it into water, or even a solution of iodide of potassium, and replace it in the camera, exposed to a fresh object; and then, on the application of the pyrogallic solution, mixed in the usual way, with a small portion of silver, we shall evolve both the images impressed. They will be quite uninjured by the rough usage they have undergone, and are in every respect equal to what they would have been if manipulated in the usual way." This quotation shows that theoretically I am not alone in this matter. We have very much to learn of the theoretical part of photography, which necessitates or imposes a duty on those who have time and opportunity to pursue this department, in preference to inventing or adopting some trivial affair that can well be dispensed with. More theory will lead to greater things.

Other members of the society had arrived at similar conclusions to Mr. Wardley, and had met with countless failures from fog, stains, &c., when they had prepared the plates in daylight.

Mr. Griffiths, vice-president of the society, made some remarks full of interest and importance. He said:—

It was an undoubted fact that some operators conducted the first preparation in daylight and obtained good results. How could that be accounted for? He suggested that it might be owing to their *probable* use of free iodine in the iodized albumen, which most photographers acknowledged would remove any actinic impression made during the first preparation. Referring to that part of the editorial leader in which it is stated that "if anything approaching reduction has taken place on a plate which has received an actinic impression, an iodide will not restore its normal condition," he said the integrity of this statement was not borne out by facts; but he might ask—Does not reduction invariably occur when a sensitive surface is exposed, for however short a time, to white light? He was one of those who believed it did; and with a view to satisfying himself on that point he had, some twelve months since, undertaken a number of experiments, one or two of which he would briefly describe. A collodionized plate was sensitized in the ordinary way, and exposed wet in the camera for such a time as was considered sufficient to impress a negative. After thoroughly washing off the free nitrate, a solution of pyrogallic acid (without free acid) was poured over it for an instant. It was again washed, and the iodide of silver removed by cyanide of potassium. Nothing was visible on the plate after this treatment; but on the application of the usual pyro developer, mixed with a few drops of nitrate of silver solution, a faint, but perfect negative made its appearance. Another plate, similarly prepared and exposed was, after well washing, treated with dilute nitric acid (one part acid to twenty of water), again washed, and a solution of pyro, without free acid or silver applied for a few seconds. It was then washed, fixed with cyanide of potassium, and pyro developer mixed with silver poured over it; but not a trace of an image could be seen. Other collodion plates were prepared. After being taken from the silver bath they were well washed by allowing a stream of water from a tap to run over them for at least ten minutes, when a drop from them gave no precipitate with a chloride. They were then dried and exposed in the camera for times varying from two to four minutes. Previous to developing one of them, a camel-hair pencil, dipped in the dilute nitric acid, was drawn across the middle of the plate. They were then all treated exactly like the first plate mentioned—that is, first with plain pyro, then fixed, and finally with pyro developer and silver. The result was that a picture was produced on every plate except that which had been touched with dilute nitric acid not a trace of a picture could be obtained. One remarkable fact remained to be noticed, namely, in every case in which a washed *dry* collodion plate had been exposed in the camera, and treated as described, the result had invariably been, not a negative, but a faint *transparent positive*. In the explanation of this singular fact is involved the proof that actinic light acts essentially as a reducing agent. Take, for example, the sensitive wet collodion plate, and represent the film chemically, as containing before exposure, Ag I + (Ag I, Ag O, $No._5$), + Ag O, $No._5$ After exposure the parts acted on by light become Ag I + Ag O + Ag O, $No._5$ + $No._5$ (set free) + Ag O, $No._5$—the picture being formed by Ag O, subsequently reduced by the developer to the metallic condition. In the case of the dry collodion plate previously adduced, where no free nitrate or other salt of silver is present in perceptible quantity, the film contains Ag I + (Ag I, Ag O, $NO_5$); and in that condition he believed it was more readily susceptible to actinic influence than when wet—an instantaneous exposure being sufficient to produce the change represented by Ag I + Ag O + Ag I + (N $O_5$ set free). A long exposure would have the effect of partly reducing to the metallic condition, the newly formed Ag O, and thus produce the effect known as solarisation or reversed action of light. These views were offered not altogether as his own, but rather as the result of his study of the works of Hunt, Miller, Barreswil, Davanne, and others.

The exact nature of the change produced by light on the film of sensitive salts of silver remains, at present, a curious and important, but still unsolved problem. We think, however, there can be little doubt that it is desirable to conduct all the operations, with an excited film, by the aid of non-actinic light. If glass of the proper colour be selected for the window of the dark room abundance of light may be admitted.

## PHOTOGRAPHIC CHEMICALS.

### THEIR MANUFACTURE, ADULTERATION, AND ANALYSIS.

*Hyposulphite of Soda.*

THE manufacture of this salt offers good illustration of the laws of supply and demand. Before photography became a widely diffused and popular art, hyposulphite of soda was a mere chemical curiosity, occupying in laboratories a similar position to that which the corresponding hyposulphate does at the present time. It had been investigated as a chemical compound, and its leading properties were tolerably well known; but no practical use having been suggested or made of it, it remained almost unknown except as a museum specimen, and we doubt if all the laboratories of England could have furnished a pound weight of it. No sooner, however, did there arise a demand for it amongst photographers, than this salt found its way into commerce, and at the present time its manufacture gives employment to a vast number of hands, and has assumed somewhat important dimensions, South Lancashire alone producing three tons weekly, the bulk of which is consumed by photographers, and by paper-makers, and bleachers, as an *Antichlor.* Hyposulphite of soda is formed under several different circumstances; but chiefly:—1, when sulphites are treated with an excess of sulphur; 2, when a sulphide or polysulphide is submitted to the action of sulphurous acid; 3, when polysulphides are exposed for some time to the air. This latter method is, however, seldom made use of. According to the method first mentioned, crystals of crude soda are saturated with sulphurous acid until they are converted into bisulphite of soda. This bisulphite is then dissolved and neutralized with soda until it is converted into the neutral sulphite. It is placed in a large iron boiler, and an excess of flour of sulphur added; the liquid is then heated to the boiling point, and kept in ebullition until no more sulphur is dissolved. 100 parts of soda crystals, saturated with sulphurous acid, require for this purpose about 12 or 15 parts of sulphur. When the action is terminated, the solution is filtered through linen to separate the excess of sulphur, and the filtrate allowed to cool in shallow iron pans, when it soon deposits hyposulphite of soda in large crystals. These are generally purified by recrystallisation.

Another method of preparing this salt has lately been successfully carried out. It depends upon the mutual re-action of sulphurous acid upon alkaline sulphides. As a starting point, nitrate, instead of carbonate of soda, is used, by which the fluctuations in price of carbonate of soda are avoided.

Finely-ground native sulphate of baryta is mixed with carbon and calcined in a reverberating furnace out of contact of the air. The sulphate is reduced, and the whole becomes a greyish mass of sulphide of barium. This is then exhausted with water, and filtered. The clear liquid, after concentration to the requisite strength, is then mixed with an equivalent quantity of nitrate of soda (Chili saltpetre). A double decomposition thereupon takes place, by which the nitric acid goes to the baryta, and the sulphur to the sodium, thus:—

$$BaS+NaO.NO_5=NaS+BaO.NO_5.$$

The nitrate of baryta thus formed, being of very slight solubility, soon deposits from the solution in the form of crystals, whilst the sulphide of sodium, being very soluble and deliquescent, remains in the liquid. The whole of the baryta is removed by successive crystallizations, and the mother-liquor evaporated nearly to dryness, when a solid mass of sulphide of sodium is obtained. This moist mass is then broken up into coarse pieces, and placed in a large upright rectangular box ten or twelve feet high, lined with lead, and standing on a leaden cistern provided with a tap. The interior of the box is provided with wooden shelves pierced with holes, on which the moist sulphide of sodium is placed. At the lower part of the box, below the sulphide but above the cistern, a leaden pipe enters, which conducts a stream of sulphurous acid from a furnace, where it is generated, into the box (which acts as a chimney to the sulphurous acid). By contact with this gas the sulphur of the sulphide of sodium oxidises in the following manner:—

$$2NaS+3SO_2=S+2\ (NaO.S_2O_2).$$

The hyposulphite of soda ($NaO.S_2O_2$), as soon as it is formed, dissolves in the small quantity of water contained in the sulphide, and the solution trickles down into the cistern placed beneath the box. From this it is drawn off from time to time, concentrated, filtered from the precipitated sulphur, and purified by crystallization. The nitrate of baryta formed in the first re-action is commercially valuable, both for pyrotechnic purposes, and also for the manufacture of precipitated sulphate and other salts of this base.

The above methods of making hyposulphite of soda are, however, manufacturing operations, rather than processes which the amateur photographer could conveniently adopt, if it were necessary for him to prepare this salt on the small scale. If he have conveniences for the preparation of sulphurous acid or sulphite of soda, he may, indeed, make use of either of the above plans with advantage; but, otherwise, it will be more advisable to adopt the following method:—Take one pound of very pure, crystallized carbonate of soda, and dry it as perfectly as possible. When dry pulverise, and mix it intimately with five ounces of sulphur. Place the mixture in a shallow dish, and gradually heat it to the melting point of the sulphur, keeping it at that temperature for some time, with constant stirring, so as to bring every part in contact with the air. At first sulphide of sodium is formed; this absorbs oxygen from the air, and is converted with feeble incandescence into hyposulphite of soda.

'he mass is then allowed to cool, when it is dissolved in ater and boiled for some time with sulphur. It is next to e filtered, and the filtrate evaporated to the crystallizing oint. If the heat has been raised too high, part of the ılphur is burned off, and there remains an excess of caronate of soda undecomposed, which will have to be removed y a second crystallization. Very fine and pure crystals are btained in this manner.

Hyposulphite of soda crystallizes in different states of ydration. according to the temperature of the solution rom which it is deposited. From a hot solution it comes own quite anhydrous, but from a cool, less concentrated olution, it crystallizes in large clear oblique prisms, beonging to the right prismatic system, and containing 5 quivalents, or 36·23 per cent. of water. It is inodorous, nd has a cooling, saline taste, passing into a bitter and ulphurous flavour. It is quite neutral to test paper, and emains unaltered in the air. Upon heating, it fuses in its vater of crystallization; at a higher temperature it loses, vithout decomposition, all the water of hydration. Upon eating it still further it burns with a blue flame, evolving ulphur, and leaving a brownish mixture consisting of ulphide of sodium and sulphate of soda. It is insoluble in lcohol, but extremely soluble in water. Its aqueous soluion undergoes gradual decomposition on keeping, being onverted in close vessels into sulphur and sulphite of soda nd if air have access, into sulphur and sulphate of soda. The aqueous solution has extraordinary solvent powers over various chemical precipitates. Its action upon chloride of ilver is well known; in addition to this it dissolves in he cold, chloride of lead, subchloride of mercury (calomel), odides of mercury, silver, copper and bismuth, cyanides of ilver, lead, copper, uranium, zinc, cadmium, and bismuth, errocyanides of copper, lead, silver, uranium, cobalt, and bismuth, and the ferricyanides of copper, silver, manganese, cadmium, and lead. In addition to the above, it dissolves more sparingly, iodide of lead, cyanides of manganese and cobalt, and ferrocyanide of iron. Of these solutions, some appear to undergo spontaneous decomposition, but others appear more stable. The solutions of the chlorides are more stable than those of the iodides. It will, therefore, be seen that hyposulphite of soda is an energetic solvent for many bodies, and might possibly be advantageously employed in photographic processes which may be hereafter devised, in which any of the above salts play an active part.

## A FEW WORDS ON THE MANUFACTURE OF PHOTOGRAPHIC VARNISHES.

By H. R. Nichols.

To make a good varnish of any kind requires great care, much experience, and proper vessels for the preparation of the gums. In the latter lies the chief secret of varnishmaking; for if even the right gums be used, if they are not used in the proper condition the varnish will be useless.

The first consideration, then, is the selection and preparation of the gums, according to the purpose for which the varnish is intended. A negative varnish is required to be clear, hard and tough; not to become soft or sticky, or to crack under the influence of the sun's rays, and to bear a decent amount of handling without injury. It appears to be the impression of many photographers that the mere solution of a gum in spirit is a varnish. So it is, but a very bad one, and one which will very soon spoil a good negative. Those who will follow my directions will have a firstclass article, which will answer every purpose to which a negative is exposed.

*Negative Varnish.*

Take gum benzoin, broken into small pieces, from which select the *white* portion only. Put about four ounces, or other convenient quantity, into a conical vessel of copper or glazed earthenware, and insert this vessel about one-fourth of its depth into an iron lamp chimney. Apply heat from the flame of a lamp just sufficient to melt the gum. If scum arise, remove it. Keep it in fusion a quarter of an hour, then pour it on to a slab to cool. If this is nicely managed, the gum, when broken, will be glassy and slightly coloured. Put two ounces of this into one pint of spirits of wine. This should not be stronger than 50 over proof, nor should it be weaker than 40 over proof. This is of great consequence; for if the spirit be too strong, entire or partial solution of the film will occur. Add ten grains of the gum sandarac of commerce. Dissolve without artificial heat.

When perfect solution is effected, add fifteen drops of mastic varnish, prepared as follows:—Put one ounce of picked gum mastic into a glazed pipkin: melt it over a clear fire, stirring with a wooden spatula, continually. When perfectly fluid, remove it from the fire, and add, in small portions at a time, one gill and a half of turpentine, stirring it all the time. When cold and settled, it is fit for use. This forms, also, a good varnish for prints, &c., which must be first sized with parchment or gum size.

The benzoin varnish, with the mastic added, must now be boiled in a flask for a few minutes, and left to clarify. When clear, it is fit for use. The trouble of making this varnish is well repaid by its quality.

I have a few words to add on the use of shellac, from its frequent recommendations as a constituent of negative varnish. However useful shellac may be for other purposes, it is much out of place here, being decidedly injurious to spirit varnishes applied to glass. In my experience with shellac, no matter in what form it is used, the results are the same; a rough and freckled surface always ensues. If it is not so on its application, a few exposures to the sun's rays generally make it so, soon rendering the negative unfit for printing purposes. The cause of this is partially due to the spirit used with it containing so much water (from 45 to 50 over proof.) The remedies in this case are however, in my opinion, worse than the evil. With a spirit at 90 over proof these appearances are very slight; but the negative is much weakened, if it be not entirely destroyed by solution of the film. This may be prevented by sizing the film with gelatine before varnishing; but this practice ought never to be used without absolute necessity. When the use of gelatine is required, after the film is dried, a clear cut round the plate should be made with a sharp knife, about an eighth of an inch from the edge of the glass, so that the varnish may come in contact with the clear glass. If these precautions are not taken, the destruction of the negative soon follows: the moisture arising from many causes to which a negative is subject attacks the gelatine, causing it to swell, and the film becomes detached from the glass. This is, of course, followed by cracking of the varnish and the spoiling of the negative. I think these troubles far outweigh the trouble of manufacturing a varnish which will stand against all mishaps, and bear a very large amount of rough usage.

*Positive Varnish.*

An excellent varnish for collodion positives on glass may be made on the following formula:—

| | |
|---|---|
| Gum dammar ... ... ... | 2 ounces |
| Benzole ... ... ... ... | 16 ounces |

Dissolve and add

| | |
|---|---|
| Mastic varnish ... ... ... | 4 drachms. |

Stand the bottle in hot water half an hour; when fine it is fit for use; this varnish will never crack.

*Varnish for Positives to be Coloured.*

| | |
|---|---|
| Gum dammar ... ... ... | 1 ounce |
| Benzole ... ... ... ... | 12 ounces |

Dissolve, and then take

| | |
|---|---|
| Amber resin ... ... ... | 1 ounce |
| Turpentine ... ... ... ... | 4 ounces |

when both are dissolved, mix together, and let the mixture stand a few days. Then pour the clear portion off for use.

*Varnish for Paper Pictures.*

| | | |
|---|---|---|
| Picked gum mastic | ... ... | 2 ounces |
| Turpentine ... | ... ... ... | 10 „ |

when dissolved, add half a scruple of Canada balsam. Size the picture first with vellum size, dry it perfectly before the fire, and then varnish and dry in a free current of air.

*Liquid Enamel, or Polish for Paper Pictures.*

| | | |
|---|---|---|
| White shellac | ... ... ... | 1 ounce |
| Sandarac ... | ... ... ... | 1 drachm |
| Mastic ... | ... ... ... | ½ drachm |
| Spirits of wine | ... ... ... | 8 ounces |

Dissolve with slight heat.

*Black Varnish for Positives. No. 1.*

| | | |
|---|---|---|
| Asphalte ... | ... ... ... | 4 ounces |
| Tar naptha ... | ... ... ... | 8 ounces |
| Boiled linseed oil | ... ... ... | ½ ounce |

No. 2.

| | | |
|---|---|---|
| Asphalte ... | ... ... ... | 4 ounces |
| Benzole pure | ... ... ... | 6 ounces |
| Mastic varnish | ... ... ... | 2 ounces |
| Vegetable blacks | ... ... ... | ½ drachm. |

No. 3.

| | | |
|---|---|---|
| Shellac ... | ... ... ... | 2 ounces |
| Water ... | ... ... ... | 8 ounces |
| Biborate soda | ... ... ... | 5 drachms |

Boil till dissolved, and add

| | | |
|---|---|---|
| Vegetable blacks | ... ... ... | 1½ drachms. |

This in a more dilute state forms a good ink for the laboratory. The copy of this article is written with it. It has no bad smell, and stands unrivalled in many respects.

Good writing-paper coated with No. 2. I have often used for collodion positives, instead of glass; it answers well.

*Transfer Varnish.*

| | | |
|---|---|---|
| White shellac | ... ... ... | 1 ounce |
| Water ... | ... ... ... | 5 ounces |
| Biborate soda | ... ... ... | 2 scruples |

Boil until dissolved.

Coat the positive, and dry before the fire two or three times, using a camel's-hair brush. Coat, also, a piece of black paper, press both together wet: when partly dry, the picture easily leaves the glass.

## MICROSCOPIC PHOTOGRAPHY.

BY M. GIRARD.

As a member of the Jury of Admission of the Universal Exhibition of 1862, I had occasion a few days ago to visit the ateliers of M. Dagron; and in seeing the interesting results obtained by this operator, I promised myself that I would communicate to the Photographic Society an account of what I had seen. Since then I have learned that M. Dagron's processes were the subject of important suits with respect to the priority of patents; this circumstance caused me to hesitate, but remembering that the Society, according no official value to the communications made to it, is in the habit of leaving all responsibility with their authors, without wishing to appear in any manner as a judge between the parties, I have thought, therefore, that it would be permitted me to make this communication, without in this case, more than in others, our erecting ourselves into a tribunal.

I know that for a long time, in England especially, microscopic photography has been practised, and that to enlarge these proofs, use has been made of the microscope. I am also aware that in France, M. Marion on the one part, and MM. Angé and Picard on the other, have suggested the placing one of these proofs in the little telescope lorgnettes, which are employed as *breloques de montre;* but it seems to me that there is an important difference between these isolated attempts and the great development given by M. Dagron to the introduction of microscopic photography into current jewellery; and it is precisely in consequence of this development that the subject has appeared to me worthy of interesting our Society.

M. Dragon's pictures are obtained from transparent plates prepared by the Taupenot process, by means of apparatus which appeared to me no special novelty, except in an ingenious and intelligent arrangement of the several parts. These proofs are taken in any number on small glass plates, by means of multipliers placed at the extremity of the camera. Being afterwards made into little squares of three millimetrés each, they are ready for mounting. This latter can be effected in four different ways. The first two will not occupy us long, besides they are now seldom employed by M. Dagron; one of them is applicable to the case in which it is desired to obtain a single proof; the other very curious case is that in which we wish to place two different ones in the same apparatus. In the first case, at one of the extremities of a little copper tube we place one of the little combinations, known as the *Stanhope lens*, at the microscopic proof at the other extremities. In the second case, the system is composed of two little apparatus of the same kind, opposite to each other, and placed in a tube furnished with a longitudinal aperture, by which penetrates a quantity of light sufficient to lighten the proof; but this method, like the other, is not much employed by M. Dagron, who prefers the following methods:—

To mount single proofs he cuts little elongated rectangular prisms out of crown glass, then passes one of the ends of this prism through the flame of a lamp, so as to give it the desired curvature. The proof is simply glued into the other extremity, then the asperities and edges are rounded and smoothed at the lapidary's wheel. When it is desired to obtain two opposite proofs, mounted end to end, we proceed by an extremely ingenious process, invented by M. Barquille, one of M. Dagron's workmen. It consists in taking a quadrangular prism of crown glass, well squared at its two extremities, and gluing a proof to each, and afterwards passing each of the glasses bearing these proofs to the lamp, so as to transform the plane surface into a curved surface of the desired curvature, employing a magnifier to view the opposite proof enlarged, while that nearest the eye is too small to be perceptible.

Such are the methods which have permitted M. Dagron to make of microscopic photography and its application to jewellery an extensive branch of industry. His ateliers are occupied by one hundred and fifty workmen, and I thought the Society would be interested in knowing the importance thus acquired by an application of the art to which it has devoted all its cares, and of which it always receives tidings of its progress with pleasure.—*Bulletin de la Soc. Franc. de Photographie.*

## THE CAUSE OF ACTINISM.

BY S. D. TILLMAN, A. M.*

The clear and succinct statement of the principles of the Undulatory Theory, contained in Sir John Herschel's "Essay on Light," may be accepted with a modification of the last proposition, which is, "That as in the doctrine of sound the frequency of aerial pulses or the number of excursions to and fro, from the point of rest made by each molecule of air determines the *pitch* or note, so in the theory of light, the frequency of the pulses or the number of impulses made on our nerves in a given time by the ethereal molecules next in contact with them determine the *colour* of the light; and that as the absolute extent of the motion to and fro of the particles of air determines the loudness of the sound, so the amplitude or extent of the excursions of the ethereal molecules from their point of rest determines the brightness or the intensity of the light." The first part of the statement seems to imply that the

* Read before the American Photographical Society, Nov. 11, 1861.

optic nerve is impressed by the increasing number of undulations so as to excite a sensation of colour, gaining in luminosity by regular gradations, as the auditory nerve is impressed by increased frequency of aerial waves so as to produce a sensation of sound of higher pitch.

In papers heretofore presented for the consideration of this Society, I have endeavoured to show why the darkest ray is not found at one end of the solar spectrum, and the lightest ray at the other. From both the ratios which express the relative number of undulations, and the mean length of all the undulations producing white light, we can determine the position of the yellow ray in the spectrum. Assuming that it has been satisfactorily shown, in the papers alluded to, that the degree of luminosity depends on the laws of harmony, as to other forces we find there is a resemblance between those undulations which produce heat, and the waves of air which give a downward progression of pitch; also between those undulations which produce actinism and the air waves which give an upward progression of pitch.

The interesting problem is now before us: how can undulations of ether or eeth waves having no distinguishing characteristics but a relatively increasing curve, and an accelerated transversal motion, produce such instantaneous and peculiar effects when brought in contact with the class of sensitive compounds used by the photographer? Of the manner in which such chemical changes are produced we know but little experimentally. Between the cause and the wonderful result there is a vast void as yet unbridged by observation.

Adopting the view of Ampere, that ponderable matter is composed of molecules, each of which is formed by a group of atoms, both atoms and molecules being prevented from actual contact with each other by an intervening fluid, vastly attenuated and elastic, which we may assume to be identical with, or a portion of, the all-pervading eeth, the inquiry is presecuted, whether a series of wave forces generated by the sunbeam, when acting upon certain kinds of highly sensitive matter, can so modify the forces of cohesion and chemical affinity as to produce all the phenomena under consideration.

Let *a b c d e f g h* represent molecules whose centres are in the same right line. If the longest eeth-wave producing the invisible and least refrangible rays of the solar spectrum includes in its length all these molecules, the wave of half the length will include four, the wave of one-quarter the length two, and the wave of one-eighth only one; in the whole distance there will be one wave including eight molecules, two waves of the octave each including four molecules, four waves of the double octave, each including two, and eight waves of the triple octave each including one.

It would be, perhaps, too great a digression to illustrate the action of these waves by diagrams, and give the formula for estimating the comparative effects of wave forces. It will be readily seen if transversal velocity increases with the increasing number of waves; the molecule *a* will receive a transversal impetus from the series of shortest wave, vastly greater than from the longest wave.

A crude conception may be formed of a transversly-increasing circular undulation, by comparing the exterior of a half wave with an ordinary bell, in which the tongue, hanging at rest in its centre, shows the direct force. An infinite number of perpendicular radial lines, from any point of the central line of the tongue will represent the sum of the transversal forces in the wave, at the altitude or amplitude marked by the circle of intersection. The direct line measuring the length of the half wave may be taken as the measure of the force of compression and the radial line measuring the amplitude of the wave as the measure of a disintegrating force. The latter predominates as the diagonal line representing these two forces approaches a perpendicular to the line of direct action.

The range of octaves here presented is really within the limit already recognised. Esselbach's calculations based on acknowledged data and confirmed by the deductions of Muller, measure four octaves within the fluorescent and thermal spectra; the length of the extreme fluorescent wave being 0.0003 millimetres, and that of the extreme thermal wave being 0.0048 millimetres.

It is evident the shortest wave, assumed to embrace a single molecule, will exert an effect in strong contrast to that of the longest wave, which takes within its sweep the whole group. We can easily comprehend that the action of the latter, being the wave of greatest force, tends to expand the mass of a solid, and if further increased in amplitude, to make it assume a vibratory movement, and become a centre of radiant heat, as a sonorous body vibrating in air becomes a centre of sound.

On the other hand the shortest eeth-wave may effect the normal condition of only one molecule, by changing its relative position and motion and polarity. Every molecule of the mass is subjected to this isolated action of an eeth-wave, and hence the chemical effect, now defined as actinism.

Surface exposure is an essential condition to this action as solution is to that of chemical affinity. Actinism increases with the increasing number of transversal departures of eeth from the direct line of action within a given length. The greater the number of such departures the smaller is the group of molecules affected. Actinism becomes the prominent power in that portion of the sunbeam where the path of each undulation includes but a single molecule, and has its maximum effect when the length of the undulation does not exceed the distance between the centres of two atoms. Actinism is most apparent in bodies which absorb a portion of the light passing through them, or, more accurately, in the presence of a so-called elementary substance, whose atoms acquire sympathetic vibrations in unison with a passing eeth-wave, and which in turn sends forth like an Æolian harp a similar series of eeth-waves, thereby causing its characteristic colour. The most prominent of such elements are included in the haloid class of salt-radicals. Knowing only the fact that the violet ray has a higher actinic power than any other primary, we would select the violet coloured volatile iodine as the most sensitive of the haloid class. Knowing farther that the extreme violet ray, produced by an increased frequency of undulations, gives increased rapidity to actinic action, we should be led to add to the iodine salt a small portion of a salt containing the red coloured volatile bromine.

It should be borne in mind, however, that the chemical power of the sunbeam extends through a wide range of undulations of different velocities, whose action upon a given substance depends upon the relation between such velocities and the molecular arrangement of such substance. The action of similar rays upon different kinds of matter is well illustrated by the Daguerreotype and the collodionised glass plate. In one case the eeth-waves have effected a partial decomposition, in the other only a change in the position of component parts, which allows the waves to pass unbroken and makes the collodion film as transparent as the glass. The intensity of actinism, like that of heat, depends upon the amplitude of the wave which, when increased, tends to bring both molecule and atom more completely under its influence by a relative increase of transversal velocities.

The diverse effect of undulations of the same medium may be thus briefly stated:—the longer eeth-waves have the power of giving an undulatory motion to the whole molecular chain; the shorter waves the power of moving each particular link of that chain. The longer waves penetrate and disturb the whole substance, thus evolving heat; the shorter waves act superficially, yet they change the original motion and position of the minutest component part of the surface, thus generating actinism. If the views here advanced are tenable, we may dispense with the ingenious three-wave theory of Sir David Brewster, to which the late Prof. Nichols presented insuperable objections.

## PERMANENT PRINTS: FIXING BEFORE TONING.

SIR,—Photographers generally have begun to look with grave doubt, if not with suspicion, upon any silver printing process for permanency. They have seen their pictures rapidly produced, and almost as rapidly disappear, that they have come to the conclusion that the process for securing permanency is still looming in the regions of future discovery. But why should not a silver print be as permanent as a glass positive? In each case the image is produced by metallic silver, and the method of production is almost identical, and yet they are so different in their stability, that the cause of fading cannot be attributed to the agents employed, but rather to the way in which they are used.

Photographers generally aim to produce deep blacks on their prints, in imitation of a steel engraving, and the public like to have them so. To preserve these blacks intact, I think may be attributed one of the chief causes of fading. The prints are removed from the fixing solution while they are being rapidly reduced, before the unreduced silver is removed. Hence it follows that rapid decomposition sets in, because there is a sufficient quantity—it may be an infinitessimal quantity—of silver, or sulphide of silver in the print, capable of being acted on by light. Hence we find the the first symptoms of decay are perceptible on the highest lights of the picture. But why should the highest lights of the picture be attacked first? Because there is the largest quantity of unreduced silver. It is a remarkable fact, that prints are never attacked first in the deepest shadows, and this confirms my opinion that one of the chief causes of fading is due to the presence of unreduced silver, because in the deepest shadows the silver has been reduced by the action of light, and need not the prolonged action of the hypo bath. I may be wrong in this opinion, but observation and experience has led me to this conclusion. It sometimes happens, in fixing a lot of pictures, some of them stick together, and the hypo bath imperfectly acts on some portions of them, and this may not be seen until the prints are mounted, and then it is perceived by disagreeable yellow patches. Now, I think that these yellow patches are identical (only in a greater degree) to the yellowing over of the lights of the print after a short exposure to the action of light. It is a known fact that prints more rapidly fade by being exposed in shop windows, or suspended in rooms, than those do that are placed in albums. It is worthy of notice (and worth an experiment), that when prints are placed in the fixing bath, for the first ten minutes they are rapidly reduced, and for the next ten minutes they are very much less so; and, if allowed to remain an hour, the reduction is not perceptible. Now, if a print that is still being reduced by the fixing solution be removed and washed, and mounted beside one that has been removed from the fixing bath, when it could no longer be reduced in any perceptible degree, the former will rapidly turn yellow in the lights, while the latter will retain its purity and brilliancy. I saw some *cartes* the other day that had been sent out by a respectable London establishment (the name was on the reverse of the carte), and they had only been out a few weeks, and the lights had turned to a dirty yellow. I feel certain from a careful examination that they could not have presented such an appearance had they been properly fixed.

I attribute the permanency of prints, fixed and toned by this process, to the prolonged action of the hypo, and their thorough fixation. Before referring to details, I may say a word or two in reference to the quality of the paper used. It is not at all likely that if the photographer can produce prints that will bear the test of ages, that the paper on which they are executed will remain entire. It is a known fact that for years the quality of paper has been deteriorating. The cause of this deterioration appears to be the excessive use of sulphate of lime in the manufacture, for the purpose of giving it a good colour, and apparent firmness of texture. The president of the Royal Scottish Society of Arts, at the last meeting, referring to this subject, said "that our books, some of which are called standard, are falling to pieces, and the deeds, which were intended to be permanent exponents of their writers' wills, are now so faint as to be scarcely legible." If printers' ink so rapidly fades through the bad quality of the paper, how can we expect any other than a silver print will fade from the same cause, if everything else is conducive to its permanency? No doubt this is the cause of the rapid discolouring of the paper, after excitation. The French papermakers, I think, use chlorine gas as the bleaching agent, which no doubt is an advantage, as no lime can remain in the pores of the paper. In order to preserve the keeping qualities of the paper as long as possible after excitation, I use a large quantity of nitric acid (½ drachm to the pint of silver solution), and place the papers in a close box. Some samples of paper will remain pure for a week; others under the same circumstances will not keep above three days. The difference I attribute to the sizing, or bleaching agents employed by the makers.

I need not say a word on albumenizing, as most parties buy their paper ready prepared. I excite the paper on an 80-grain solution of silver to the ounce, from three to five minutes, according to the thickness of the paper. I think there is no perceptible difference in the colour and vigour of the print, if a 60-grain solution is used, or if it is allowed to be the strength of 90 or 100 grains to the ounce. I think the silver solution should be regulated by the quantity of salt in the albumen. Makers of albumenized paper would confer a boon on purchasers, if they would state with each parcel sent out the quantity of salt used in albumenizing.

I almost invariably print in the shade, and deepen with a minutes exposure in the sunshine. The proofs should be printed several shades deeper than they are required, as they are considerably reduced in the subsequent processes of fixing and toning. But not more so than they are in the carbonate of soda bath, the printing that does for one, will do for the other. The prints should then be washed in three waters, then placed in a large pan of water, in which has been dissolved a handful of salt, allowed to remain there five minutes, then washed in another change of water, and they are ready for the fixing bath. My object in getting rid of the free nitrate is to preserve in working condition the fixing bath for a longer time; as it may without danger to the prints be used several times over. The fixing bath is composed as follows: six ounces of hypo to half a pint of water. Allow the prints to remain in this bath about twenty minutes, then wash rapidly in two changes of water, and they are ready for the toning bath, which is made as follows: dissolve four ounces of hypo in a pint of water, add gradually two grains and a half gold, dissolved in two ounces of water, stirring while it is being added. Let it stand twenty-four hours, as in the acetate of soda bath, then test for acidity; if no trace of acid is perceptible, add two or three drops of acetic acid. The bath should never be alkaline, and only slightly acid. The prints first assume a red colour, then a deep brown, then a purple, up to a blue black. This last colour named, frequently takes some hours. But the time varies according to temperature from half an hour to nine or ten hours. The bath tones better after a few prints have been toned. But it is necessary to add gold occasionally, whenever the bath tones slowly. When it ceases to tone satisfactorily it should be thrown away.

As regards the washing of the prints, I wash them very rapidly for the first half hour in several changes of water, then allow them to soak for four or five hours, changing them occasionally.

As regards the advantages and disadvantages of the process, they may be summed up in a very few words. The only disadvantage (if you are pressed for time) is the slowness of toning compared with the alkaline toning processes. But the certainty of the results in the purity of whites, the agreeable tone, and the permanency of the prints, more than compensate for this little drawback. I had intended sending a series of prints with this letter, to show you the capabilities of the process, but I have had no time to get them ready; but will send them on when I may have occasion again to refer to this subject.

Enclosed is half of a stereogram, done nearly five years ago, in fact, it was one of the first that I toned by this process, and it does not appear to have changed in the least degree, although it has been thrown about in every conceivable way. (The scene is a village inn, Devon.)—Yours respectfully, THOS. TEDRAKE.

*Appledore, North Devon, Jan. 4th*, 1862.

[The picture received is of a purple brown tint, and shows no sign of fading. The slight amount of acidity extracted would, however, undoubtedly lead to the decomposition of the hypo, and induce sulphur toning.—ED.]

## Critical Notices.

### A MANUAL OF ARTISTIC COLOURING, AS APPLIED TO PHOTOGRAPHS. By A. H. WALL. Second Notice.

WHEN we first introduced Mr. Wall's Manual to our readers, we had not time or space to enter into any detailed examination or analysis of the work. From what we had seen of the book, and what we know of its author, we felt perfectly safe in expressing our hearty commendation. A further examination more than confirms our first expressed opinion, and induces us to give a brief *resumé* of some parts of the work which possess especial interest.

Having duly introduced the subject and purpose of his work, in a chapter from which we quoted in a previous notice, Mr. Wall says, that regarding the photograph as the drawing upon which the colours are to be applied, it is of no small importance that it should at least be "perfect in resemblance, and pleasing in its general effect," and that it may be so, he points out the methods which the photographer should adopt in posing, grouping, lighting, &c.; pointing out certain important principles of art in relation to such matters, and boldly asserting that a bad photograph can never, by colouring, be made a good picture. We are then, by way of commencing at the beginning, initiated into the abstract qualities of colour in its optical relations, from the consideration of which we glide harmoniously enough into the principles of artistic colouring, and the peculiar qualities of colours as pigments, in reference to working, drying, body, permanence, purity, transparency, &c. in water and oil, and in their dry condition, both when alone and in combination. But even then the author checks the ardour of the young colourist, and bids him put aside his new brushes and colour-box for yet a little time longer, while he lays before him "one hundred maxims" carefully selected from the writings of eminent painters on the subject of colouring; for, says the author, "There is no 'royal road' to art," adding, "It were very little use to supply the means of travelling if there were no roads, and roads themselves might only confuse and delay if they were not provided with direction posts," which he regards these precepts as supplying.

The student is then initiated into the method of painting with dry colours, how to treat defects in glass positives, &c.; after which follow in succession touching in black and white, colouring in water and in oil colours, lessons in chalk, and in painting water-colour landscapes, &c. &c.

In reference to "touching" photographs, we find the following remarks:—"The native truthfulness of a good photograph is so superior to the meretricious smoothness and laboriously stippled prettiness of an india-ink drawing, that creating the last upon the first seems to me a display of the most erroneous judgment and bad taste. The excuse generally tendered for the 'touching' of photographic portraits, or, in other words, making them resemble india-ink drawings, is, that it gives them '*finish*,' by which is evidently meant smoothness." These are followed by a quotation from a work by an artist, once a very active member of one of our photographic societies, Mr. F. Howard, which states that finish "does not consist, as appears to be a prevalent notion of the present day, in smoothness of surface, or tea-boards would be the most finished productions of art. Sir Joshua Reynolds could not be said to have finished any of his pictures. Texture would be worse than of no value; but varnish would be the artist's best friend. Nor does finish consist in another kind of smoothness which results from the careful blending and softening of all the touches, so that the method of execution shall not appear. Nor does it consist in minute detail, but in *the complete expression of character*." In this sense, asks Mr. Wall, "What can be more finished than a perfect untouched photograph?"

That portion of the volume before us which is devoted to colouring in crayon will prove of no small value now that the solar camera has introduced life-sized portraits.

The most novel, and certainly not the least interesting, portion, however, is that devoted to lessons in colouring photographic landscapes. By the method here suggested, we see no reason why the most exquisite results should not be realized, combining the truthfulness of the photograph with all the qualities of a first-class water-colour drawing. We are not aware that we ever saw a coloured photographic landscape that was not inferior to a *coloured* engraving or lithograph, and judging from our own personal practical knowledge of painting, we easily recognized the great difficulties by which an artist, desiring to make of such really effective coloured pictures, would be met; but these difficulties are all overcome by the method here suggested, and we hope that what colour has done for our portraits will prove to be as readily done for our landscapes. Not long since Mr. Hannaford, a clever amateur landscape painter, better known to our readers as a very ingenious photographer, obtained a very charming effect by the use of oil colours on a photographic sea view, but stated that were it possible he should much prefer colouring the same in water.

It has just struck us to ask, how it is that some of the beautiful composition pieces of Rejlander and Robinson have never been translated into colour.* Surely such sketches would make glorious paintings if the colourist were only the peer of the photographer as an artist. What sunny gaiety might not be infused into the "Holiday in the Woods?" what sentiment and power might not the sombre gloom of the "Lady of Shalott" gain? in short, are there any of these photographs that would not, *in able hands*, make paintings of high rank and worth? We dedicate the hint to Messrs, Robinson, Rejlander, and Wall, the first an amateur painter, and the latter two both painters by profession, the last named gentleman we heard only the other day very enthusiastic in his praise of the "Lady of Shalott" as a subject for colour. Why does he not paint it?

### INSTANTANEOUS STEREOGRAPHS, OF VARIOUS SUBJECTS. By G. W. WILSON, Aberdeen.

WE have recently received a parcel of Mr. Wilson's charming stereographs, including a variety of subjects, landscape, marine, and street views, and interiors. It is now late in the day to say, that each one of these pictures, no matter what the subject, is little short of perfection. In conversation with a friend the other day on the subject, we found ourselves somewhat at a loss for a word which, in any especial sense, characterized these pictures. They are delicate, they are vigorous, they are perfectly defined, they are clean, they are atmospheric; the subjects are well chosen; they have all these characteristics and many more; but it is difficult to say that any one of these takes precedence of the others. We were obliged to fall back on a somewhat negative term, and speak of their entire faultlessness; of the absence of anything we would wish different. The landscapes are so well composed, so full of gradation and of atmosphere; the interiors are so perfectly rendered, so full of detail, and yet so grand and forcible, free alike

* Since writing the above, Mr. Rejlander has informed us that it is no uncommon thing for his pictures to be copied by painters without alteration or acknowledgment; and mentioned, that one which was hung, and received high praise, at a recent exhibition, was simply a copy of his exquisite "Night in London."—ED.

from heaviness and chalkiness; the marine pieces are so marvellous in light and shade, and cloud and water; the street scenes are so perfectly defined and free from either under exposure or blurring of the moving figures; all are so harmonious and well chosen, that it becomes easier to declare them free from fault than to point out the especial sources of their excellence.

Amongst the most recent are a series of views of some of our principal war vessels. Amongst these are to be found, perhaps, the most perfect specimens of instantaneity which have yet been produced. Some of the vessels are engaged in "great gun practice," and the plate has been exposed the moment when the cannon has belched forth its cloud of smoke, the immense volume of which is as crisp and perfectly defined as if it had been perfectly stationary, instead of a curling, wreathing, rapidly-changing mass of vapour. With all this the ship is perfectly made out in every part, hull and cordage, without the slightest trace of under exposure in any part. "H.M.S. Cambridge, No. 316," is an admirable example of this perfect instantaneity. There are two, we observe, of the same subject, and with the same number; but that presenting the broadside of the vessel is the most perfect.

We may here call attention to a useful practice adopted by Mr. Wilson in mounting. The paper containing the name of the subject extends over the whole of the back of the slide, and has the advantage of counteracting any tendency of the card to curl from the mounting of the prints on the other side.

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INSTANTANEOUS VIEWS OF LONDON, &c. C. E. Elliott, Aldermanbury Postern.

We have had the pleasure of seeing and reviewing many hundreds of instantaneous stereographs; but we must candidly confess that we have never felt greater surprise and delight, than we have experienced in examining some of the slides now before us. The subjects are of two kinds; street scenes, and views of cloud and water. Regarding the former we must express some qualification with our praise. Whilst they are very good considering the difficulties of producing instantaneous views of the streets of London, owing to the smoky condition of the atmosphere even at favourable times, they have some faults which scarcely belong to that cause. Some of the views have been taken from a great altitude, with the camera tilted, so as to look down on the scene, and the result is a peculiarly tumble-down kind of effect in the buildings. We may mention "No. 57, St. Paul's from the foot of Ludgate Hill," as a specimen of this defect, which ought certainly to be avoided. Some of the pictures are also a little chalky and under-exposed. Having said this much, we may add that they are, notwithstanding, decidedly beyond the average of such productions: the scenes well chosen, and the photography clean and vigorous.

When we approach the marine and atmospheric effects we can adopt entirely another tone of comment. Here all are charming, and some are perfect. We observed last week, in some remarks on the progress of instantaneous photography, that Mr. Wilson would have to look to his laurels. We had these pictures before us at the time we wrote, and in the photographer who produced them we believe Mr. Wilson will find his most formidable rival, if that rivalry can be considered formidable which simply comprehends a friendly struggle as to who shall best illustrate the great powers of a great art, and is conducted with the respect and esteem which we are sure must characterize the feelings of the neophyte competitor, and are certain will not be absent in the veteran.

The views before us comprise scenes chiefly on the Thames and the Solent; and have been produced under such conditions of light and atmosphere as we have rarely seen secured. In some there is a marvellous weird effect, which almost fascinates the spectator with the apparent vastness and solemn grandeur of the scene. A fine illustration of this is "123, Sunset at Ryde." The sky here is the charm, as the water in one part is a thought chalky: but what a sky! The horizon is surmounted by one immense bank of cloud which stretches across the entire picture; the sun has just sunk behind this cloud, but a rich warm glow of light radiates from it, and illumines the whole arch of the sky. The picture at once suggests colour, and we see the deep purple black of the cloud dense, but yet full of vapoury form and texture; and we see the golden light running through various tints and gradations into the blue of the upper sky. We should like an inch cut off the lower part of the negative, and the remainder enlarged to about twelve by ten. If well done, such a picture would be one of the finest things the art has produced. Even more perfect and quite as picturesque, but without the weird grandeur of the last is "No. 82, Sunset at Greenhithe." This is perhaps one of the most satisfactory specimens of chiaroscuro we have ever seen in a photograph: both foreground and sky are perfect. The sun has just descended behind an immense bank of dark cloud, the jutting fleecy edges of which it fringes with silver; a rift in the clouds shows the clear sky, and above the rift is a mass of cirrus cloud, the lower edges of which are illuminated by the sinking sun. The only bit of pure white in this picture is the delicate fringe of illumination to the clouds; all the rest consist of various gradations of demitint and shadow, in the most harmonious arrangement. We commend this slide to those of our readers interested in the matter, as a study of chiaroscuro. One of the most perfect studies of cloud we have met with is "No. 89, A study of clouds at Southsea." Here a mass of cumulus clouds, which cover the sky, possesses modelling and roundness, sufficiently perfect to give apparent solidity. This is not obtained at the expense of other parts of the picture, for a square rigged vessel in full sail is perfectly made out in every detail, as is also the water. We have not space to particularize further, or we might mention several others, each very fine indeed in their kind. We may especially refer to Nos. 87, 83, 51, 93, and 106, all of which are nearly perfect.

We have not received from the publishers definite information on a subject we always like to mention in notices of this kind. We refer to the name of the photographer who produced the pictures. We are strongly inclined, however, from internal and other evidence, to us satisfactory, to award the credit to a gentleman who, some eight or nine years ago, was a pupil of our own in the Daguerrotype process—Mr. Valentine Blanchard. If our conjecture be correct, we have pleasure in congratulating Mr. Blanchard on his success in producing stereographs which rank as high in artistic merit as any which have come under our attention. We would suggest to him the high value which many of these would possess if enlarged; and as he and the gentlemen with whom he is allied in business are proficient in the use of the solar camera, we hope to have an opportunity of seeing some of these stereoscopic negatives reproduced in large-sized pictures, which, if we are not mistaken, would take the photographic world by surprise.

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EUCLID IN THE STEREOSCOPE.
By G. F. Sams. London: The Stereoscopic Company.

This is a highly ingenious and useful application of the principle of binocular vision to an educational purpose. The diagrams of the first twenty-one propositions in the eleventh book of Euclid, treating of planes and solids, are produced on stereoscopic slides, so that when viewed in the stereoscope the geometrical figures are seen in their proper relief and solidity. Many of our readers will remember the interest excited a few years ago by the publication of a stereoscopic slide drawn from Cruikshank's "Bottle," by Mr. Sang. The principle on which slides with the proper stereoscopic relief could be produced from one picture was first promulgated, we believe, by Mr. Sutton, and Mr. Sams acknowledges his obligation to that gentleman for the method by which these diagrams are produced. The slides are neatly engraved, and the stereoscopic effect very perfect. They are interesting as illustrations of the principle of binocular vision, and cannot fail to be welcome aid to the mathematical student.

# Proceedings of Societies.

## London Photographic Society.

The usual monthly meeting was held on the evening of Tuesday, January 7th, at King's College. The Lord Chief Baron in the chair.

The Chairman said he need not remind them that since they had last met there, on the first Tuesday in the month of December, there had occurred perhaps the greatest calamity almost which had ever befallen this or any other country at any time. It was proposed by the council that they should do no other business at this meeting than what was absolutely essential, such as reading the minutes and going through the usual forms. He should have then the honour of proposing an address of condolence to her Majesty on her recent heavy bereavement. They were not a chartered body; the society consisted of the members, who themselves appointed their council to conduct their affairs, and a president to preside over their meetings. It appeared to this council that it would be better if the address of condolence was presented not merely from the council, but from the whole body of the society, as the sentiments which belonged to them generally. It was not the council, but the society to whom her Majesty the Queen and the late Prince Consort were patrons; it was the society who had the advantage of that honour, and who benefitted by the countenance, advice, and assistance which the late Prince had rendered. Every member was interested in expressing his sincere sympathy with the bitter bereavement suffered by her Majesty, and in expressing the deep loss of the country in being deprived of the services which had contributed so largely to its welfare. It was proposed, therefore, that they should at that meeting do no business which could be dispensed with; but let their sole duty be to pass an address of condolence and sympathy to her Majesty, which had been already approved by the council. After hearing the address read it would be for the meeting to say if he should append his name to that address as their president.

The Secretary then read the minutes of the previous meeting which were confirmed.

The Chairman remarked, before reading the address of condolence, that of course if any member thought, on hearing the address, that anything could be added which would make it more acceptable to the entire society, and make it more expressive of their feelings in relation to the connection which had subsisted between her Majesty and the late Prince Consort and the society, it was open to such member to make any suggestion. The address was to the following effect:—To Her Gracious Majesty. We, your dutiful and devoted subjects, the president, council, and members of the photographic society, urged by feelings of the deepest gratitude to your Majesty and his Royal Highness the late Prince Consort, our patrons, humbly venture to address your Majesty to express how deeply, in common with all the nation, we deplore the inexpressible calamity which has befallen your Majesty and the entire nation. We, especially, who have been guided by the practical judgment of his Royal Highness, assisted by his liberality, aided by his advice, stimulated by his example, cheered and encouraged by his presence, deeply lament the irreparable loss this society has sustained. We humbly express our sincere share in the sympathy of the whole nation, and pray that, by the blessing of the Almighty, you may receive the only real consolation which so great a bereavement will admit of; and that your Majesty may derive satisfaction from the happiness, prosperity, and honour of the countries you govern, and from the universal esteem and devotion of the subjects who have benefited by your Majesty's reign.

The address was carried unanimously, and the proceedings terminated.

# Correspondence.

## FOREIGN SCIENCE.

[from our special correspondent.]

*Paris, 8th January*, 1862.

A retrospect of the progress of photography during the year that has just passed away, naturally induces the inquiry, "In what does the future of photography consist, and in what direction does it lie?" This question becomes more difficult to respond to every year, in proportion as photography advances on the road to perfection. With such results as are now attained by so many eminent artists we might reasonably be satisfied, were it not the disposition of the true artist to remain content with nothing short of absolute perfection. But the greater the strides toward perfection during the past, the more timidly we look to the future. "What further improvement can we hope for?" is the question that even the most ardent and sanguine must frequently ask.

We would gladly accept a more certain or less capricious medium than collodion, but the various substitutes for it hitherto brought into notice have found so little favour, that the empire of collodion remains unshaken.

But dry collodion, that much coveted desideratum, is far from having received its last improvement, and, perhaps, no element of photographic operations is more worthy of study and experiment than this. We have recently witnessed the effects due to the tannin process; we have yet to see what can be effected by the addition of resinous bodies to collodion, for the attempts hitherto made have lacked persistence and method. Yet enough has been achieved to satisfy the most sceptical of the resources lying dormant in resined collodion.

Closely allied to this part of our subject is the consideration of "washed collodion." Our views in this matter have been very excursive, and experience has reversed many formulæ insisted upon with singular pertinacity, even after their empiricism was fully proved. That collodion can be freely washed, without in any degree losing its sensibility, is a fact now fully substantiated, it being well proved that the presence of nitrate of silver on the collodion film is entirely unnecessary during exposure, as was once so strongly insisted upon. Besides, washed collodion pictures are developed much more rapidly under the same circumstances than are those on unwashed collodion.

M. Garneri's mineral collodion has a very tempting aspect, and it is to be hoped that experiment will realize all the results expected of it. It seems to be specially applicable as a dry collodion, and to occupy an intermediate position between albumen and ordinary collodion.

It is probable that the resources available in developing agents, or in modification of those in use, are far from being exhausted. Temperature, it has been shown, greatly modifies the results of this operation, especially in winter; but in all seasons, the reaction is accelerated by heat, while at the same time the proportion of nitrate of silver may be reduced; and thus it happens that purer images may be obtained by duly regulating the temperature of the developing solution.

The difficulty in causing collodion to adhere to the glass plate, although not insurmountable, cannot yet be said to be fully overcome. We know that it depends upon the chemical composition and cohesion of the collodion: both extremely variable conditions. And yet the importance of possessing the means of securing this adherence is very great under all circumstances. Coating the plate with albumen is a remedy, it is true, but one not quite satisfactory: another less objectionable, consists in covering the edges of the plate only with albumen, which has the effect of causing the most troublesome collodion to adhere. This simple application is very quickly performed, and fully compensates for the slight trouble it involves.

It is not very long ago when great distrust attached to positives on paper. Fading was so general, that few persons had the courage to look upon their proofs as permanent. But no sooner was the extent of the evil recognised, than a remedy was found, and, perhaps, in no branch of the art of photography has more satisfactory progress been made. It is, however, highly probable that the next step in advance will be to find a reliable substitute for the salts of gold in toning, among which, doubtless, platinum will take the first rank.

Carbon printing cannot as yet pretend to vie with printing with salts of silver; yet the success obtained by M. Fargier encourages the hope that still further progress will soon be achieved. The true path of carbon printing consists, it appears to us, in obtaining a photographic picture on stone from which any number of lithographs may be printed. The efforts yet made in this direction are very far from producing gradation of tone in the impressions, and it is not improbable that this fact will present insurmountable difficulties. For designs in outline, photolithography is fully available, but when it attempts designs in chiaroscuro the resulting picture presents no harmony: there is no relief, but a disagreeable flatness instead.

It is now generally admitted that the perfection of photographic portraiture depends principally upon the rapidity with which the picture is taken, assuming a natural attitude to be attained. Probably no style of portrait is so satisfactory as the little full-length now so popular as *cartes de visite;* certainly none other has ever been so popular. In a portrait the figure is as characteristic of the individual as the face, and if it has not hitherto been appreciated at its full value, it must be attributed to the conventionalities and short-comings of the portrait-painter. Thus it happens that the popular *cartes de visite* constitute one of the most valuable and important contributions, I might say *the* most valuable and important, to the science of anthropology.

Extremes will ever meet. Full life-size portraits would doubtless enjoy great popularity, if the difficulties to be overcome in producing them were not so great; but to be tolerable, portraits on this scale must be enlarged from very small negatives taken in the fraction of a second. Between two portraits of the same person, one taken in a quarter of a second, and the other in ten seconds, there is always as much difference in expression as between the living face and a mask taken after death.

## Talk in the Studio.

The Tannin Process.—Mr. E. Borda, writing to one of the American journals, says that tannin plates give more softness and delicacy when developed with a warm solution of gallic acid than with the pyro developer, especially for subjects having much contrast, such as dark foliage, and water, &c.

Louis Napoleon has given Professor Bunsen the decoration of an officer, and M. Kirchoff the Cross of the Legion of Honour, in recognition of their valuable discoveries in spectrum analysis.

Startling Discovery.—We, in the metropolis, are decidedly behind the age. Whilst we have deemed a certain thing as scarcely possible, in the provinces it is done; and photographic portraits in their natural colours are a regular article of commerce. A correspondent sends us a trade circular issued in a provincial town, from which we make the following extracts:—"New and important discovery! Photographic portraits in their natural colours. The ——— established for the purpose of supplying the public with large-sized, highly-finished, everlasting family portraits in their natural colours; to be taken daily, and in the evening by the chemico-electrical light, in a style hitherto unequalled." The announcement of the natural colours is not deemed sufficiently attractive alone, and as an additional inducement, an immense amount of valuable property is to be given to the patrons of the establishment. The munificent intentions of the artist are thus announced:—"Christmas presents, and New Year's gifts, of great value, to be positively given away at the commencement of the New Year, consisting of magnificent electro-silver tea service, elegant gold and silver watches, superb gilt ormolu time pieces and clocks, under glass shades; ladies' gold guards, lockets, and brooches; albert chains, and numerous other costly articles, some of which are now on view in the shop window of Mr. ——— jeweller." With a sly touch of prudence it is intimated that the quantity of "costly articles will be increased or *diminished*, according to the number of subscribers."

## To Correspondents.

*** The Fifth Volume of the Photographic News, neatly bound in cloth, is now ready, price 15s. Covers for the Volume are also ready, price 1s. 6d. No. 123, for which numerous inquiries have been made, is now reprinted, and may be had at the Office, or of any bookseller.

C. Scarfe.—The contamination of the atmosphere in the immediate neighbourhood of a gas-house will tend to discolour unvarnished collodion positives. The only way to avoid it is to varnish the films or keep the plates in boxes which exclude the atmosphere as much as possible. Some samples of collodion produce a greater tendency to discolour than others. Collodions of what is termed the "organic" character favour this discolouration most.

J. P.—In asking "what colours are most suitable to make a dark background," are we to understand you as referring to the colour for your background screen, or to the colours for applying to the background of a picture? We will presume the screen. In that case it will depend upon whether you wish to paint in oil flatting, or distemper. If the former, use white lead with just sufficient drop black to make it a dark grey, and dilute with turpentine. If in distemper, use ordinary whiting, with lamp-black added to the desired tint. Some operators prefer a stone colour of about the colour of brown paper. Common whiting and brown umber may be used to produce it. In mixing distemper colours, remember they look several shades darker whilst wet than when dry. It is well before applying them to a screen, therefore, to try first, allowing the colour to dry, on a piece of paper.

G. Price.—There can be no doubt that an analytical index would be very valuable. We have several times contemplated making one to the whole of our volumes yet published; but we fear the cost of production would scarcely be repaid. In order to derive the full value of a series of volumes containing such diversified information, we think it is highly advisable for readers to keep a "common-place book," in which should be registered alphabetically the place of every fact or formula worthy of further note or reference. In articles such as appear in our pages, it often happens that important ideas, allusions, recipes, &c. &c. occur incidentally in the article which cannot be even indicated in the title. The matter appearing under the general head of "correspondence" is full of such information. Our last issued index, got up at a very considerable cost, and given to our readers gratuitously, is the most copious we have issued, but no ordinary index can refer the reader to a tithe of the information the volume contains. Many of our readers keep such a common-place book as we have described, and we recommend the plan to all who wish to have a ready means of finding all the information bearing on all important subjects at a single glance. We will hear your suggestion as to the reference to the No., as well as page, in mind. We never dream of taking offence at well-meant advice; but aim, as far as we can, and see right, to profit by it 2. We have never met with any of the samples of paper giving mealy prints in our own practice; but have seen many mealy prints in the hands of others. Mr. Fry will, doubtless, be willing to supply you with some of that we referred to last week, if you call at his establishment in Gracechurch street.

J. A. F.—If the lenses are required for stereo work only, the stereoscopic lenses will answer perfectly. If for *cartes de visite* as well, the No. 1 B. The first cover well and work very rapidly, but cannot always be worked with full aperture. The second would have an advantage for instantaneous work, inasmuch as they will cover the stereo size very perfectly with full aperture.

An Admirer is thanked.

B. F.—If you are certain the landscape lens you speak of buying is a "Ross," you may purchase it with safety, with full assurance of its quality.

G. H. C.—We have met with a similar difficulty to that you describe, when using bichloride of mercury as a strengthening agent, the image becoming thin and transparent. It is doubtful whether in that stage there is any certain remedy; the best chance will rest in the use of pyro and silver. Dry plates are better strengthened by that means, at any time, than by bichlorides. If the latter be used, they should be very dilute.

R. Atherton.—We forwarded the letter to the proper address.

O. B.—The arrangements you require are those of the solar camera. The 9-inch condenser will answer very well. It may be placed, plano side next the negative, at such a distance from the portrait lens that its focus falls upon the front lens. The distance of the negative from the portrait lens will be regulated by the amount of enlargement. See table in our Almanac. Your mirror must be so placed that the image of the sun is always directed to the centre of the condenser, and will, if you print out instead of developing, require constant attention. See various articles on the solar camera in our last volume. The same remarks will apply to your arrangement throughout.

Subscriber.—The probability is that your collodion now contains a considerable excess of ether, and by rapid drying may cause you the lines complained of. When you require to dilute collodion, do it with equal parts of pure ether and alcohol. If the streaks arise from the collodion at all, the excess of ether is the most probable cause. Sometimes such fringes arise in the course of development from irregular draining of the solution, whilst the negative is being examined.

1862.—We do not know of any other. We have not seen the set to which you refer; but it is much too low in price to be worth anything. In photography there is nothing so delusive as mis-called cheapness. For a beginner a very low-priced set might serve for first experiments, but it would require replacing in a few months.

G. F. L.—The ebonite continues perfectly satisfactory in our hands.

X. Y. Z.—The late Mr. Lacy used the No. 2 B lens of a well-known English optician in the production of his card pictures. He had tried the lenses of several makers previously, but finally he only used those we have named.

Several articles, letters, and answers are compelled to stand over until our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32, Paternoster Row, London.

THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 176.—*January* 17, 1862.

## PRELIMINARY COATINGS FOR GLASS PLATES.

NE of the great difficulties which have attended various forts to simplify the use of dry collodion, has been a ndency, in the hands of the majority of operators, to the osening and destruction of films. The fact that in the ands of some photographers this difficulty is either never lt or easily overcome, cannot, we presume, be accepted as vidence against general experience. In our own hands ich a thing as a lost film is an occurrence so rare as not to nter into our list of casualties. Mr. Ward, whose process ppeared in our last, uses simply washed collodion, with ntire immunity from this evil. Some others give similar stimony. But in spite of all this, one of the most common omplaints amongst those who use simply washed collodion, annin plates, or plates prepared by any similar process, is, hat the films loosen, expand, crack, or blister. This evil it s clear is sufficiently general to demand some consideration f the remedies proposed.

These remedies consist chiefly of the application to the lass of some preliminary adhesive coating, gelatine, india-ubber, or albumen being the substances proposed. Major Russell, whose opinion is entitled to some consideration, ives the preference to gelatine; but although its use is, omparatively speaking, unobjectionable, it does not seem to ave become a favourite with the majority of photographers; robably owing to the fact that the aid of heat is necessary o prepare and keep the gelatine solution in a condition for se, and that the layer of gelatine is apt to decompose in the resence of damp atmosphere. A sub-stratum of india-ubber is strongly recommended by some operators. Major Russell, in a recent article in our columns, speaks of its value f certain conditions be observed. Mr. Glover, in a recent ommunication to our Liverpool contemporary, gives very ecided preference to india-rubber as a preliminary coating, nd adds some information as to the best mode of using it. We make some extracts from his remarks. He says :—

"After careful experiments with all three substances, I find a olution of india-rubber, of such a consistence as will readily ilter, to be the most effectual and easy of application, flowing vith all the readiness of collodion. In coating with gelatine or lbumen the glass must be chemically clean, or either will be epelled by the surface, and cause subsequent difficulty and nnoyance to the operator; but the solution under notice lows equally well on the glass, even after unlimited contact vith the fingers, and without affecting the resulting nega-ive. Not that any sane individual would either practise r recommend anything but strict cleanliness, but it is sola-ing to be enabled to ensure a perfect and adhesive surface vith the minimum amount of trouble. Both Major Russell nd many others complain that india-rubber films contract nd split up on applying the necessary heat to varnish he negative. This difficulty may be entirely obviated by ubjecting the coated plate, as soon as surface dry, to a consi-lerably greater heat than is required, previous to using spirit arnish—bearing in mind not to continue it to such an extent s to produce decomposition, but sufficiently long to dissipate ll traces of the solvent, leaving nothing but a coating of pure ndia-rubber to receive the collodion. The error of previous xperimenters has been the subjection of the negative to a reater amount of heat than the foundation previously under-vent. An addition of about one grain of common resin to each unce of solution is also a further preventative against the evil n question, and it is then less dependent upon the thorough eating than without such addition. I find the best solvent or the purpose to be common coal tar naphtha—or equal parts f it—and spirits of turpentine. Benzole, although more agreeable to the sense of smell, is too volatile; which is also the case with chloroform, producing lines or streaks of unequal thickness, similar to collodion containing too great a proportion of ether.

"What I wish to urge is the superiority of india-rubber as a support for collodion, on account of the following reasons :—The great facility with which it is prepared and applied; its un-changeable qualities, as after it is once properly filtered it never deposits sediment, and keeps indefinitely; its complete neu-trality, however long in contact with nitrate of silver; its insolubility in water and very slightly in collodion, so that the thinnest possible coat is only necessary; and, lastly, its inde-pendence of the state of the glass surface."

Probably the plan suggested by Mr. Glover of applying considerable heat to the film of india-rubber, when on the glass plate may, by slightly melting it, cause it to adhere more firmly to the glass than it does when the film is simply dried by the evaporation of its solvent. If this were not the case, we should not expect the layer of india-rubber to adhere more firmly to the glass during the processes of wash-ing, then a film of glutinous collodion. Indeed, we have used both india-rubber and gutta-percha as a preliminary and an efficient aid in transferring the film. In preparing a solu-tion of india-rubber it may be well to mention that the pro-cess may be materially facilitated by the use of a portion of chloroform. In either benzole, mineral naphtha, or turpen-tine, the india-rubber requires digesting for some time, and sometimes the aid of heat before perfect solution is effected. If, however, the strips of india-rubber be immersed in a little chloroform, it is rapidly dissolved, and may then be diluted with any of the other solvents which may be chosen. It should be remembered that both mineral naphtha and tur-pentine leave some residue behind after vaporization, the pre-sence of which is scarcely desirable.

The preliminary coating which has been most largely used, and most generally preferred is albumen. The use of a substratum of albumen has been recommended as having under some circumstances a very important chemical action, as well as for its mechanical aid in preserving the film. Some years ago the Rev. Mr. Laws suggested its value in giving vigour and richness to the negative image, a result to which it undoubtedly contributes. Mr. Hislop, whose paper on washed collodion was recently read at the North London Society, invariably uses a coating of dilute albumen solely with a view to its mechanical effect. Incidentally, however, there can be no doubt it plays a part in the chemi-cal part of his process. Against this view it was urged at the meeting, that Mr. Hislop coagulated his albumen by ex-posing the coated plate before a brisk fire. We at the time ventured to affirm that no coagulation would take place under such circumstances. It has been asserted also that the film of albumen is coagulated by the application of the collodion. We venture to doubt this also, as we feel satisfied that a film of dried albumen is not coagulated by ether or alcohol. But even supposing it were coagulated, that would not prevent it exercising an important action in the forma-tion of the negative image.

That this should be the case is not, however, by any means necessarily a disadvantage if it can be proved that plates so prepared do not injure the bath. This is a point on which much contradictory experience has been promulgated. As we were anxious to lay the best evidence we could obtain on this subject before our readers, we have taken some pains to collect some facts and opinions from trustworthy sources. So far as we can ascertain, general experience is corroborative of the views of Mr. Hislop, to the effect that collodionized plates, having had a preliminary coating of *dilute* albumen may be excited in silver baths containing *acetic* acid without injurious results. Mr. McNab, of Glasgow, who has had very extensive experience in the use of plates so coated, gives us a very full, lucid, and satisfactory statement of his own practice in the matter from which we make the following extracts:—

"I have been much interested in the discussion going on in the North London Society, on the preliminary coating of the plates with albumen. I had thought its use had been a settled question, and no new light could be brought to bear upon it. If I may be permitted to give my experience upon it, it is more or less in unison with that of Mr. Hislop. The cleaning or preparing of the plates is at the threshold of all our other operations, it is not the most pleasant: it is too often the Slough of Despond to many; it is tedious and often irksome in the extreme. How often have our tempers been ruffled and soured in endeavouring to prepare them fit for use, the testimony of the thousand and one failures, mishaps, comets, spots, and all the innumerable ills to which dirty plates are liable, not to hint at cracking and rising of the films, and other evils too numerous to mention, can testify.

"I think I am within the mark when I say that more failures have arisen from this cause, than all the fogging baths, and tender and bad collodion put together. One is apt to treat the matter lightly, and think there is nothing easier than to clean a plate fit for good work: this is a great mistake, to the bitter experience of many who have abandoned it as a great bore. If it is difficult with small plates, it is worse with larger ones. How very many would be up and doing, but they *hate* the cleaning of these abominable plates, and shove it off from day to day, and dodge it fifty ways rather than begin it. If they could speak, many neglected cameras, and dusty lenses, and deserted apparatus, could bear testimony to all I now say, arising from the drudgery of washing, drying, and buffing glass plates. To get over the evils complained of, a friend of mine recommended me to try a preliminary coating of albumen. I did so, and found it to work well, and had it constantly in use for a considerable time, when I had the pleasure of a visit from Mr. Shadbolt. I mentioned the matter to him, that I used a bath for positives and negatives; he said it was somewhat singular that he had a communication from Manchester, in type, on the same subject. He suggested to me the use of iron to coagulate with, which I have constantly used with much satisfaction.

"First of all, a flattened sheet is carefully selected, free from kiln smoke, or crown glass, this effects a considerable saving in the price. They are washed in water strongly acidulated with nitric acid, and afterwards in a copious stream of pure water from a tap; and then put into a rack to drain a little. In the wet state they are coated with albumen in the same way as you coat a plate with collodion, the superfluous albumen is drained through a filter into a wide-mouthed bottle to be ready for future use; the plates after draining are put upon a rack before a brisk fire to dry, and then to be stowed away in packages, to be ready at any future time to be coagulated ready for use. In this state a great many are prepared at one time, and generally two hands are at work on them at the same time, the one to wash, the other to coat with albumen.

"When wanted for use they are taken out of the packages, and one after the other wetted all over under a flowing tap. A saturated solution of sulphate of iron acidified with sulphuric acid is now poured over the plates, the same as if you were developing the plate, the solution is made to flow over the plate in one continuous, unbroken wave, and kept floating upon the plate for a short time, and afterwards washed in abundance of water. It is now placed in the rack before a brisk fire and dried. After they are dried they are carefully cleaned upon the back and marked, as it would now be difficult to find out the prepared surface. I have never experienced any difficulty in covering the plate with collodion.

"In preparing the albumen, I take white of eggs with the germs carefully taken out, and beat them up in a bason for some fifteen to twenty minutes till it gets into light, white froth. It is allowed to settle, and three parts of water to one of egg is added and filtered into a large bottle: liquor of ammonia is added till it sensibly smells of it. This helps to preserve it.

"The advantages of a preliminary coating of albumen to the glass is cheapness in the price of flattened sheet for large plates. The collodion, however tender, adheres with tenacity, and is with difficulty removed. Less labour and more certainty in the preparation of the plates; freedom from blemishes of every sort; the negatives will stand much rougher usage, and is somewhat firmer in texture; and I do not find the bath more liable to get out of order than with plates in common use. I have worked with baths until they were unfit for use from the large quantity of ether and alcohol they contained, without having a foggy plate. I have thought that after long use they showed symptoms of loss of sensitiveness, but I am not quite sure but that the same may be said of a bath somewhat improved from constant use, when it begins to show symptoms of coming age.

"To all who are in the habit of using large plates for out-door work or copying, or printing large transparencies, it offers many advantages, not the least being a temper unruffled by losing films from off the plates, and perfect immunity from spots and blemishes, so far as the preparation of the plates is concerned.

"I have thus given in my own way my method of working plates so prepared. I do not know if I may have shown it as you wish that I should have done it—it is the best way I can explain myself.—I am yours, dear sir,

"ALEX. MCNAB."

Mr. McNab's conclusion, it will be seen, after perhaps more extended experience in the matter than any other photographer we know, is in the highest degree favourable to the use of this preliminary *couche* of albumen. Mr. Hughes, who at one time tried the same plan with marked success, so far as the negatives are concerned, was obliged to give it up from the gradual injury to the bath, which resulted in fogging. There was this difference in Mr. Hughes' mode of proceeding: he used undiluted albumen, whilst in all the successful cases of which we have record, the albumen is used in a considerably diluted condition.

Before leaving this subject, there is another curious discrepancy of experience to be noted. Mr. Glover, in the article to which we have referred, says:

"Finely-ground glass gives a more sensitive film than its natural surface does. On the contrary, gelatine and albumen surfaces have a decidedly retarding influence. This is not the case with india-rubber, as may be demonstrated by the following experiment:—Coat the halves of three plates with each of the substances in question; make them into dry plates by any of the processes; expose and develop as usual, and observe the result.

"The appearance of the half covered by the albumen is that of being less exposed than the half left bare; the gelatine presents a greater contrast still; while the india-rubber seems not in the least to have affected the result."

Mr. Hughes, Mr. Hislop, and all from whom we have received any communication, state on the contrary, that the use of an albumen coating gives a very decided accession of sensitiveness. The only mode of reconciling this discrepancy is to refer it to some varied condition of the other chemicals used by the gentlemen in question, as it is well known that organic matter, in some circumstances, acts as an accelerator, whilst under other conditions it materially retards actinic action.

## Notes and Jottings.

No. 11.

### "NEW" IRON PROCESS BY MR. REYNOLDS—"NEW" CARAMEL DRY PROCESS.

WE have before us the paper read by Mr. Reynolds, before the Dublin Chemical Society,* together with some remarks thereon by Mr. Shadbolt, in the last number of *The British Journal of Photography*.

The term "new," as here applied, reminds us of the way in which the same word has been so frequently used in claiming originality for slight modifications of well known dry and preservative processes. Mr. Shadbolt himself would have some difficulty in informing us of the number of "new" processes his introduction of honey, as a preservative, has originated. Brown sugar, white sugar, burnt sugar, "hard-

* See p. 5 of the present vol.

bake," treacle, golden syrup, are only a few of them. This printing process is equally "new;" for Sir J. Herschel long ago stated that persalts of iron were reduced by light to protosalts, which latter, as is well known, precipitate the salts of gold and silver.

He says: "If paper prepared with the ammonio-citrate, or ammonio-tartrate of iron, and impressed with the latent picture, be washed with nitrate of silver, a very sharp and beautiful picture is developed of great intensity. . . . . The picture may be fixed by the hyposulphite of soda, *which alone, I believe, can be fully depended on for fixing argentine photographs.*"

Now, the use of peroxalate in lieu of the salts of iron given above, is as original as the employment of treacle instead of honey, just alluded to, so that nothing "new" can be claimed on that score; and the same may be said as regards the reduction of silver by the protosalt of iron.

Mr. Burnett, too, has, we believe, given very similar suggestions, although we cannot at this moment recollect where and when; but some of his communications state the results of numerous experiments with the proxalate of iron.

His Uranium process in its action and manipulation is identical with that given by Mr. Reynolds, save in the difference of the sensitive agent. Thus:—

Persalt of *uranium* is reduced by light to a protosalt: persalt of *iron* is also reduced by light to a protosalt. When the print is placed in solution of silver or gold, the protosalt of uranium, again becomes oxidized, silver or gold, as the case may be, being deposited.

The iron print, on immersion in gold or silver, likewise becomes again per-oxidized in the reduced parts, the metals being deposited.

In each case the sensitizing salt is removed by water.

It will thus be seen that in principle Mr. Burnett's uranium, and Mr. Reynolds's, or rather Sir J. Herschel's iron processes, are the same; the difference of one salt being used instead of the other, being, theoretically, about the same as developing the image on a collodion plate with one deoxidizing agent in preference to another.

But Mr. Reynolds says, as regards fixing, after immersion in silver solution:—"All that now remains to be done is to wash well dry and mount, when the picture is finished." Mr. Shadbolt endorses this statement, saying, "it then remains but to wash the print in distilled or rain water, and the operation is finished." Now Mr. Hardwich in similar cases has objected that all papers contain chlorides in their composition, chloride of silver being thereby formed, the lights of the picture suffering in consequence. In our quotation above, from Sir J. Herschel, we have italicised his assertion that the use of hyposulphite of soda is necessary, and Mr. Burnett after full trial, very unwillingly had to fall back on the same agent.

We do not remember to have heard of a like statement to that of Mr. Reynolds respecting the weakening of half tones in consequence of the reduced protosalt being partially dissolved by the persalt, and for this hint we must certainly give that gentleman our thanks. Mr. Shadbolt we know has always been of opinion that bichromate prints do not present half tones equal to silver, that is, that the number and minuteness of particles of reduced silver would be greater than those of the bichromate. Without waiting here to discuss that point, we purpose giving a trial to his suggestion as to whether the reduced bichromate is not in a similar manner partially dissolved by the perchromate.

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Mr. Bartholomew's caramel, or burnt sugar process is also not quite new. Sutton in his dictionary says:—"It has been tried instead of honey, &c., in preservative processes. It was found to lessen sensitiveness, but was less inclined to crystallization." In short it is the honey process of Mr. Shadbolt, slightly modified.

Of his third "new" process we shall be glad to hear something more. Michael Hannaford.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.

BY F. R. WINDOW.

It is easy to find fault. It is far from my intention to do so. In the following remarks upon some of the apparatus employed in photography, my aim is simply to pass in review a few of the contrivances that are generally in use; and, keeping in view the object for which they are intended, to ascertain whether each particular form is the one most suited to its purpose, offering occasionally such suggestions as may from time to time be prompted by my own experience.

Every one who has practised photography has probably at some time discovered that the instruments at his disposal, that is, those generally manufactured for sale, were not quite suited to some particular object he wished to attain, and he has had to exert his own ingenuity to remedy the shortcoming. Descriptions of many of the modifications so designed have appeared in these pages; and this class of practical information has mostly been well received by photographers, who are always anxious to seize whatever may tend to the improvement of their art, whether it be a chemical, an optical, or a mechanical detail, or a lucid illustration of its higher capabilities to "hold the mirror up to nature."

In the following "remarks" I do not propose to deal with exceptional cases, like the above, which photographers have generally proved themselves perfectly capable of dealing with, but I intend to confine my observations solely to those instruments which are required for the ordinary daily practice in the laboratory, the studio, and the field.

It is worthy of remark that, with the single exception of the optical portion of the lenses, the mechanical appliances for producing photographic pictures have suffered scarcely any important modification in their various details, since the date of the first introduction of the now universal process on collodion: and while our eminent opticians and chemists, by dint of hard labour and minute investigation of the various requirements of the art. have furnished us with lenses and chemical formulæ which can compare with those of 1850 as "Hyperion to a Satyr," we have still the same cameras, the same baths, the same dishes, stands, boxes, and other apparatus, with but slight modifications, that were used at that date.

Does this arise from the absolute perfection of this apparatus, and the recognised impossibility of improving it, to keep pace with the optical and chemical departments? I think not. I believe that if a dozen intelligent practical photographers, competent by their mechanical knowledge for such a work, were separately requested to furnish a design of their idea of a perfect camera for the studio, for instance, they would very probably produce twelve designs each differing in its details distinctly from the others; but I feel equally certain that each would likewise differ quite as widely from that in general use. Indeed, this opinion is corroborated by the fact that a large number of our principal artists use cameras and other apparatus made after their own design, differing materially in many points from those which continue to be manufactured for sale to the general public.

We must, therefore, reject the idea that our present photographic apparatus has undergone so little alteration during the past twelve years, because it was at first designed perfect, and scarcely susceptible of improvement. I believe the real cause will be found in the fact that it is no one's business to study the matter with a view to improvement. The photographer is engaged in the production of the best possible pictures, with the appliances at his command; and it is evidently not the interest of a manufacturer to risk the introduction of new types and innovations into his business, entailing a fresh education of his workmen, so long as the articles he is accustomed to produce meet with the approbation of his customers.

Another cause, also, nearly allied to the above, may probably be traced in the fact, that photographers generally may not be sufficiently conversant with mechanical operations to enable them to offer really *practical* suggestions for the defects which they may recognise in their apparatus; and that the manufacturers have seldom that intimate practical acquaintance with the art of photography which would alone enable them to judge of its real merits.

It may be urged that our apparatus cannot be very defective, because we are able to take with it very excellent pictures. This is true; but our aim should be *perfection*, an unattainable goal in art, but which, I take it, is nearest approached by a consciousness of imperfection, a diligent study of its cause, and a steady desire to progress. We ought to be dissatisfied with our work if, at the end of a year, our results do not show an improvement upon those produced twelve months ago. We should always be striving to move forwards. In such an art as photography, how slight, how apparently insignificant, may not be the cause of a great effect? Yet, if each trifling cause or source of recognized error, when remedied produced an amended effect but in a ratio to its minute self, we should not neglect it, but—however small the apparent step—rather set it down as a great profit, as another round gained in our climb towards perfection.

A remark by one of the most eminent photographic artists that this country has produced—alas! no longer among us—was registered in this journal a short time since, and is so singularly illustrative of my argument that I cannot refrain from quoting it. In reply to a question respecting the worth of a toning formula he had purchased at rather a high figure, Mr. W. G. Lacy, replied, "In aiming at perfection, a very slight step is a great deal, and is worth *anything*." And the enlightened editor aptly comments—"Such an answer was a key to his success."

So, if in the "remarks" which I propose to make, and the propositions I may have to offer respecting the mechanical appliances used in photography, I am successful in advancing the art but one very slight step, I shall be content, and count it a great deal.

(*To be continued.*)

## Scientific Gossip.

Composition of the Photographic Image—Ruby Gold and Silver—Minute Divisibility of Matter.

The recent discussion on the composition of the photographic image, first started by Mr. Malone's lecture on this subject, at a late meeting of the Photographic Society, has caused attention to be directed in several quarters to the almost infinite extent to which matter may be subdivided. The idea that a dense metal like gold or silver *could* be precipitated in so minute a state of subdivision as to allow of the passage of rays of light, appeared incredible to some writers on the subject—one contemporary, indeed, going so far as to question the statement of the ruby or purple colouration of Mr. Malone's liquids being produced by solid suspended matter at all, unless the said particles could be seen floating about in the liquid when examined under the microscope. Now undoubtedly neither Faraday nor De la Rue, could detect the slightest symptoms of resolvability of the ruby gold liquids into separate particles, but this only shows that the compound microscope has but limited powers, in spite of the perfection to which it has been brought, and must not be used as an argument to limit the powers of nature. Indeed, Faraday has shown that in his ruby fluid there is only one volume of gold diffused through about 750,600 volumes of water; and that whatever the state of division to which the gold may be reduced, still the proportion of the solid particles to the amount of liquid through which they are dispersed must be of that extreme proportion. This accords perfectly with their invisibility under the microscope; for it is only necessary to calculate what is the minutest fraction of a drop of the ruby coloured liquid which can be seen under the microscope, and the above proportion proves that the size of the solid particles must be at least 750,600 times smaller.

This would appear to prove that the ruby colour of the liquid was due to *solution*, and not to suspended solid matter. It is not so easy to disprove this, but still upon attentively examining the subject, the arguments in favour of the latter explanation appear so convincing as to amount to little less than absolute proof. Thus if sunlight be concentrated by a lens on to the ruby liquid, the path of the cone of rays will be distinctly marked out through the liquid by the copious reflection of light of a golden character. This even takes place when the ruby liquid is so diluted with water as to show scarcely any trace of colour, and can only be explained on the assumption that it contains solid suspended matter. Another proof is that upon allowing the liquids to stand at rest for some weeks a ruby or purple deposit settles at the bottom, whilst the supernatant solution has become of a lighter colour. If this liquid be carefully poured off from the deposit and allowed to stand by itself for a month or two, a fresh deposit will be formed, and the supernatant liquid will be almost or quite colourless. If these deposits are shaken up with pure water, they will again become diffused through it, and will reproduce the ruby liquid, from which they will settle a second or third time if allowed to stand undisturbed. All these phenomena are inexplicable, on the assumption that the ruby fluid is a true solution, whilst they appear perfectly consistent and natural, if we assume, with Faraday, that the colour is due to finely divided particles of gold suspended in the liquid.

Immediately connected with this question, as proving the almost incredible degree of subdivision gold can be reduced to, by the comparatively coarse method of mechanical division, are some experiments and calculations which have recently been made on the divisibility of matter. They strikingly show the wonderful resources of mechanical and chemical subdivision, and also of microscopic science, whilst they at the same time prove the hopelessness of attempting to detect the ultimate solid particles in a ruby-gold fluid by the present instruments; for notwithstanding the almost incredible minuteness of the particles into which gold is capable of being cut by mechanical means, it is certain that the chemical subdivision of the ruby or violent precipitate far exceeds anything obtained by artificial means. In the first place, an ordinary sheet of gold leaf is taken, measuring 3·375 inches square, and weighing about one-fifth of a grain. In Faraday's paper, "On the Relations of Gold to Light,"* he shows how a leaf of this kind may be reduced very considerably in thickness, whilst its metallic continuity remains unbroken. This he effects by breathing on a clean plate of glass, and then gently placing it on a piece of gold leaf; the latter will adhere to it, and if distilled water be immediately applied at the edge of the leaf, it will pass between the glass and the gold, and the latter will be perfectly stretched; upon now draining the water out, the gold leaf will be left extended, smooth, and adhering to the glass. If after the water is poured off, a weak solution of cyanide of potassium be introduced beneath the gold, the latter will be gradually dissolved away, becoming thinner; but at any moment the process may be stopped, the cyanide washed away by water, and the attenuated gold film left on the glass. If towards the end, a washing be made with alcohol, and then with alcohol containing a little varnish, the gold film will be left cemented to the glass. The film in this condition, although consisting of pure gold, presents none of the ordinary appearances of the metal, being perfectly transparent and resembling a delicate film of pale green varnish more than a dense metallic body. Its thickness has been reduced to about one-twelfth part of what it was originally, weighing about the $\frac{1}{600}$th of a grain per square inch, and being no more than the $\frac{1}{350000}$th of an inch in

* "Researches in Chemistry and Physics," p. 391.

hickness. Let us now see what is the extreme degree f subdivision to which this film can be reduced. Some nonths ago in our "Scientific Gossip" we gave a brief acount of some observations by Messrs. Wormley and Sullivant n a Nobert's test plate. From this it was found to be possible to rule, with a diamond point on glass, lines so lose together that upwards of 90,000 of them were comprised in the space of one inch linear. It was, however, een that the limit of vision in the best microscopes s at present made, will not resolve lines closer together han $\frac{1}{55000}$th of an inch, which does not widely differ from the heoretical deductions of Fraünhofer and others, based upon he physical properties of light. Applying this to the plate of glass supporting our gold film, it will be seen that ines may be ruled across it not more than the $\frac{1}{80000}$th of an nch apart, and if at right angles to these other similar ines be drawn, we shall have a single square inch of gold ilm cut up into 6,400,000,000 separate pieces, each of which s capable of being distinctly seen under adequate microscopic power. What, now, does each piece weigh? The gold eaf with which we started measured 3·378 inches square, and weighed the $\frac{1}{5}$th of a grain; a square inch therefore weighs the $\frac{1}{57}$th of a grain. After being reduced in thickness by the action of cyanide of potassium, it therefore weighed (in round numbers) the $\frac{1}{600}$th of a grain. This being cut up nto 6,400,000,000 separate pieces, it is evident that each piece weighs no more than the $\frac{1}{3840000000000}$th of a grain; or, n other words, we have actually cut up by mechanical means a single grain of gold—a piece about as large as a good-sized pin's head—into three billion, eight hundred and forty thousand million parts, each recognizable to the assisted eye! The proportion which each separate piece bears to the original grain being about the same as a thimbleful of water bears to a building six times the size of St. Paul's. How purely conventional do the terms large and small appear in the presence of such overwhelming figures as these: they are seen to be merely relative, and to depend for their significance upon some artificial comparison instituted in our own minds, which has no connection whatever with the absolute amount of substance regarded in the abstract.

## MEALINESS IN TONING.

BY SAMUEL FRY.*

It really seems to require some apology for writing a paper on a subject so well worn as toning; but my excuse must be, that notwithstanding all the communications made on this matter, and the deep and valuable researches of scientific enquirers, more failures still occur in toning than ought at this period of the history of photography to be the case. Alkaline toning, whilst giving longevity to the print, has also produced a new disease, that of mealiness, and red spots caused by the refusal of certain isolated spots of the picture to acquire the same tone and colour under the influence of gold as the main body of the print.

It has not unfrequently occurred that samples of otherwise excellent paper have been necessarily rejected, from the impossibility of getting rid of this most objectionable dotting, and streaking with red spots on a surface otherwise neutral or black in colour.

It has necessarily occurred that the nature of the positive proofs required has considerably modified the resultant image; for example, a sample of paper which would give perfect, brilliant, homogeneous proofs of a landscape negative, abounding in details of trees, rocks, &c., would possibly give impresentable proofs for a portrait negative whose smooth surfaces and delicate gradations would render painfully perceptible every aberration from the main surface colour of the picture. I think I am not exaggerating when I state as my opinion, that the once vital question of "Whose collodion do you use?" has been considerably superseded by the more modern query of "What paper do you use?" Various remedies have been proposed, but although mostly founded on correct principles, they have not, to my knowledge, proved invariably, or even generally successful. Slow toning undoubtedly mitigates the evil to a certain degree, and the use of a toning bath containing acetate of soda to a still greater extent; but when using either or both of these, it is far from unusual to come upon a batch of paper with which nothing can be done satisfactorily.

The remedy I now propose to bring before you is not of my own originating, having appeared lately in a letter in the Photographic News; but I was so impressed with the results obtained in printing on a very indifferent class of paper from negatives for album pictures, which require the highest qualities of paper, that I determined to go into a few experiments, in order to ascertain certainly if samples of paper rejected from their unsuitability could be effectually brought into use, and I am now fully satisfied that any albumenized paper of ordinary excellence may be used with complete success by adopting the method indicated below.

Wash the print with great care, to thoroughly remove all the chloride of silver, but do not immerse in salt and water finally, as has been customary hitherto, but instead place for five minutes in acetate of soda 10 drachms, water 1 pint. This solution may be used three or four times over.

After five minutes has elapsed, pour off the acetate solution, and rinse the prints with water before toning, which may be done either with chloride of gold and acetate of soda, or chloride of gold and carbonate of soda; I now generally use the latter from preference, perhaps from fancy more than anything else. Fix as usual in hypo of 4 oz. to the pint of water.

In order to thoroughly investigate the matter, I took some prints on paper, which I was sure would, under ordinary treatment, turn out mealy and poor; then I cut in half, and toned one piece as usual, the other as above, and in every case with a complete removal of the unpleasant symptoms, and the substitution of the most even agreeable colouration that would be desired.

Further practice in the ordinary way of business has convinced me that the method of treatment I have indicated invariably gives good results. There may be undoubtedly irregularities of surface arising from paper kept too long, or having been in contact with foreign substances, such as a flat surface of wood, or any other disturbing agency; but the practical photographer will readily distinguish between these and, if I may be allowed the expression, the social evil of printers.

* Read at the meeting of the South London Photographic Society, on Thursday, January 9th, 1862.

## ON THE EFFECTS OF AFFINITY IN PHOTOGRAPHY.

BY DR. SCHNAUSS.

For the practical photographer, the true road to future progress consists less in reading and experimenting upon new formulæ, than in the study of the laws of nature, for they are eternal. What may appear to be a new discovery is only a manifestation of laws which have existed from the beginning most frequently already known, but under another form, only the proper practical application was wanting. There are still thousands of hidden treasures to be discovered; but to attain them requires a watchful eye, and a profound study of physics. And even these will not always suffice to make discoveries; something also is due to accident or chance, by way of suggestion. Although photography has been enriched by many important discoveries, to apply them we must possess a knowledge of natural laws, or at least of the most important facts in physics and chemistry. We shall endeavour to throw some light on many of the obscure phases of our art, and expose whatever is false or characterized by the empiricism of charlatanism, and in a series of articles explain the most important natural laws in their application to practical photography, adding various remarks on the improvement of photographic agents, and on the means of attaining successful results with certainty; first occupying myself with the various kinds of attractive force. Almost all the necessary chemical experiments have been made specially for this object in the writer's laboratory.

ATTRACTION, one of the most powerful natural forces manifests itself in various ways. The attractive force which bodies exercise upon each other, according to their mass is called *gravitation*, and it is chiefly the attractive force exercised by the earth that is understood by this designation. *Gravity* is, therefore, the force by which various bodies are attracted by the earth; it is their absolute weight which is measured by the balance. But a great number of much smaller masses also attract, as may be seen upon examining bodies floating in water. A ship, for instance, will attract a boat with a force proportioned to its size.

Gravitation also acts at great distances, as is seen in the motions of the celestial bodies. *Cohesion*, another kind of attractive force, acts only in the case of immediate vicinity, that is in contact and between the molecules of the same body. According to the degree of this attraction relatively to the repulsion between the molecules of a body, so its form differs; it is *solid*, *liquid*, or *gaseous*. In the first case, cohesion prevails; in the second, cohesion and repulsion are in equilibrium: in the third case, repulsion prevails.

Heat is antagonistic to cohesion; consequently it can change solids into liquids and gaseous bodies, and the body submitted to the action of heat experiences a great expansion of volume. Cohesion acts also during the crystallization of bodies, because they pass from the gaseous, or the liquid state, to the solid, and assume a symmetrical form; but there are many bodies which do not crystallize, hence they are called *amorphous* bodies. The resistance opposed by a solid body when torn or broken, arises from cohesion, and constitutes its solidity. If cohesion consists in the attraction of the molecules of the same body. We know also of an attraction which exhibits itself in the contact of *heterogeneous* bodies, which is called *adhesion*. If a liquid remains attached to an insoluble solid body, immersed in it, it is in consequence of their adhesion; polished plates of glass, copper, or zinc, adhere so strongly together upon pressure being applied, that it requires great force to separate them.

Another attractive force between the molecules of heterogeneous bodies, very different from adhesion, and which is of the greatest importance in photographic operations, is *chemical attractive force*, or *affinity*. Wherever it appears, heterogeneous bodies are united to a homogeneous body, possessing entirely different properties. On the present occasion we shall occupy ourselves chiefly, and merely mention in passing two kinds of attraction, *magnetic* and *electric*. They differ essentially from the others in two different forces attracting each other in consequence of the polarity which electric and magnetic bodies acquire.

The force of chemical attraction is the basis of all photographic operations: it causes the formation of iodide of silver in the collodion film; of chloride of silver in the positive paper; the development of the latent image; the solution of the iodide and the chloride of silver in hyposulphite of silver during fixing; and the toning of the image formed by the metallic agent.

Now, to understand all these changes, we must first speak of some other fundamental doctrines of chemistry. Bodies may be separated, or they may not. In the first case they are called *simple* bodies or *elements*. We must here explain the difference between mechanical and chemical separation, in order to appreciate a chemical composition. Suppose we wish to mechanically separate the parts of a piece of marble, we pulverise them in a mortar. Marble is a compound of lime and carbonic acid. Let the pulverisation be ever so long continued, it is only possible to separate the pieces of carbonate of lime into anything but carbonate of limes, never the lime from the carbon. To effect the separation of the carbonic acid, which is a *chemical* separation, it is necessary to apply the force of chemical attraction, or the tendency carbonic acid possesses of passing to the gaseous state at an elevated temperature. In the latter case, the marble is submitted to the action of a strong acid, nitric acid for example, which combines with the lime, displacing the feebler carbonic acid, which is liberated in the gaseous form. In heating the marble in a strong fire, the same result is obtained, the carbonic acid is liberated, and the lime remains. Both the lime and the carbonic acid can also be decomposed by the chemist, the lime into a metal, *calcium*, and a gas, *oxygen*; the carbonic acid into *carbon* and *oxygen*. Calcium, carbon, and oxygen, are the elements of which the marble is composed, and are indecomposable into other matters. No one would suppose upon looking at a piece of marble, that it is composed of a gas, a metal, and carbon. From this example we see how the properties of simple bodies are changed in their combinations. From the appearance of iodide of silver the photographer would scarcely expect to find in it the bright metal silver, and the violet-vapoured element iodine.

The force of chemical attraction is so powerful that it completely changes the nature and aspect of bodies. But there is no irregularity in the relative quantity of the matters which unite chemically, for they combine in exact proportions, which remain the same under every condition, and which expressed in numbers the weight of the compound or the *equivalent*. It would lead us too far astray to relate all that concerns this subject of equivalents, which is to be found in every treatise on chemistry. By means of a greater affinity, a body (simple or compound) can separate another body, simple or compound, from its combinations, and be the more easily effected if the decomposition takes place in a liquid, or if the newly-formed compound is insoluble. In such cases, a body possessing very feeble chemical affinity can even displace a body possessing a much greater affinity.

As an interesting illustration of this law of affinity, derived from practical photography, I shall first describe the toning of photographs on paper by means of a bath of a solution of gold.

I have studied the process so precisely, by the following chemical experiments, that I entertain no doubts on the subject.

(*To be continued.*)

## ON THE MANUFACTURE OF PHOTOGRAPHIC PYROXYLINE.

BY MR. NICOL.*

PHOTOGRAPHY, the child of but a few years, has astonished all who have taken the trouble to think of it, by the rapidity with which it has attained its present position; but this it owes as much to the time and circumstances, as to anything of inherent expansive power in itself. Had the chemist, in his never-ending search after something new, not accidentally or otherwise discovered pyroxyline, and through it collodion, and, having discovered it, had he not been ready with his long list of iodides and bromides, photography would have been in a very different position. An analysis of last season's photographic exhibition will perhaps show more clearly the relative position which collodion holds. It contained altogether 764 pictures: of those, one was by the calotype or iodized-paper process, six by the albumen process, 72 by the wax-paper process, and the remaining 620 were by collodion in one or other of its various forms. It will be evident that an article which plays such an important part is very likely to have been the subject of much attention; and such is indeed the case, more having been said and written on collodion than on anything else connected with photography, lenses, perhaps, excepted; and yet I believe there is nothing which the photographer uses about which less is really known, or of which less is thoroughly understood.

Now it is not at present my intention to attempt anything towards the removal of this obscurity, but simply to indicate,

* Read at the December meeting of the Photographic Society of Scotland. Mr. Nicol explained that the paper had been written more especially for the Pharmaceutical Society, and he had been hastily called on to lay it before the Photographic Society.

rst, the necessary conditions of a really good photographic llodion, and secondly, a certain and simple method of proicing at will those conditions.

The collodion should flow from the plate in a smooth oilke sheet, without any appearance of running in streams or lges, and as it begins to set, or become slightly dry, there ould be no trace of a clotted or gelatinous appearance. If at is stage the finger be passed across the surface, it should not ar the film from the glass in shreds, but remove only as uch as it comes in direct contact with, leaving at each side raight and not jagged lines. It must not be contractile, so as leave the edges of the glass, or be pulled into a state of inute network on hardening. When properly dry it should resent a hard glassy surface, which is not affected by a pretty rm rub with the finger, be perfectly transparent, and show no ace of structure under the microscope with at least a quarterich object-glass.

You will notice that the conditions indicated are mechanical, ot chemical; and although photography is essentially a chemid operation, yet I have no doubt whatever that the absence f those mechanical conditions is the cause of a large proporon of the failures which so provoke and dishearten the photorapher. A good collodion is absolutely necessary to success; nd after an experience of seven years in its preparation, I am onvinced that the quality depends entirely on the pyroxyline, nd that the iodizing material is a matter of very little importnce. Almost every conceivable iodide and bromide have been ecommended; and our French neighbours especially have xercised their ingenuity in mixing them by the dozen; but I m perfectly satisfied that one is just as good as another, or as ny combination—all that is necessary being a sufficient uantity of some soluble iodide, to charge the film with iodide f silver.

No doubt, some of the objectionable qualities to which I have eferred may be produced by impure solvents, such as acid, ther, or an undue amount of water in the alcohol; but ordiary care will be sufficient to guard against these causes, and I ay therefore assume that, with good pyroxyline, good colloion is easily obtained.

Pyroxyline, or gun-cotton, is generally obtained by the action f nitric acid of a certain strength on lignine or cellulose, or, ore correctly, on both, as the former term is applied to the ubstance of which the walls of the cells are built, and the tter to the substance with which the cells are filled. They re, however, so much alike, that one term will answer very ell for both. Lignine, then, consists of carbon, hydrogen, nd oxygen, and exists in a state of considerable purity in aper, and almost perfectly so in cotton. What we know as medicated cotton" is generally employed for the production f photographic pyroxyline; and though many other things, uch as paper, cloth, and sawdust, have been tried, it is on the hole more generally successful. If a tuft of cotton be imersed in ordinary commercial nitric acid, or even in acid of a pecific gravity of 1·500, it gelatinizes and dissolves. If, howver, sufficient sulphuric acid be added to withdraw a quantity f water from the nitric acid, no such change takes place, the otton remaining apparently unchanged. It is only apparently o, however, as on being washed and dried it exhibits properies of which it was not before possessed: its weight has inreased, sometimes by more than half; it is soluble in acetic ther, and in a mixture of ether and alcohol; and on the appliation of flame, it explodes with considerable violence, or burns vith great rapidity.

Pyroxyline thus obtained differs to a certain extent from what we are in the habit of considering a definite chemical ompound, and belongs to the class of substitution-compounds —a certain portion of the nitric acid, or rather peroxide of itrogen, taking the part of a certain portion of hydrogen; hich will perhaps be more readily explained in this way—

$$\text{Lignine}\left\{\begin{array}{l}\text{Carbon}\\ \text{Hydrogen}\\ \text{Hydrogen}+\text{nitric acid}=NO_5\\ \text{Oxygen}\end{array}\right.$$

$$\text{Pyroxyline}\left\{\begin{array}{l}\text{Carbon}\\ \text{Hydrogen}\\ \text{Peroxide of nitrogen } NO_4+\text{water}\\ \text{Oxygen.}\end{array}\right.$$

n atom of peroxide of nitrogen taking the place of an atom f hydrogen, leaves an equivalent of oxygen, which combining with the displaced atom of hydrogen forms water. It is imortant to keep this in mind, as it explains what would otherwise be obscure when I come to speak of the practical operation. A peculiarity of this change of substance by substitution is the fact that, although it seems to take place atom for atom, the extent to which it goes is dependent on certain conditions. Thus, the quantity of peroxide of nitrogen which pyroxyline contains, depends on the strength of the nitric acid, and the temperature at which it is when the lignine is introduced, the maximum being obtained by the strongest acid, and *vice versa*.

From this it will be evident that, if the range between the maximum and minimum be great there will be considerable variety in the products; practically, however, we may divide pyroxyline into three classes — one highly explosive and scarcely, if at all, soluble in a mixture of ether and alcohol; one entirely soluble in that mixture, and leaving a structureless transparent film when allowed to dry on a plate of glass; and, thirdly, one which is almost entirely soluble, but which leaves on drying a film more or less opaque. The first and last being useless in a photographic point of view, I will confine myself to an indication of the method which I have adopted for the production of the intermediate quality, which possesses not only solubility and transparency, but also all the other essentials of a really excellent pyroxyline for photographic purposes. It will be evident, from what I have already said, that the *desideratum* is to obtain a nitric acid of the proper strength: this is very easily done by adding a certain quantity of sulphuric acid, when the former, in consequence of its great affinity for water, withdraws that body from the latter, and, provided the proportions and specific gravities are properly arranged, it gives us exactly what we require.

For a long time I experienced considerable difficulty in getting commercial sulphuric acid of sufficient strength, the samples ranging from 1·816 to 1·834: the latter, although theoretically strong enough, did not on mixing raise the temperature sufficiently high; and, from some cause which I cannot explain, the temperature raised artificially failed to give the desired result. Latterly I have had no difficulty in obtaining it from 1·840 to 1·850 which leaves nothing to be desired.

Into a well-glazed porcelain dish, considerably deeper than an evaporating-basin, and holding about 30 ounces, I put 10 ounces by measure of sulphuric acid of specific gravity of 1·840; on this I pour five ounces by measure of nitric acid of specific gravity of 1·370, and then two fluid drachms of water; the temperature at once rises to above 150°; and if the cotton be immediately immersed, it gives what is known as "powdery" collodion—a state similar to what is produced by age, and very suitable for certain "dry processes;" but for general purposes, I let the temperature fall to 140°, and then, being armed with two glass rods, an assistant adds, tuft by tuft, 5 drachms of good cotton; as each tuft is added, it is pressed into the acid and the whole kept moving about to ensure equal action: when the whole of the cotton is in, the dish is covered with a plate of glass, and left so for ten minutes; it must, however, be carefully watched during this time: the acid being not much above the dissolving-point, actual solution occasionally begins, but is immediately stopped by a press with the rod.

Although the five drachms of cotton does not absorb the whole of the acid, that quantity must not on any account be exceeded: the change taking place being the conversion of portions of the hydrogen of the cotton and of the oxygen of the nitric acid into water, the addition of a single half drachm is sufficient to change the nature of the product, and occasionally to produce solution of the whole. I, as rapidly as possible, press the cotton between two strong strips of glass, and plunge it into a large quantity of water, where it is immediately teazed out and rapidly moved about to diffuse as quickly as possible the adhering acid throughout the whole volume. Nothing then remains but to wash till every trace of acid is removed: this is conveniently and effectually done by packing in a percolator, and turning on a stream of water for a few hours; and dry by steam or otherwise.

It may seem that the quantity of material operated on at a time is small (but experience shows that larger quantities considerably affect the result); but that is really no great objection, as with two dishes and an active assistant, the pyroxyline may easily be turned out at the rate of 5 ounces per hour.

The sulphuric acid which I have recently been using has a specific gravity of 1·850, to each ten ounces of which I find an addition of three drachms of water to be necessary. And I commenced a series of experiments some time ago with the view to determine whether this held good throughout—that is, whether it might be taken as a rule, that success would be insured by the addition to the formula already given of six minims of water for each additional unit of specific gravity above 1·840 of the sulphuric acid. I regret, however, that want of time has prevented the carrying out of the experiments; but probably I may have an opportunity on some future occasion of again bringing the matter before you.

## Photographic Tourist.

### PHOTOGRAPHIC PENCILLINGS OF AN EASTERN TOUR.*

During the earlier portion of my stay at Malta the days were bright and fine enough, but the very morning on which I made up my mind that my previously arranged three weeks stay here was quite long enough, there came a change in the weather. A fierce wind from the north-east roared over the troubled waters of the Mediterranean, making the harbour white with foam, and bearing the spray of the yeasty waves, thundering against the foundations of the fortifications, right over their lofty walls. Drenching showers fell at brief intervals, and looking out to sea at that vast restlessly moving plain of indigo, so liberally bespread with its changeful patches of fleecy foam, I felt quite qualmish at the bare idea of a voyage in such weather, and resolved to defer my departure until there was a prospect of a more comfortable journey. So I remained wandering about the steep broad hilly streets, examining the effigies of saints and virgins stuck up here and there at their corners, or trying to make out the partially traceable arms on the defaced old shields over some of the doorways, or wandering to the more interesting localities in the island. Photography being, of course, out of the question, I did not relish the delay, although the friends with whom I was staying made time pass very cheerfully.

Not to occupy too much space with this stage of my tour, I will briefly describe a few of the places I saw, &c. Visiting the interior of the governor's palace, I found much that was interesting and curious. I greatly admired the fine staircase: it is said the grim knights, clad in complete mail and mounted on their heavy war-steeds, have gone thundering up these stairs, which certainly seemed strong and wide enough for the feat, although I cannot see why these stern old jokers should indulge in such eccentric equestrian experiments. I here saw many mementoes and relics of these famous warriors, in the shape of paintings, tapestry, old suits of mail, and weapons, which either once belonged to celebrated members of the order, or else were relic-spoils, won in battle from the gloriously defeated infidels. The cathedral church is another place which well repays one for a visit. It is dedicated to St. John of Jerusalem, and stands not far from the palace; its exterior is plain enough, but when inside I found much to admire, and still more to interest a curious visitor like myself. Some massive handsome metal work, said to be solid silver, is shown as having escaped being carried off by the French during their brief possession of the island by being painted black; but many other appointments, scarcely less valuable, were sacrilegiously borne away. The decorations of the aisles and chapels, as they are termed, are very rich and elaborate. On the day I saw the cathedral I also visited one of the convents, and some of the fortifications.

At length the boisterous wind subsided, and the clear expanse above grew deeply blue and cloudless; the waves of the Mediterranean again splashed their clear waves in playful sport against the rocky foundations of the fortifications, over the walls of which its spray and foam had been so fiercely hurled a few days before. Some young bathers and fishers were laughing joyously as they sported in or with the placid element, of which the natives seem at all times so passionately fond; the gaily painted boats with their bright clean awnings moved swiftly on their way, or lingered near the shore in search of hire. The wide, well-paved, pallid-looking streets were bright with sunlight, and the Maltese were again out upon the flat, terraced roofs of their oriental-looking houses. So I once more brought out my camera and tent, and hiring a trap, started off along the main road (a very good one) in a direction opposite to that by which I sought the bay of St. Paul. After a ride of about seven miles or less, and passing the country house of the governor, I reached Civita Vecchia, or as it used to be termed, I believe, Citta Notable, the ancient capital. It occupies very high ground, and must be, as I calculated, very nearly in the centre of the island. It is a quiet insignificant little place enough; almost entirely occupied by numerous religious establishments. There are a few celebrated paintings in the cathedral; beyond which. however, it contains little that is particularly inviting or attractive. The streets are exceedingly narrow, and are full of ragged mendicants, who either plague you to buy coins which they represent as being dug up, but which look suspiciously like modern manufactures, or beseech you to employ them as guides to the lions of the poverty-stricken little place, chief amongst which are the catacombs and St. Paul's Cave. The former are excavated from the rock on which the town stands, and are entered by a low narrow passage winding downwards. As you pursue this labyrinthine way, it gradually widens until you find the tombs, hewn out on either side, and niches here and there for lamps. Reaching a small apartment, with an arched roof, about 10 feet high, I was informed that here the early Christians assembled for worship in their hour of persecution and danger. St. Paul's Cave, situated beneath a church dedicated to the saint, is a small circular low-roofed place, with the walls and ceiling thickly covered with autographs, in which stands a somewhat dilapidated marble statue of the apostle, brought originally from Italy.* It is said that after his shipwreck, the apostle lived in this cave three months, and there is a miraculous tale of how this dark rocky apartment always retains the same size and appearance despite the efforts of those who are carrying away the rock piecemeal to sell or preserve as relics. Before leaving the island, I also visited the village of Mosta, to see a somewhat celebrated church, built literally by the inhabitants themselves. I also went to the small town called Creudi to view the ruins said to be those of some ancient places of religious worship pertaining to the Phœnicians, of which I was delighted to obtain photographs. These remains of this ancient people are situated some little distance from the town, and stand on a wild looking rocky slope near the sea. The barren aspect of the spot harmonizes well with the sentiment of these huge masses of stone, forming a rude, lofty, massive entrance gateway, a number of smaller apertures, and some elliptical shaped compartments. The remains of several altars are easily recognized, and their form would, I should think, indicate that they were made for sacrificial purposes. Artists tell me that my photographs of these most interesting relics are extremely picturesque and valuable, and that my views of St. Paul's Bay are the most dreary and unpicturesque subject of the whole; and agreeing with them, I congratulate myself upon not leaving the island without seeing this portion of it.

I must here pause to note a very singular ciacumstance, which I do not remember ever experiencing before or since, and which I never heard or read of as occurring in the experience of any other photographer in any part of the world.† I had been getting a view of Fort Angelo, and found the light very energetic in its photographic action. The wind was westerly, and the sky cloudless and clear—it is here, as is well known, remarkably so. Suddenly there was a change, and a plate exposed immediately after one which had been unusually successful, did not show anything but the very faintest ghost of an image. I gave the next twice the exposure of the first—worse and worse! A fourth

* Continued from p. 9.

* And since removed, I believe, for more careful preservation.

† The author of this paper is evidently not aware that Mr. Rejlander mentioned a similar circumstance at one of the earlier meetings of the London Photographic Society. The incident certainly seems very unaccountable.—Ed.

I gave four times the exposure of the first, but with no better result. Perplexed and alarmed, I tested my bath, and prepared a fifth plate, giving it a longer exposure than ever. The result was as fine a fog as I ever witnessed; the over exposure was tremendous. So I prepared a sixth, which I exposed half as long as the *first*, and found it a very good negative, slightly, perhaps, *over exposed!* I have often thought about this, and puzzled myself with attempts to account for it. I could not then, nor can I now, conceive that there was anything like a positive cessation of actinic influence in the light itself; but to what can such a mysterious change be attributed? I have put this question to many, and I here put it again; for never yet has it been answered to my satisfaction. I left Malta at the latter end of January. M. H—N.

## Proceedings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of the Society was held in St. Peter's School Room, Walworth Road, on the evening of Thursday, January 9th. Mr. SEBASTIAN DAVIS in the chair.

After the usual routine proceedings

The SECRETARY announced that one of the presentation prints had been decided upon by the Committee, and congratulated the members on the circumstance that they would receive one of the most artistic and beautiful photographic landscapes which had ever been produced: he referred to Mr. H. P. Robinson's "Early Spring." Before sitting down he would take the opportunity of stating that he conceived he had been unfairly dealt with by one of the journals, in which a very imperfect report of his remarks on the subject of the Photographic Committee of the International Exhibition had been given. His conclusions had been given without the reasons by which he justified such conclusions, a mode of proceeding which in this especial case did him much less than justice, and it would have been only fair either to have entirely withheld his remarks, or given them in such form as expressed his views. He wished to add also that since the last meeting he had been told the Earl of Caithness was an able photographer and an energetic man. If anything he had said did that gentleman injustice he now expressed his regret.

Mr. G. WHARTON SIMPSON said that Mr. Fry, who promised a paper for this evening, had called upon him to say that he would be unavoidably absent, and asked him (Mr. Simpson) to express his apologies to the meeting, and to read a brief paper on "Mealiness in Toning" (see p. 29). Mr. Fry had intended he believed to bring some prints with him, showing the irregular toning in its worst form, and some produced from the same paper, in which, by adopting the proposed remedy, total immunity from any sign of mealiness was secured. He (Mr. Simpson) had seen the prints, and in the absence of specimens the meeting must take his word and that of Mr. Fry for the fact.

The SECRETARY stated that he had recently had three printers employed, from none of whom he had been able to obtain anything but mealy prints from a certain sample of paper. His present printer was using the remedy suggested in Mr. Fry's paper, and he had not had one mealy print from the same lot of paper. He thought this spoke highly for the efficiency of the proposed remedy.

The CHAIRMAN asked if Mr. Fry had arrived at any conclusion as to the theory upon which the remedy was based.

Mr. SIMPSON believed not. Mr. Fry simply concluded that the conversion of the free nitrate into an organic salt of silver removed the tendency to irregular mottled toning. He found a bath of phosphate of soda acted in a similar manner to the bath of acetate of soda. He (Mr. S.) thought that, prior to forming a theory as to the operation of the remedy, it was important to arrive at definite conclusions regarding the nature of the cause of mealiness, which, however, appeared at present to be little understood.

The CHAIRMAN thought it would be interesting to ascertain the colour produced by the conversion of the free nitrate after exposure with various salts of silver. Some time ago he excited some plain paper without any other chloride than that contained in the size of the paper; after exposure he submitted the print to the action of an alkaline chloride. The result was that the purple tone produced by light was changed to a salmon colour. It would seem from this that the action of salt was to redden the print. In gold toning, however, he always found it advantageous to submit his prints to a salt bath before toning. He thought that much of the irregular toning was due to the paper being unequally absorbent. If we had a paper of a more homogeneous and uniform texture, less difficulty would be experienced.

Mr. SIMPSON said doubtless the quality of the paper affected the question; but it could only be one part of the cause. In the old method of toning with hypo and gold, this evil was unknown with any sample of paper. Its existence was unfortunately coeval with the alkaline toning system. The great advantage of that method was somewhat marred by the prevalence of this evil. In searching for the cause of the evil, it must not be forgotten that it was in some way essentially connected with this method of toning, and although the nature of the paper might aid in producing the effect, it was the toning which absolutely brought it about. They had to discover both a predisposing and an exciting cause.

Mr. HENDERSON, (who, it was explained, first suggested the remedy of an acetate bath in a letter to the PHOTOGRAPHIC NEWS,) said he would have pleasure in detailing the results of some experiments in toning.

*In the first experiment* he washed a print in boiling water for ten minutes. It was then toned in a bath of gold and acetate of soda. The time required for toning was sixty minutes, and the result was very poor and mealy. The toning bath gave no precipitate of acetate of silver.

*Second experiment.*—The print was washed for fifteen minutes in cold water, and then toned as the last. The time required was forty-five minutes, and the result was somewhat better.

*Third experiment.*—The print was washed ten minutes in cold water and toned. The time required was twenty minutes. The print was of moderate quality, and a slight deposit of acetate of silver was thrown down.

*Fourth experiment.*—The print was washed for five minutes in cold water and toned. The time required was ten minutes. The print was good, and considerable precipitate of acetate of silver was thrown down.

*Fifth experiment.*—This print was not washed at all before toning, and the tone was best of all.

After these trials, he mixed the various toning baths used, which had been fresh for each print, and filtered out the precipitate, which had been greater in each succeeding experiment. He then divided the solutions into two parts, and added a little fresh gold to one portion, which produced a little of a yellow precipitate. A print placed in this toned very slowly. A print placed in the other half remained for an hour without the slightest toning action. He then added to this half a little fresh acetate of soda, and placed in another print. In about ten minutes, this print and the one which had remained an hour unchanged, were toned perfectly. His experiments led him to the conclusion that a print placed in the toning bath direct from the printing frame, without washing, gave the best and most rapid results, but it precipitated the gold largely. Also that a toning bath which appeared exhausted or inactive, might sometimes be made to tone satisfactorily on the addition of a little acetate of soda. The paper he had used gave him mealy results with every formula he tried, except that with the acetate, which had been described, and with the old hypo bath. When he had tried the chloride bath before toning, the results were worse. A mixture of chloride and acetate was equally bad. It appeared to him that the acetate acted in some way on the albumen, so as to induce a more regular reduction of the gold. Whatever might be the theory, practically, he believed, the bath of acetate was a cure for the multitude of evils alkaline toning had been found heir to.

Mr. PRICE called attention to the diversity in different formulæ, as to the amount of acetate of soda which should be added to the gold.

Mr. HANNAFORD said it was quite unimportant, so long as there was enough. He had used various proportions, from 30 grains to 160 grains to one grain of gold. It was best to have it in excess, as in that case it would be unnecessary to add more to cause renewed activity.

The CHAIRMAN asked if Mr. Henderson had tried other acetates, and if he always found that they removed mealiness as well as facilitated toning.

Mr. HENDERSON said he had tried other acetates, but preferred that of soda. The preliminary acetate bath always removed mealiness. It was necessary for all the free silver to be converted into acetate. The presence of chloride of silver was injurious. In the old hypo bath the chloride was dissolved before toning commenced, whence there was not the tendency to mealiness.

Mr. Hannaford said there were two kinds of mealiness. One kind he did not altogether dislike, as it gave a certain amount of atmosphere to the background, similar to that given by the texture of the paper in water-colour drawings. When he had first made use of acetate of soda in the toning bath, it was simply for the same purpose that Mr. Hardwich recommended the citrate of soda, as giving a richer purple bloom than could otherwise be obtained. It was incidentally that he discovered that it gave immunity from the mealiness which he found many others were complaining of. He was in the habit of washing the prints in one or two waters, but not in a chloride solution, before toning, and he was never troubled with mealiness. A print which had been salt washed had chloride of silver formed in the cavities in the surface of the paper, and when toned mealiness ensued. So far his experience confirmed that of Mr. Fry. The use of an acetate did not, however, entirely prevent mealiness without careful washing. He had found a hot solution of hypo entirely removed mealiness. There was another source of mealiness to which he might advert. It arose from a certain amount of greasy repellant condition of the surface, which prevented the washing water from coming in contact with it. In such cases a little oxgall added to the washing water would be found useful.

The Chairman thought that Mr. Hannaford's experience seemed to confirm the idea that chloride of silver was more difficult to tone than an organic salt of silver.

Mr. Fitch had observed more tendency to mealiness when using thin papers. Thick paper was generally free from it.

Mr. Simpson thought it important to remember that this difficulty was not observed in plain paper. It was confined to albumenized paper.

Mr. Hart said that at one time having unlimited command of distilled water he always used it for washing, and at that time he was free from any troubles with mealiness. Subsequently he had nothing to use but hard water, he then had nothing but mealy prints. Recurring next to the use of a soft river water, he again got rid of this trouble.

The Chairman said that doubtless the use of distilled water, preventing the formation of insoluble salts of silver, would tend to remove the tendency to mealiness.

Mr. Simpson said there could be no doubt that water containing carbonates or chlorides forming insoluble salts, largely contributed to the production of mealiness; but these were not the sole cause. It should be remembered that this troublesome defect occurred on prints treated in every respect the same as those upon which it did not occur where other samples of paper were used, and even on parts of the same sheet of paper. He did not think, therefore, that it was solely attributable to the water. He would again direct attention to the fact that mealiness was not found to arise with plain paper, but always on albumenized paper. It was clear the albumen was connected with this evil. There was another circumstance which had not been named; he had observed that a weak, thin negative increased the tendency to mealiness, but where the action of light was the most complete there was the least mealiness. Perfect reduction seemed to prevent it.

Mr. Hannaford thought it was probable that the acetate of soda acted in some way on the albuminate of silver.

Mr. Martin said that as the acetates and phosphates were weak reducing agents of the noble metals, their action in preventing mealiness might be due to this action. He thought this view of the matter was singularly confirmed by Mr. Simpson's statement, that where deep printing and perfect reduction by light had taken place, mealiness did not occur.

Mr. Price mentioned that a correspondent to one of the journals had recently stated that he got rid of mealiness by using pure chloride of sodium in his washing water instead of common salt.

Mr. Leake found recently a batch of prints completely spoiled with mealiness. He ascertained on enquiry that the youth who assisted him, had, in order to get quickly through his work, placed the prints in salt and water direct from the printing frame, without previous washing. He had tried the process recommended in Mr. Fry's paper now for a week, and had not found the slightest tendency to mealiness when it was used. He put an ounce and a half of acetate of soda into half a gallon of water, and used this again and again returning it to the bottle when done. He found that working in this way no extra trouble was involved, whilst very valuable results were gained.

After some further conversation on the subject, in which Mr. Wall, the Chairman, Mr. Simpson, Mr. Martin, Mr. Hannaford, Mr. Hart, Mr. Henderson, and others, took part, the subject was concluded by votes of thanks to Messrs. Fry, Henderson, and Simpson.

The report on the subject of a meeting-place was then laid before the meeting, and on the motion of Mr. Simpson, seconded by Mr. Hannaford, it was resolved that future meetings should be held in Sussex Hall, Leadenhall Street.

Mr. Vernon Heath, Mr. Henderson, Mr. F. W. Hart, and Mr. Farringdon Lane, were then proposed and duly elected members of the society.

After which the proceedings terminated.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 15th January*, 1862.

The observatory of Wilna is situated on the fourth story of an old Jesuit's college, and therefore is deprived of the advantage of being able to place its instruments on an immovable foundation. Under these circumstances, the best course to be pursued appeared to be that of directing the industry of the establishment to special investigations which should recommend themselves by their importance, and the observations for which can be made with apparatus which does not require to be placed upon an immovable foundation. After a careful discussion upon the various branches of science coming within this category, Messrs. Sabler and O. Swave decided upon those whose object it is to study the physical constitution of the sun. Of all the instruments at present employed for this purpose, Mr. De la Rue's photoheliograph at Kew Observatory is, without doubt, the apparatus which promises the best results. The photographic operations of this apparatus require only the fraction of a second, and, consequently, the perfect immobility of the observatory is not an indispensable condition.

Mr. De la Rue has announced that he is ready to furnish a photoheliograph of similar dimensions to that at Kew, in the course of six months, for the sum of three hundred pounds sterling.

The second object of study at the observatory of Wilna will be the photometry of the fixed stars. The labours of Schwerd and Seidel have recently thrown a new light upon this subject. It appears that the apparatus invented and constructed by Schwerd very satisfactorily fulfils the object to which it is applied. M. Sabler is therefore desirous that after the observatory is supplied with the apparatus necessary for studying the sun, that the surplus funds be appropriated to the acquisition of the photometer of Schwerd.

M. Reynaud has communicated to our photographic society the results of a great many experiments upon iodide, bromide, and chloride of silver. He shows that if the iodide of silver derived from the iodide of potassium is slowly acted upon by light, it yields very dense and extremely fine negatives, and is especially adapted for those of small dimensions.

The cadmium iodide is one of the quickest to receive the action of light, but the negatives it gives are frequently fogged. To remedy this inconvenience M. Reynaud adds 1 to 2 per cent. of chloride of zinc to the collodion.

The ammonium iodide of silver is less sensitive, but it gives excellent negatives in an artistic point of view. M. Reynaud is of opinion that the sensitiveness of the iodides is in the same ratio as their solubility in alcohol.

To obtain the maximum sensitiveness the collodion must contain little iodide.

A neutral silver bath is frequently the cause of fogged negatives. In order to avoid this result a small quantity of nitric acid is added to the bath, about one drop to every three ounces of bath solution. Hyponitric acid added to the bath instead of nitric increases its sensitiveness. Carbonate of soda or of lime is an excellent agent for neutralizing baths that are too acid.

EXCHANGE OF PHOTOGRAPHS WITH AMERICA.

DEAR SIR,—I have relatives in the United States and in corresponding with them, I always make my letters up to the weight with stereograms trimmed ready for mounting, and from their replies I gather that the enclosures form quite the most interesting part of the letter. They are not photographers, and consequently I receive no "exchanges." On reading the article by Coleman Sellers extracted into a recent number of the NEWS, it struck me that an Exchange Club, similar in principle to the English one, might easily be formed between photographers in this country and in America, and there can be no doubt of the interest that would attach to the exchanges. There would require a secretary in each country to whom all prints for exchange should be forwarded, and who should keep a register of the number of different classes received from each member, return the worthless ones, and forward the remainder to the other secretary for distribution. From either London or New York I presume the parcel of prints could be forwarded in bookseller's parcels at small expense, but even if sent by post, the cost on each print would not be much. The number of prints received from each country would probably not be the same, but the members on the side on which there was a deficiency might be supplied in the order in which the secretary had received prints from them, those last on the list being supplied out of the next batch. At any time an intimation from the secretary that there was an accumulation of prints on hand waiting exchange, would be sure to bring in enough to clear off the score. Doubtless some good photographer here would undertake the office of English secretary, and though Coleman Sellers does not seem to be able to find time to be neat, I have no doubt from the evident gusto with which he handles new prints, that he would find plenty of time for arranging the American department. As I see from your answers to correspondents that he is a reader of the NEWS, should you deem this proposition worthy of consideration, you will perhaps mention it there, so as to bring it before him and other photographers in both countries.—Yours, respectfully, L. LOMAS.

[We commend this suggestion to some of our American readers: to Mr. Coleman Sellers especially, if he can find time to attend to the matter. We have no doubt whatever of finding some gentleman ready to undertake the duties on this side of the water.—ED.]

FIXING BEFORE TONING.

SIR,—I take the liberty to inform you, that some of your correspondents err in taking upon themselves to call fixing before toning a new invention. I must confess it is a very old process indeed, and has long been abandoned by eminent photographers. If you read Mons. Legray's work you will find that he has given and used it as early as 1852; and had he found this process permanent, he would certainly not have rejected it.

I certainly am not surprised that the French deride us when we bring in as new discoveries old methods. On my part I must say that the alkaline process is a very great improvement to our art. If there are some of our professionals who do not know how to use it, they should not, at least, try to bring in old for new. I am perfectly convinced the alkaline process, properly manipulated, is the best of all; and I warrant, by my mode of manipulating, photographs will last a number of years. I have some copies by me in perfectly good preservation, particularly since I prepare my own albumenized paper. I have always considered that the fault is in the preparation of the paper. If you expose certain papers to a prolonged action of light, you will find it change to all manner of colours. The manipulation I have adopted is the same as you have given in many of your columns. I have not made any addition that I know of, but, if you wish it, I shall be most happy to give you the description of my mode of manipulation by which I obtain these tones. If any professional or amateur should like to try my process and paper, I shall be most happy to supply them with it. I shall, in my next, give you a different process. Hoping you will be kind enough to insert this in your journal, I am, yours truly, W. WERNER.

*High Street, Oxford.*

P.S. I shall be pleased to have your opinion on the copies inclosed, which are on two kinds of paper.

[Our correspondent is in error in attributing to the recent contributions to our columns on "Fixing before Toning" any intention to claim novelty for the process. The writers merely reconsider an old subject. It is often wise to examine old methods by the light of new experience. There is some truth in the paradoxical apothegm, "there is nothing so new as what is old." The prints inclosed have a very agreeable tone, and every indication which usually accompanies permanency. We shall have pleasure in receiving practical details from our correspondent.—ED.]

## Photographic Notes and Queries.

VARIOUS QUERIES.

SIR,—If yourself, or any of your talented correspondents, would give, in a condensed form, the changes a plate undergoes from first to last, it would be of much benefit to many of us amateurs.

1. The plate, when coated with collodion and dipped in the bath; how acted on by the solution?

2. The change it undergoes when acted on by the light, and by the iron or pyrogallic solution?

3. Why does the cyanide dissolve off the iodide?

4. Mr. Coleman Sellers says that glass can be got ready in a moment by acetic acid and alcohol, and when the picture is taken it can be flowed with a solution of gum arabic and *aqua ammonia* (What is that?) what strength to make it keep—without washing?

Do you think if the plates, after exposure, were kept in a grooved box of tin filled with thin starch coloured with turmeric, it would answer the above purpose?—I am, Sir, with many thanks for the many hints and valuable papers in your excellent NEWS, your obliged and faithful servant,

*Hasle, Dec.* 2, 1861. ROBERT SAWYER.

[To obtain a full and satisfactory answer to all your queries you should study carefully the various articles on the theory of photography contained in our pages, or such a work as Mr. Hardwich's "Manual." We may, however, very briefly answer your questions here.

1. When a plate coated with iodized collodion is immersed in the nitrate of silver, a change called double decomposition takes place. Silver has a great affinity for iodine, and a portion leaves the nitrate solution to combine with it, forming iodide of silver, which is the creamy looking substance you see on withdrawing the plate from the bath. The nitric acid set free when the silver leaves it, combines with the base of the iodide, and remains dissolved in the bath.

2. The change which the iodide of silver undergoes when submitted to the action of light is not understood. It is known, however, that the parts acted on are reduced to metallic silver when the developing solution is applied. Proto-salts of iron, and pyrogallic acid, have a great affinity for oxygen, in virtue of which they have a tendency to reduce the salts of silver and other similar metallic salts.

3. Iodide of silver is soluble in cyanide of potassium, &c. The latter therefore dissolves all except the part reduced to metallic silver, which constitutes the picture.

4. Aqua ammonia is liquor ammonia, which will be supplied by any chemist. We have no further details except those published in the article referred to. The use of starch and turmeric, as you describe, would probably be troublesome and unnecessary.—ED.]

MODIFIED RESIN PROCESS.

DEAR SIR,—I have lately printed several stereoscopic transparencies by superposition, using the modification of the resin process, the details of which I gave in the number for Nov. 8th, 1861; and have found it to answer better than any other process I have tried. They are *untoned*, and are of a beautiful transparent purple brown, and are as clear, sharp, and brilliant as albumen ones. I sincerely hope that your readers will give this modification a trial, as I am assured that it will amply repay their trouble. I advise those who intend to print transparencies to well dry the plates before coating with collodion, and to run a little shellac round the edges to prevent all danger of the film slipping. Develop with

| | |
|---|---|
| Pyrogallic acid ... ... ... ... | 2 grains |
| Citric acid ... ... ... ... | ½ grain |
| Acetic acid ... ... ... ... | 20 minims |
| Distilled water ... ... ... ... | 1 fluid oz. |

As soon as all detail is out, and the picture looks finished, add citric acid *freely* to the developer, and flood the plate with it; wash, and fix in hypo that has been used before.

Begging pardon for occupying so much of your valuable space, I am, yours respectfully, H. COOPER, Jun.

## Talk in the Studio.

PRESENTATION PRINT.—The South London Photographic Society have selected as one of the prints for presentation to members of the greatest gems the art has produced—a 10 by 8 vignetted print of Mr. Robinson's, entitled "Early Spring." For beauty of composition, delicacy, and atmosphere, few photographs have equalled this. We congratulate the members on the prospect of obtaining a picture which is alone worth the amount of subscription. We may here add, as a hint to the forgetful, that the treasurer speaks of members in arrears, for whose benefit it will be impossible to order prints until they have paid their subscriptions. Speaking of presentation prints, we wonder if any one has heard how the three photographs promised to the members of the parent society are progressing. It is nearly twelve months since an announcement was made that the council intended to make such presentation.

IODIDE OF SODIUM.—We have received several enquiries as to the manufacture of this salt. It can be prepared in the same way as the potassium salt, given under the heading "Photographic Chemicals." The easiest way, perhaps, is to form iodide of iron first by digesting an excess of piano-forte wire (the purest form of commercial iron,) under water, with iodine. They readily combine, and form the pale green solution of proto-iodide of iron. Now add solution of carbonate of soda to this until the iron is exactly precipitated, when the soda will take the place of the iron.

$$FeI + NaO,\ CO_2 = NaI + FeO,\ CO_2,$$

forming iodide of sodium and proto-carbonate of iron. Filter off the latter, and evaporate to the crystallizing point.

## To Correspondents.

⁂ ERRATUM.—In the formula for dry collodion, by Mr. Ward, given in our last, the quantities of ether and alcohol should have been each 4 drachms, not 4 ounces.

ROSELLI.—Woodward's solar camera is manufactured by Mr. Atkinson, of Liverpool, and may be had of all dealers. The price is, we believe, about £12. There is not very much definite information as to the best modes of using it. Several articles on the subject appeared in our last volume; and there is, we believe, a little pamphlet issued by Mr. Atkinson. As regards its results, we think very highly of them, and think it very probable that they will come into more general demand. The method of using it may be mastered by any intelligent photographer after a little practice. It requires a room devoted to it, with a window facing as nearly south as possible.

C. E. L.—Plain unsalted paper must be used in the phosphate printing process. If you carefully read the description, you will find that the formation of chloride of silver is to be carefully guarded against. You can procure paper without salt from most of the dealers. We shall endeavour to get some more details of Mr. Reynold's process.

ENQUIRER.—Caramel is burnt sugar. When sugar is submitted to a temperature a little over 400°, its properties are curiously changed. It becomes a brown tasteless mass, readily soluble in water. It is used for colouring spirits, &c. It may probably be had of the druggists.

J. BURNS.—A 9-inch condenser, with a focus of 17 inches is very suitable for the solar camera. Different kinds of lenses may be used for the enlarging, a view lens may be used; a portrait lens, about half plate, is generally used; a triple achromatic would, we think, be most suitable. 2. In a glass room, we should prefer about five feet over the head of the sitter to be dark; about three feet on each side of the background dark; from thence, about six feet on each side, glass to the ground. The sides for the remainder of the length may be glass to within two or three feet of the ground. Avoid glass in front of the sitter. 3. A twin lens camera may be used for card portraits with great convenience, provided it have suitable lenses.

A CONSTANT READER.—We do not know who is the patentee, but will let you know if we learn.

A DRY PLATE.—Barley sugar has not the same properties as caramel. How far it might answer the purpose, we cannot tell. See answer to "Enquirer."

J. H. REDIN.—We are obliged by your letter and specimen, which certainly possesses an agreeable tone, and is free from mealiness. This is probably due to the formation of an organic salt, or organic salts, of silver in the bath, to which it is subjected before toning. The bath would contain lactates, phosphates, cyanates, &c. You will see on referring to the report, in the present number, of the last South London meeting, that the value of organic salts of silver were discussed, and a conclusion, corroborative in some degree of your experience, arrived at.

S. BYRAS.—Bertch's Automatic Camera is not made in this country at all, that we are aware of, nor do we know of any one who keeps it, or has specimens of its work. Some of the enlargements by the solar camera are very fine. The method of enlarging described in the PHOTOGRAPHIC NEWS ALMANAC will answer very well for landscapes up to ten inches.

J. E. B.—Your letters have never reached us. If we remember rightly, we received one upwards of twelve months ago, asking for some advice about lenses. This we answered by post, and have received no communication from you since. We give a formula for the manufacture of iodide of sodium in another column.

H. R. N.—We shall be glad to hear particulars of the instantaneous movement. We are obliged by your recent letters.

STUMPED.—Your difficulty is an unusual one: we have never met with it. The only suggestion we can make is the use of less of the sugar syrup. If you followed the former carefully the film should not leave the glass; the only thing which could give it any tendency to do so would be an excess of syrup in proportion to the albumen. We are very partial to transparencies produced on wet collodion; there is a softness and delicacy rarely to be obtained by other means. If you have any skill as an amateur mechanic you can easily manufacture a box or camera which will answer. A bromo-iodized collodion gives the best results in our hands. We recently produced some with iron development, which have an exquisitely warm chocolate tone. You will find full information on the use of chloride of zinc as a flux, and on soldering, in the article, "Amateur Mechanic," in No. 87, p. 5, vol. 4.

R. ALBURY.—We are obliged by your communication, and glad to learn you find the NEWS so useful and interesting. Your progress appears to have been very satisfactory indeed. The chief faults of any of the prints is a little under-exposure. Some of them will be eligible, we should think, for exchange. We shall have pleasure in receiving a description of your contrivances.

B. B.—Your pyroxyline has been made at too low a temperature probably, if 4 grains gives you a thick, glutinous collodion. You may make use of it for positives, after diluting with ether, until it is of a satisfactory consistency. We say ether alone, as that will make it more fluid than alcohol and ether. Render sensitive with an alkaline iodide, as cadmium would tend to make it still more glutinous.

JAMES WOOD.—There have been about a dozen patents obtained at various times for methods of etching and engraving photographs; but we do not think your process would infringe any of them, even if the patents have been maintained. We shall be glad to see some of your results.

EXCELSOR.—In using a Latimer Clark stereo-camera, you will obtain no stereoscopic effect if the camera be placed in the centre of the baseboard. It must be placed alternately at each extreme. The lathes should be so arranged that the camera traverses the arc of a circle of which the sitter is the centre. The picture will occupy the same position on the plate, no matter in which of the positions the camera may be placed; but by placing it correctly two different views of the sitter will be obtained, so as to give relief in the stereoscope. To use the camera, commence with it moved on the lathes to the right, and the slide containing the plate also at the right; expose, and then cover the lens. Now move the camera to the left, and push the slide to the left, and again expose. You will thus obtain the two pictures in correct relation to each other. If you examine the *principle* involved you will soon see how the arrangement works. 2. On page 131, vol. 4 (No. 97), you will find the description of a lens similar to Jamin's. You will there learn how to use yours.

J. E.—We have not used the lenses you name; but think it probable they are good. It entirely depends upon the purpose for which you require them, as to whether the first or last-mentioned are best. The first for portraits, the second for landscapes.

G. P.—The two writers are not speaking of the same thing. When Mr. Sutton and others recommend 12 grains of salt to an ounce of "pure albumen," they simply mean 12 grains to each ounce of solution. The words, "pure albumen," as there used, mean pure white of egg, which is solution of albumen. The proportion of salt need not be altered, if the solution contained half water and half white of egg. The Abbé Pujo, however, in the remark you quote, is referring to another matter; not the proportion of salt in a given solution, but the relation of salt to albumen, ("pure" in a more exact sense,) as contained in a given quantity of solution. The first refers to the amount of salt to be spread over a given surface of paper; the latter to the proportion of chloride of silver to be formed, as compared with the amount of albuminate of silver.

A. B. C.—The bath of acetate of soda may be used over again until it is exhausted. 2. The cause of the developing solution turning dark whilst on the plate is partly the mixture with reduced silver, and partly the action of the oxygen it is acquiring in the act of de-oxydising the nitrate of silver. 3. In our experience, toning after fixing is more troublesome and inefficient than before.

R. GORDON and others.—We have written to the secretary of the Birmingham Society, and hope to be able to give some information in our next.

W. BARTHOLOMEW.—There was an error, drachms should have been given, instead of ounces. We have no information as to the waters used for washing, but Mr. Ward would doubtless furnish information with pleasure. We will bear your suggestion as to mealiness in mind. See report of the South London Society. 2. We shall have pleasure in trying the collodion when it arrives. We never think your communications a bore but always receive them with pleasure.

H. NEWTON.—If our memory serve us correctly, the name you mention is the one referred to; but we have not preserved the copy. The place is Derby.

H. R. NICHOLS, CHEMICUS, and several other correspondents, as well as several articles, in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 177.—January 24, 1862.

## PHOTOGRAPHY AND THE INTERNATIONAL EXHIBITION.

he final arrangements for the management of the photo-raphic department of the International Exhibition are now made and will shortly be annouuced to photographers. We ar that in many respects the votaries of the art in this ountry are doomed to disappointment without remedy, and at the very best that can now be done will be far from tisfactory. So far as it has been possible in the brief me and with the limited facilities afforded, we believe it is ut justice to the committee appointed by Her Majesty's ommissioners to the control of this department, to say that ey have worked very hard, and striven very anxiously, to ake such arrangements as may give general satisfaction. hey have resolved to allot the space placed at their isposal in such a manner as shall, to the best of their dgment, give the most adequate possible representation of e art, but that they will fail to satify many of the appli-nts must be evident, when it is remembered that the whole ace devoted to photography is less than the amount asked r in some single applications.

We cannot but think, wherever the blame may rest, that ith has scarcely been kept with photographers, in the aintenance of the arrangements originally intended, satisfactory as they were. Whatever section of the uilding or of the catalogue photography was destined to cupy, it was at least intended to exhibit it collectively. e were authoratively informed that it was intended that e photography of the world should occupy one apartment, d thus afford at one glance a general view of the progress the art universally, and admit of the completest facilities r the comparison of international characteristics and excel-nce in the varied branches. This decision is now reversed; d instead of one universal photographic department we all have several minor national shows, each country hibiting its own photographs in its own department. It to little purpose to enquire now the origin of this changed tention, since it is, we understand, without remedy. We lieve it is due to the persistent protest of the French Com-issioners who insisted that their photographs should be hibited in the French department and not in any general llection. In what category within that department pho-graphy will be placed remains to be seen. Possibly this ay have been a shrewd but efficient mode of avoiding, for rench photographers, the mechanical allocation with which e art was threatened. Time will solve this part of the estion.

The fact stands, however. British photography will now exhibited alone; and whatever space, or whatever position, e art may occupy in the displays of our continental ighbours, it caunot take a very conspicuous position with . It will share an apartmeut with numerous objects voted to the purposes of education, such, we presume, as aps, diagrams, models, broadsheets, &c. The space devoted photographs and photographic apparatus in this great cenuial exhibition will be just one-seventh more than that ually filled by the annual exhibitions of the photographic ciety. In this space every phase of photography, historic, ientific, artistic, and economic, must be condensed: land-ape and portraiture, plain and coloured; micro-photo-aphy and life-sized pictures; historic records, illustrations processes, commercial applications, photo-lithography, amel photography, instantaneous photography, composi-on pictures, in short, all the products or results of the art. But this is not all; photographic apparatus of all kinds, from a plateholder to a camera stand, from a paper-clip to a rolling press, have to be provided for, and all this in half of a moderate sized apartment.

All this is now beyond remedy, and it may be asked, therefore, why dwell upon the subject? It is bootless now to ask who is to blame; but we have an object in bringing the matter distinctly before the minds of our readers. It is quite clear that many photographers will have to forego the display of much they had contemplated, the most judicious selection therefore will become imperatively necessary, to give to the exhibition in quality what it must lack in quantity. Further, from disappointed applicants we would bespeak for the committee a fair amouut of consideration. These gentlemen have accepted, at the last moment, a very unthankful task. They have undertaken to make the best of a matter mismanaged from the outset, and to make the most of limited space. We know they have endeavoured to exercise a most judicious eclecticism in the allotments made, and that some of their number have traversed the metropolis to acquire a personal knowledge of the import-ance of claims made by men whose reputation and standing were unknown. In apportioning the claims of artists of recognized position, the duty is, where all must be cut down, invidious enough; but the duty is tenfold more difficult in dealing with those as yet unknown to fame, and who it may be, are waiting to make their mark in the forthcoming exhibition. The difficulty is still more enhanced by the uncertainty which must prevail in many cases as to the size and character of the pictures to be exhibited. The space which would be very ample for the display of stereo-pictures, might be utterly useless to the applicant whose sole contri-butions are intended to consist of life-size solar camera pictures. If the difficulty of dealing satisfactorily with the applications of artists be great, the difficulty of satisfying the manufacturers of apparatus must be tenfold greater. We hope these considerations will be borne in mind when the allotments reach the hands of those concerned, which will now be within a few days at latest.

The precise conditions for the guidance of photographers we cannot yet state. We believe it is intended to exclude such pictures as are retouched or worked up altogether; but where the line is to be drawn which defines the term untouched, we are at this moment uncertain. It was in contemplation to make the term very stringent, involving entire freedom from any kind of "dodging" in either negative or positive. This would at once exclude not only all worked-up pictures, but all with painted out, masked, aud improved skies; and although it might be strictly just, it would be scarcely desirable. Possibly a wide definition and a discretionary power to be exercised by the committee may be productive of the best results, although it can scarcely be hoped, however wisely and well such a power may be used, that everybody will be satisfied.

If the same course be followed here as in other depart-ments—and we presume it will—applicants on receiving their allotments will be required to signify their intention of filling the space awarded to them, and will, at the same time, be required to nominate a certain number of gentlemen as jurors in their department. This will be an important duty; for however inferior to what had been hoped the photographic department of the exhibition may be, the prestige attaching to the award of jurors generally possesses some value. Self-interest will, therefore, prompt the nomina-tion of men at once of cultivated taste, dispassionate judgment, and freedom from bias; equally capable of forming a correct estimate, and free from all influences which might warp their decision.

Thus ends, then, the magnificent hopes which some of us have formed of an exhibition of the photography of the world at one glance. Instead of one grand collection, we shall have several minor collections; the display from English photography a little exceeding in extent, although largely we hope in excellence, the usual annual exhibition. International comparison, such as we had hoped for, with national collections side by side, we can have none. Fine art comparison and companionship, we can have none, as the apartment in which British photographs—in company with the respectable, but by no means picturesque, display of educational objects—will be exhibited, is quite removed from the picture galleries. All this, however, should be simply an incentive to make our department of the exhibition of sufficient excellence to challenge attention and extort admiration, in despite of the absence of all the circumstances which might have given it adventitious claims.

## THE LATE PRINCE CONSORT AND PHOTOGRAPHY.

PHOTOGRAPHERS generally are aware that his late Royal Highness the Prince Consort was interested in photography, and a patron of the Photographic Society. But few are aware, except those who came in contact with him, how warm was his interest in everything connected with the progress of the art, and how thoroughly sound and technically correct was his judgment in every department of photography. We scarcely meet a photographer of eminence who has not some anecdote to relate connected with some transaction which has illustrated the familiar knowledge, zealous interest, and practical skill, in various departments of the art, evinced by Prince Albert.

Perhaps few men know better the extent of this knowledge and interest than Dr. Diamond, and we find in the *Journal* of the Society the following remarks from his pen:

"We cannot pass over the liberal and princely sympathy which he ever evinced in the progress of photography, not only with his purse, but his suggestions—suggestions founded upon a real and thorough comprehension of the chemical and artistic requirements of the art. The words of the Address so ably drawn up by the Lord Chief Baron, where he says, 'We (especially) who have been guided by the practical judgment of His Royal Highness, who have been assisted by his liberality, aided by his advise, stimulated by his example, and cheered and encouraged by his presence and praise, deeply lament the irreparable loss your Majesty and all society has sustained,' are no unmeaning words; they speak the heartfelt sentiments of every member of the Society who has ever paid the least attention to the interest taken in its affairs by the late Prince. We should mention here, that when the committee for the investigation of the permanency of photographs was first mooted, the late Prince was one of the first who came forward and supported it by a donation of £50. Besides this, he regularly attended every exhibition of the Society, in company with Her Majesty, and carefully inspected the merits of each picture, and subsequently, from his marked catalogue, selected a large assortment of those pictures which pleased him. We need hardly say that this was done with the greatest discrimination; and it was frequently found that little, meritorious pictures, which might have been hung not exactly in such places as were likely to catch the eye, were sure to be in the selection.

The collection of photographs made by His late Royal Highness is, we should think, one of the most complete extant. He did not, however, confine himself simply to the collection of pictures; he also availed himself of the assistance of photography to enable him to reproduce everything that would in any way tend to illustrate the history of Raffaelle's works. This collection, several of which have from time to time been exhibited at the Society's Exhibitions, is, we believe, entirely unique. As a manipulator in photography he was unsurpassed: in his practice of the art he was greatly assisted by his former librarian, Dr. Becker; and on the occasion of his last visit to the Society's Exhibition, he spoke of the great loss he had sustained in his photographic pursuits when Dr. Becker removed to Germany. We should perhaps here add that Her Majesty is also a very good photographer. Certainly the art has no reason to complain of want of patronage and support from the Court; so extensive is the collection of negatives which have been taken for and by the members of the Royal Family, that it is necessary to have a private printer to keep them and print them when copies are wanted."

The debt which the art has owed to the late Prince's aid and patronage it is endeavouring to repay by perpetuating his memory. It is quite certain that at no former period of the world's history were mankind so familiar with the personal presentment of their great ones and benefactors in every grade of life as our art has made them in this age. The everyday aspects of royalty are known at every fireside, and a reigning family beloved alike for its domestic virtues, high personal worth, and beneficent influence on the general well-being of the nation, becomes, by the aid of photography, personally familiar, and an honoured presence in the cherished portrait gallery of loved friends and admired heroes.

Amongst the portraits of the late Prince, genuine and pirated, with which the metropolis now abounds, two or three which have been issued since his death take prominence. A very fine 10 by 8 photograph has been issued by Mr. Mayall, from negatives taken a few months before his death. The face is in profile, and is characterized by more than the usual thoughfulness of a face which was always grave and serious. A copy which lies before us, is unimpeachable as a specimen in photography, delicate, round, vigorous, and full of gradation. Its only fault is in the composition, which had the picture been taken in the artist's studio, with every necessary at hand, instead of at the palace, doubtless would not have occurred. There is a want of balance, which might have been remedied by a piece of drapery filling the vacant space behind the chair. In an engraved copy of the photograph just issued this want is filled up in the way we have indicated.

Another portrait of the Prince is a vignette bust on a whole plate, also a profile, by Mr. Rejlander, from a negative or negatives taken upwards of twelve months ago. A copy we saw in the portfolio of the artist, was as perfect a photograph as we have often seen, and a fine portrait; but we regret to say that the majority of those we have seen exhibited for sale are far inferior, and have much the appearance of reproductions.

Another, perfect as a photograph, and perhaps more pleasing than any as a likeness, is a full length sitting figure by Mr. Vernon Heath. This is very satisfactory throughout; the view is about three-quarter face, and the expression very good. This is not yet published, we believe, the demand for the Court absorbing all the copies at present produced. It will doubtless be shortly before the public.

We need not now, since a contemporary has given publicity to it, hesitate to mention, what before we had conceived the artist might not desire yet to make public. Mr. Rejlander has in hand, and intends to complete, if possible for the forthcoming exhibition, a photographic memorial to the late Prince. The design, if carried out as the artist described it to us, will be a most interesting and grateful memento of the august patron of photography, whose portrait will occupy the central position, surrounded by an allegorical group, indicative of the relation held by his late Royal Highness as the patron and promoter of all the arts of civilization.

## PHOTOGRAPHY IN BELGIUM.

THE glowing accounts we have heard from various quarters of the superior figure photography of the Continent, and especially of the magnificent enlarged portraits, which are to eclipse so signally the productions of our English photographers, has excited our interest to learn all that is possible upon the subject from every quarter. We have recently ublished the impressions of one able observer in Paris. Ve wrote the other day to a friend well capable of judging, t present in Belgium, asking him to give us his impressions, especially of the productions of M. Ghèmar, of Brussels, whose pictures we had heard described as amongst the nest things of the kind which had been produced. We ubjoin some extracts from his letters, conceiving that our eaders may feel as much interest in this question as we do urselves.

"I was at Namur a day or so since, and there saw three *very* xcellent enlarged portraits. I should think the best I have een yet. I did not remark the name upon the door; I went n and examined them. They were evidently enlarged from *arte de visite* negatives, and bore every appearance of being uite untouched. The person in the 'show-room,' (*i.e.* shop,) ith whom I conversed, declined to furnish me with any inormation respecting their mode of production; but he showed o little intelligence, and made several remarks so unscientific, hat I am inclined to believe these pictures were not taken by im at all, and had probably been bought at Paris or elsewhere, o hang in his show-room. This is a very common way of aking a show here. I have seen the same whole plate picures exposed in Brussels, Antwerp, Namur, Mons, and Liege. recognise some that are familiar to me in London; some that have seen in Paris.

"I have not examined with care Ghèmar's large pictures, hough I have seen them; but it has always been by gaslight. will make a point of going there shortly, and will give you y opinion of them. Upon first seeing them, my impression as that they were prints from enlarged paper negatives, and hat these *negatives* were a little touched.

"I do not think that very large portraits are likely ever to ecome a source of profitable business, as the expense of such a icture must of necessity be considerable; and probably the ublic would elect to pay a little more, and have it upon canvas y an oil colour artist. But I believe that if photographers ould give their attention to the perfect reproduction of album ortraits, enlarged to about 28 × 18, which they will bear ery well indeed, and have a remarkably fine effect, a large and ew business might be created. I think in a commercial ense, life-size is a mistake, at least at present. I do not hink we know the *dernier mot* about solar cameras yet.

"There is some careful photography to be seen here, as far s the mere mechanical part is concerned; but generally the ictures (in the show-cases) are poor in artistic effect, the pose eing too often either harshly formal, or too theatrical. This may n some measure proceed from the stuff they have to work with; r the natives here are not very refined in our acceptation of e term, and it is not easy to produce a graceful representation f a *gauche* original.

"The pictures seem in most all cases to bear evidence of nferior lenses, a portion of the picture being out of focus, or an ncouth position being adopted to avoid it; and a deficiency of ght may almost invariably be noticed towards the feet, as if a o small *front* stop had been used. This latter defect may erhaps arise from the imperfect lighting in the glass room. n many of the shows, I see the yellow witness of old hypo oning, and in some these are side by side with the bright roofs produced with the alkaline formula, which appears to dicate that this latter is *beginning* to replace the former."

A letter received a few days afterwards says:—

"I called yesterday on M. Ghémar, and had the pleasure of aking the acquaintance of a most agreeable and intelligent entleman, with none of the froth and voluble bluster so unfornately common to scientific men on the Continent.

"I found him very obliging and communicative; he showed e all over his large *ateliers*, and gave me every information at I asked for. Some of his large pictures are extremely ood—one may be termed *perfect*, that of S. A. R. le Comte de landres. They are all of them taken with the solar camera of Voodward, slightly modified, from a thin iron-developed negave, direct upon chlorided paper, the exposure averaging about ree hours. The proofs are toned and fixed in the usual man-r. They are then touched up, but very slightly; not more, fact, than a whole-plate portrait generally requires. After is they are varnished.

"The touching up in the proof I have named of the Comte Flandres, was confined to the light spot upon the eyes, which always too large, and to the details of the several orders upon the breast, which, being composed of gold, silver, and brilliants, were re-produced too opaque in the negative—as it is easy to imagine. The flesh, beard, drapery, and surrounding furniture were pure photography; the 'touching up' did not occupy half an hour in all, so you may conceive it is not great. You will understand the fidelity of the photograph by the fact that a curtain of wool-work, which forms a part of the background, is reproduced with each of its stitches clearly defined, as in the original negative; and the whole will bear looking at as closely as an ordinary sized photograph. The modelling and relief are perfect, and the softest half-tones beautifully preserved. The height of the picture, I should think, is a little over three feet, and of the figure about 28 inches. I state this merely by guess, and from recollection.

"There are no others equal to this one, but several of them possess much merit. They are generally life-size, and from this circumstance have required more touching up; but still, I am told, seldom upon the flesh. They require to be looked at from a distance—the same as an oil painting—when the general effect is good; but, in my mind, scarcely pleasing. There is about them a *je ne sais quoi* of an unfinished appearance, as if the master's finishing touch were yet wanting. This inspection confirms me in the opinion I expressed lately to you, that half-size of life, or a little less, was a preferable style with our present appliances, and it probably always will be so, than the more ambitious full life-size.

"Among other things, M. Ghémar named a fact to me which I had only suspected from my own experience, but had never proved to be true: I daresay it is familiar to you. He says that, beyond a doubt, paper positives taken from weak, thin negatives, however brilliant when first finished, always fade, whatever precautions are taken, in washing them. He never got a proof returned taken from a strong dense negative, but *invariably* those from weak negatives come back to him at the end of a year or so; he furnishes fresh copies from the same negative, and these, in their turn, are certain to fade also. His walls are hung with experimental specimens in cases, placed alternately from dense and feeble negatives, and certainly the latter show all of them signs of decay not visible in the others.

"I think this is all the information I need give you upon the subject of the large photographs of Ghémar. I am glad, however, to announce to you, that you will have the opportunity of judging them for yourself, as he intends to send some of them to the Exhibition."

Our correspondent sums up his impressions by stating that, judging from what he saw exhibited, none of the Belgian artists surpass the English; and that, with the exception of M. Ghémar, none equal them. Mayer and Pierson, who have a house in Brussels, make a much worse show there than they do in Paris. There are two other establishments of about equal calibre, and all the rest are decidedly bad. The good old photographic caricature (unknown to Paris) of the fifty-centime portrait—just worth the money—is rampant; but, thanks to the police, there are no touters! Whatever may be the case as regards other countries, it is evident English photography will not be eclipsed by that of Belgium.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Hyposulphite of soda* (continued).—The ordinary salt met with in commerce is the one which we described in our last article, as containing 5 equivalents of water, and having for formula—

$$NaO.S_2O_2+5Aq.$$

It is liable to be contaminated with sulphite of soda, sulphide or poly-sulphide of sodium, which communicates to it a yellow colour and disagreeable odour; and also, but more rarely, by salts of other sulphur acids. No chemical means, which could be employed by the amateur, are known whereby the freedom of hyposulphite of soda from many of these latter impurities may be ascertained. It will, however, be advisable to test the salt for sulphides by adding to an aqueous solution a few drops of solution of acetate of lead. If sulphides are present, the precipitate will be dark coloured immediately, whereas the pure hyposulphite precipitates lead salts white, which does not discolour until it has stood for some time, or has been heated. The freedom of the salt from other impurities may best be ascertained by the iodine test. This is founded on the reaction which takes place between hyposulphite of soda and iodine, whereby the former is converted into iodide of sodium and tetrathionate of soda.

$$2\ (NaO.S_2O_2)+I=NaI+NaO.S_4O_5.$$

Both the products being colourless salts, the completion of the reaction may be known by the solution remaining coloured when more iodine is added than the theoretical quantity. The proper amount may be easily calculated; from the above formula it is seen that two atoms of hyposulphite of soda. completely dissolve and discolourise one atom of iodine, Now, the atomic weight of crystallized hyposulphite of soda is 124, two atoms, therefore, being 248, and that of iodine being 127, it follows that 127 grains of iodine should be completely dissolved into a clear colourless solution by 248 grains of hyposulphite of soda. As, however, hyposulphite of soda is never absolutely pure, but contains usually a slight excess of water, or a trace of sulphate, (both of which are immaterial,) it is generally considered satisfactory if a rather less proportion of iodine is able to be discoloured by the salt. The method recommended is therefore to weigh out very accurately 20 grains of the hyposulphite of soda to be tested, and 10 grains of pure iodine, (theory would require 10·24 grains of the latter). Dissolve about three quarters of the hyposulphite in half an ounce of water, and add the iodine to it, facilitating the mutual action by grinding the latter with a pestle, or the end of a thick glass rod. The hyposulphite will be decomposed, and the iodide of sodium formed will dissolve the excess of iodine, forming a deep brown coloured liquid. Now add the remainder of the hyposulphite, dissolved in a little water. If the liquid becomes quite colourless, the hyposulphite may be looked upon as sufficiently pure; but if it be still coloured by uncombined iodine, the salt is impure; the amount of impurity is in proportion to the quantity of free iodine left behind, but since this will be in great measure dissolved in the iodide of sodium, the actual per centage of impurity cannot readily be told, as it otherwise could be by filtering off and weighing the residue of iodine.

Hyposulphite of soda, when in the form of aqueous solution, will dissolve about one-third of its weight of chloride of silver, forming a readily soluble salt of the formula,

$$AgO.S_2O_2+2\ (NaO.S_2O_2).$$

In this form, the silver compound has but little tendency to decompose at the ordinary temperature. But when more chloride of silver is added, there soon commences to be formed another double salt—

$$AgO.S_2O_2+NaO.S_2O_2,$$

containing only half the amount of hyposulphite of soda present in the former compound, and very sparingly soluble in water. This salt will therefore be precipitated in the form of minute sparkling crystals; and when this takes place in a fixing bath, there is great danger of the destruction of all the prints which it contains, owing to the tendency which the crystals have to deposit on the surface and in the pores of the paper, where they resist all attempts to remove them by washing, and speedily decompose, with formation of yellowish brown sulphide of silver and sulphuric acid. Thus is occasioned the well-known appearance of yellow curdy patches in positives, best seen by holding them up to the light. When chloride of silver is dissolved in hyposulphite of soda, there is not much danger of decomposition, provided a good excess of the latter be kept in the liquid; but the case is different when nitrate of silver is used, the salt formed in this case being much less stable than the other, and very liable to precipitate sulphide of silver in the prints. For this reason, it is preferable to wash all the free nitrate of silver away from the positives before immersing them in the fixing bath, or to place them in a dilute solution of a chloride, to convert all the free nitrate into chloride of silver. This plan, however, is not adopted by many photographers, as the tones of the print do not turn dark so readily. Since the *toning* properties of the hyposulphite of soda are communicated to it in this case by the ready decomposition of hyposulphite of silver into sulphide of silver and free sulphuric acid, which latter induces a further decomposition and a separation of sulphur, hydrosulphuric, sulphurous, and other sulphur acids from the hyposulphite of soda, it is evident that prints fixed without removal of the free nitrate of silver which is on their surface, are more liable to be "sulphur-toned," and therefore to fade, than prints which only introduce chloride of silver to the hyposulphite of soda.

It is no part of our design in these chapters on "Photographic Chemicals," to enter into the practical details of the photographic processes; but we may here mention that to perform the operation of fixing positives in the manner most in accordance with strict chemical principles, so as to ensure the greatest possible chance of permanency, it would be advisable to adopt a plan somewhat as follows:—

The positive paper, in the first place, should have a considerable excess of free nitrate of silver on it, in proportion to the chloride present, so as to obtain the *density* of image requisite to stand the various lowering influences to which it will be subsequently subjected. The paper should be used as soon as possible after preparation. The printing should not be too dark, and the prints as soon as they are removed from the printing frame should be well washed until all the free nitrate of silver is removed; the last washing being with water, containing a little common salt dissolved in it. It is perhaps immaterial whether the print be toned before or after fixing, but the toning bath should be alkaline, prepared with gold, and should have no hyposulphite whatever in its composition. The fixing bath should be quite new, and consist of one part hyposulphite of soda to five or six parts of water, kept alkaline by a grain or two of carbonate of soda. The prints should remain here until the whole of the free chloride of silver has been converted into the soluble double hyposulphite of silver and soda, when they should be removed and quickly washed in plenty of water. Whether the fixing or the toning be performed first, the prints should be well washed between the two operations. The final washings should be by rapid and copious changes of water, continued for about twelve hours; the last washing or two being with distilled water. Only a few prints should be placed at a time in a bath, and as soon as any solution shows signs of exhaustion, it should be replaced by a new solution—not replenished by fresh chemicals. If a print be not properly coloured in the toning, never attempt to colour it by allowing it to remain in the hyposulphite of soda longer than is necessary to fix it; but either be content to have it of an inferior colour, or re-immerse it, after washing, in the toning bath. By attempting to make the fixing usurp the functions of the toning bath, the former will be rendered unfit to perform its proper offices with safety to the prints. No doubt good colours may be more readily obtained in this way, but it is at the sacrifice of permanency, and a good photographer should think how his prints will look in ten years' time, rather than how they look at the present moment. One permanent print, even though it be of a rather inferior colour, is better than fifty faded prictures.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Lenses.

It is not my intention to examine the optical portion of lenses, as that subject has often been treated in these pages by those more competent to do so than myself. I propose merely to notice the mechanical parts which serve to apply them to photographic use.

The mountings of lenses are of three kinds. They are

* Continued from page 28.

her set in rigid tubes, in tubes sliding one within another, in sliding tubes, with a rack and pinion to commuuicate e movement.

Of these, the first or rigid mounting, is decidedly the st, and should always be selected in preference where use is possible; that is, when it is intended to be emoyed with a camera having a sliding or expanding body. ie only utility of a lens having a movement *per se*, is for e purpose of focussing; but if this can be performed in other manner, there is nothing gained by duplicating the eans, except an unnecessary complication, and an useless ldition to the prime cost. A camera, with a sliding body operly made, and to which the rack and pinion movement fixed, with a lens set in a rigid mounting, will be found ry superior in practice to the ordinary form of camera pplied with a lens in a sliding mount.

Of course, those cameras which have no movement, or which the moveable parts, from faulty design or construcon, work with difficulty, irregularity, out of square, or in ch a way as to render them unadapted for focussing purses, require a lens capable of movement. The question the advisability of employing such cameras for poraiture will be examined under the appropriate heading.

Of the two kinds of mounting for lenses with a moveent, that in which the mounted lens simply slides in other tube is to be preferred. This is more particularly e case with single lenses, for landscape purposes; but it so holds good for portrait combinations. The adjustment the rack, which is merely fitted into a slot in the mountg, is a fertile source of the admission of dust into the lens ount, and of light into the camera. It is very liable to t out of order, and it may inconveniently do so just when d where it is difficult to get it repaired; and it adds aterially to the prime cost of the lens.

For out-of-door work with cameras that must be focussed y the movement of the lens, a sliding tube will be found fficient. It is the most economical, not liable to get out f repair, nor inconvenient to use. For portraiture, it is est not to employ such cameras, but rather those with a iding body moved by a rack and pinion, in which case lens with a rigid mounting is best.

The cap of a lens should be made of wood, papier maché, eather, or some such material, in preference to metal. Caps ade of metal are easily bruised by falling down, or by a low, and are thus temporarily rendered useless. It should t easily on to the hood, so that it may be taken off and placed without danger of shaking the camera.

In taking children and animals, it often happens that the ct of taking off the cap attracts their attention, and causes em to move. To avoid this, I have found a great advange in employing a hinged shutter *behind* the lens, moveble from without, instead of a cap: in this way the lens an be uncovered at any moment without any apparent ovement of the operator, or the sitter being aware that a icture is being taken. The artist can wait until the dered expression comes over the features, and make the best se of the time while it lasts.

The stop or diaphragm of a single lens should be placed n front of it, at a distance of about half its diameter. If be placed too far off, it ceases to be a stop, and acts as an bject, and cuts off light from the edges.

The stop of a double combination lens should be about alf-way between the two lenses: the exact position for it epends upon the relative foci of the lenses. In those nses which are not furnished with a transverse slit in the ounting to receive the central stops, they must be placed n position by unscrewing the back lens. A centre diahragm of cardboard well blackened is perfectly effective, nd, if one has to be improvised, it is very easy to make. f cut a trifle larger than the tube its own spring will keep in position. In a double combination the stop should *in o case* be put in front. This is so well known that I hould not have thought it necessary to mention it, had I ot quite recently seen two separate instances where a front stop was used by professional photographers of eminence in London to produce *carte de visite* pictures with a quarterplate lens. This produces a flat picture, and the field is diminished, because a stop so placed does not act as a stop but as an object.

(*To be continued.*)

## ON COLLODION POSITIVES.*

The production of collodion positives has generally been considered by the mass of negative operators as a matter so simple as to be scarcely worth a thought. It is, nevertheless, a fact beyond dispute, that but comparatively few really excellent positive operators are to be met with. To produce a good collodion positive requires as much care and skill, and attention to proper conditions, as to produce a good negative. As the positive process is generally a favourite with beginners, because they obtain results at once, without waiting for printing, we shall give a brief statement of the best mode of proceeding.

The collodion for positives requires to be of an essentially different character to that best suited for the production of negatives. It should be entirely free from any organic or powdery tendency. For those who are desirous of making their own collodion, the method of preparing the soluble cotton with mixed acid is simplest and best. The nitric acid should be of a specific gravity of 1·420; and the sulphuric acid of a specific gravity of 1·840. Of these take equal parts by measure. To six measured drachms of the mixed acids add two drachms of the best carded cotton wool, which has been previously well pulled out into thin tufts for ready and convenient immersion. The temperature of the acids should previously have been raised by placing the jar containing them in a vessel of hot water to about 130° Fahr., which temperature should be maintained during the immersion. The cotton should be immersed as rapidly as possible, being pressed into the acids by means of a stout glass rod, or spatula. When the whole of the cotton is immersed, it should be kept in the acids from five to ten minutes, the thermometer being kept there also, to test the temperature. It is then removed, thoroughly washed, pulled out, and dried.

From four to five grains of this cotton should be dissolved in equal portions of ether and alcohol, the latter about 63 over proof. The formula will stand as follows;—

| | |
|---|---|
| Pyroxyline about ... ... ... | 8 grains. |
| Washed ether... ... ... ... | 1 oz. |
| Alcohol (63 o.p.) ... ... ... | 1 „ |
| Iodide of cadmium ... ... ... | 5 grains. |
| „ potassium ... ... ... | 3 „ |
| Bromide of ammonium ... ... | 2 „ |
| Tincture of iodine, *quantum suff.* | |

The exact quantity of pyroxyline will be regulated by the thickness of collodion it produces, but about four grains to the ounce will generally be found to give a pleasant working consistency. The iodides of cadmium and potassium in the proportions named, and in conjunction with the bromide, give a stable collodion yielding a fine toned positive. The tincture of iodine is made by dissolving ten grains of iodine in an ounce of alcohol. Sufficient of this should be added to the collodion to make it yield fine clear blacks, free from fog. The proportion will vary with circumstances, but sufficient to produce a sherry colour will generally be found to give the best results. American operators are fond of the addition of hydrobromic acid for a similar purpose. A method of preparing this in a pure form was recently given in the articles on the preparation of photographic chemicals in the Photographic News, but as the method is scarcely available to those not familiar with chemical manipulations, we subjoin the rough American method which, whilst yielding a less pure product, is still found to answer for this purpose:—Take an ounce of alcohol, and add to it sufficient

* From the Photographic News Almanack for 1862.

bromide to make it red. Leave it to stand for a day or two, when it will have become colourless. Repeat the operation until it ceases to lose colour, and then add sufficient alcohol to remove the colour. This is hydrobromic acid, not pure, but sufficiently so to answer the purpose. A drop or two added to an ounce of newly iodized collodion rapidly liberates free iodine, and makes the collodion work clean, with fine silvery tones. Too much will, however, diminish sensitiveness.

Those who do not wish to make their own collodion will frequently find the addition of tincture of iodine or hydrobromic acid an improvement to newly iodized commercial samples. It is a good plan to keep two or three different samples of different ages, and giving different results; some giving much detail, and others much vigour. These can then be mixed in such proportions as may from time to time be found desirable.

The Glasses should always be scrupulously clean, as a very slight impurity will mar a good positive. Alcohol and tripoli will render new glasses perfectly clean, but for glasses which have been used a little nitric acid is necessary. It is worth remembering that the use of a full-bodied collodion is favourable to the production of clean pictures, as a thin film makes apparent the slightest dampness in the cloth with which the plate was rubbed, whilst with a thick collodion the same causes would produce no injurious effect.

The Nitrate Bath.—This should be made of pure recrystallized nitrate of silver; the strength, forty grains to each ounce of water, with sufficient nitric acid to give clean brilliant pictures of a silvery tone. The best way to proceed about making a bath is first to mix the quantity of solution of the required strength. It may not be unimportant here to remark that nitrate of silver is sold by the ounce avoirdupois, which contains only 437½ grains; some photographers make an error by mixing an ounce or more of silver just as they have bought it, with a given quantity of water, on the assumption that it contains 480 grains, the amount of an ounce troy, or apothecaries' weight. Care should be taken that each ounce of water contain forty grains of nitrate of silver. A large plate coated with the collodion to be used having been placed in the bath and left there for an hour or two; a picture may then be tried. If it work without fog, it may be assumed that the silver and the distilled water were both free from organic matter. If the plate be covered with fog or streaks, it may be desirable at once to expose the solution for a few hours to sunlight, which will have the effect of blackening and precipitating the organic matter. The solution is then to be rendered sufficiently acid and will be ready for use. This operation of sunning may be dispensed with, as the addition of sufficient acid would in most cases remove the streaks and fog; but as it is very desirable, in order to produce the most brilliant results, that a positive bath should be free from organic matter, the sunning will give more certainty, and tend to the production of better pictures. The amount of acid to be added will depend somewhat on the amount already present in the crystals; but with a forty-grain bath, from one to two drops of nitric acid may be added to each ounce of solution. It is always well, however, to begin with a minimum quantity, and gradually add more, trying plates in the meantime, until the best results are obtained. It must be remembered that since the collodion generally used for positives contains free iodine, every plate inserted in the bath will liberate a little nitric acid, and that hence, a positive bath generally becomes acid from use. When it begins to work very slowly, either neutralize with oxide of silver, or add more neutral nitrate of silver, to strengthen the bath, as the more acid there is present the stronger the silver solution should be.

Lighting.—One word only is necessary on this head. The lighting of the subject for a positive is the same in principle as for a negative, with this difference, that the light and shade on the figure for the positive may have a little more contrast than is desirable for a negative. The camera and dark room should be carefully shielded from diffused light, by the use of every precaution possible.

Developing.—By far the greater part of the beauty of the finished positive depends on the skill and judgment with which this operation is performed. The strength of the developer should be proportioned to the condition of the bath and the temperature, especially to the latter. Stronger developers, with less free acid, will be required in winter, than in summer. If the bath be very acid, the same conditions will apply, a strong developer with little free acid will be necessary. A weak developer, requiring longer application than a strong one, will sometimes have a tendency to accumulate reduction more on the high lights than on other parts. The same tendency will be observed on using a developer over and over again. Some positive operators are fond of this practice as it tends to give brilliancy to the picture. Care should be taken, however, not to carry it too far or there is danger of losing detail in the shadows, or if the development be continued long enough to give drawing in the shadows, both force and detail are lost in the face through over development. Nothing but a practised eye will enable the operator to determine the exact point at which development should be stopped in a positive. And whilst this part of the process is very important in negatives, it is of still more vital importance in positives. In the former a trifle more or less development may affect somewhat the beauty of the resulting print, but does not necessarily spoil the picture; whilst in a positive an error here may be fatal, rendering the picture quite worthless. We subjoin formulæ for two or three developers, each giving excellent, but slightly different results.

| | |
|---|---|
| Protosulphate of iron ... ... | 10 grains |
| Nitric acid ... ... ... ... | 2 minims |
| Water ... ... ... ... | 1 oz. |

This gives a very metallic-looking picture. It should be used fresh each time:—

| | |
|---|---|
| Protosulphate of iron ... ... | 15 grains |
| Nitrate of potash ... ... ... | 10 „ |
| Acetic acid (glacial) ... ... | 15 minims |
| Water ... ... ... ... | 1 oz. |

This gives pictures of very fine tone. It may be used over and over again, taking care to add each time, however, an equal bulk or more of fresh solution:—

| | |
|---|---|
| Protosulphate of iron ... ... | 20 grains |
| Acetic acid (glacial) ... ... | 20 minims |
| Nitric acid ... ... ... ... | 2 „ |
| Water ... ... ... ... | 1 oz. |

This gives a brilliant ivory-like picture with solid whites It should be used fresh each time:—

| | |
|---|---|
| Nitrate of baryta (powdered) ... ... | 1 oz. |
| Nitric acid (s. g. 1·400) ... ... | 3 drms. |
| Water ... ... ... ... ... | 16 oz. |
| Mix and dissolve, Then add— | |
| Protosulphate of iron (powdered) ... | 1½ „ |

A white turbidity will ensue, which will subside in a few hours. Decant or filter, and the solution is ready for use. It should be kept carefully corked, as it rapidly loses developing power on exposure to the atmosphere.

This is a solution of proto-nitrate of iron, with a little protosulphate in excess. When fresh it is of a green tint, but becomes yellow as the iron oxidizes, and is then gradually losing strength. A little fresh protosulphate should then be added. With many first-class positive operators this is a favourite developer, giving very brilliant and silvery tones. In our own experience we have found that to obtain the best results with it, the bath should be strong and acid, and the plates scrupulously clean.

In all these developers a little alcohol must be added, the amount to be regulated by the state of the bath. With a new bath very little; with an old bath, and especially in warm weather, from twenty to thirty minims to each ounce of developing solution.

Fixing.—The unaltered iodide of silver may be removed ther by hyposulphite of soda or cyanide of potassium. The tter is generally preferred as giving a whiter and better ne to the positive. If used at all it should not be used rong, about ten grains to the ounce being sufficient, and it ay be used over and over again with advantage. Hypo- lphite of soda will, however, give very good results, and we commend its use in preference to cyanide, which, on account its poisonous fumes, we should like to see banished from e dark room. Where hyposulphite of soda is used, the ate should receive a very careful washing with hot water, it can be conveniently done.

The black varnish should not be applied on the collodion de; indeed, in many cases its place is well supplied by ack or dark maroon velvet, which gives a very rich effect the shadows. As a general principle a "crystal" varnish peferable to a spirit varnish, which is apt to lower the ne very much.

The process of whitening pictures, if judiciously managed, ten gives a very fine effect, especially for coloured pic- res. Various recipes have been given for producing ese results, the chief fault of all being a tendency to pro- ce a blue, cold effect. We cannot here enter into details, it may remark that the best effect we have seen was pro- ced by the original "alabastrine solution." Whatever ethod be used, the pictures should be backed with dark lvet in preference to black varnish, which spoils such pic- res.

A gold matt or mount gives a much finer effect to a collo- on picture than the immediate contact of either a black or hite *passe-partout*.

## DRY COLLODION WITHOUT PRESERVATIVE.

Dear Sir,—I wish to offer a few words of comment upon article in last week's Photographic News upon "Dry ates without Preservative." It is a subject of growing im- rtance, as it appears almost certain that we must seek in is direction for such an improvement in the preparation dry plates as will enable them to produce pictures with fficient rapidity to convey those transient effects of atmos- ere, cloud, and wave, which are properly looked for now necessary to a good photograph.

It is very desirable that we should base our experiments little as possible upon conjecture, especially when proof possible; and, I think, one of the first points that ought be settled, should be the part played in washed plates by substratum of albumen. Travelling upon the Continent, m not in a position to make any experiment myself just w, but there would be little difficulty in deciding the estion. Half a plate coated with very dilute albumen, d the other half clear, collodionized, sensitized, dried, and veloped, as usual, would settle the matter. The *value* of two halves must be compared, not the *colour*, because s would certainly be different. It should be carefully ertained whether the half tones, and the details in the adows be better in the one than in the other; in short, ether one is a *better* negative. I think I made this expe- nent, and proved the inactive part of the albumen, but I nnot find any note of it.

In some experiments I was making with a certain preser- ive, I found that the more diluted I used it—that is, the s substance I interposed between the collodion and the ect to be photographed, the more sensitive was the plate; herefore occurred to me to place the so-called preservative *der* the collodion to fill up the pores, according to the n received theory, and nothing at all over it. I did this reversing the collodio-albumen process. I laid the col- ion upon an iodized albumen with only 25 per cent. of ter, and got excellent pictures. I then omitted the iodides the albumen, with the only result that the character of negative now partook more of the nature of collodion, l less that of an albumen negative: having the same idity, the same density, and softness, but black instead of brown. I then increased the water in the albumen solu- tion by degrees to six ounces to one of albumen, without any appreciable difference in the picture, but still firmly believing that this albumen was necessary and actively use- ful in filling up the pores of the collodion. One day, how- ever, after developing an excellent picture, I discovered that by mistake I had put the collodion on the unalbumenized side of the glass, which showed it was *not* necessary, and I frequently afterwards took pictures without using it, that were every whit as good in all respects as those upon albumen.

Undoubtedly, the thin layer of albumen does form a sen- sitive compound with the nitrate of silver, which, when developed, adds its mite to the collodion image; but I be- lieve it is infinitely small when the albumen film is so thin as I used it, and that the nature of the collodion negative is not in any way affected by its presence or absence—it is only an almost imperceptible *addition* to it. I continued to use a very dilute albumen in my general practice for washed plates, because the collodion I was then using had a large proportion of water in it, and was very apt to leave the plate.

This brings me to another point that I wish to notice: the supposed necessity for some mechanical means to keep open the pores of the collodion when dried. Is it a fact that any such necessity exists? I am strongly inclined to doubt it. We have received the dictum without sufficiently examining into its truth, and I think it has led our en- quiries in a wrong direction. When the collodion is suffi- ciently set upon the plate to be placed in the bath, it is still combined with a certain quantity of its solvents, ether and alcohol, which in the bath are substituted for water. The film therefore on coming from the bath is composed of iodide of silver, held in a spongy organic body, the pores of which are full of water. These pores may, and do contract or shrink when the collodion is dried, and expand again or contract with water, like a sponge, but it puzzles me to imagine how they can entirely close up, having only water, which is not a solvent of pyroxyline in them, and that sub- stance not welding with itself without a solvent. That the pores do not close up is shewn in the fact that dried plates not only admit a developing solution into these pores, but they produce pictures more like those on wet collodion than the plates whose pores have been filled up with foreign matter. "A preservative" does fill up the pores, and makes many collodions serviceable for dry plates, that would other- wise be useless, but it is *not necessary*, and better pictures can be obtained without it, so our aim should be to deter- mine the qualities of the collodion most suited to dispense with it.

I believed at first, that an addition of water to the collo- dion would have the effect of making it more porous, and in consequence more suited for washed plates; upon trying it I found it gave a marked improvement to the collodion I was then using, with the drawback I have named, that it made it very liable to leave the plate; but in subsequent trials with other samples of collodion they have sometimes been spoilt for the process instead of improved by the addi- tion of water, and I find that most collodions giving good negatives with the wet process are more or less suitable without any addition at all. It would be a very great service if some competent person would carefully investigate the question, and determine what are the requisite properties of a collodion most suitable to be used without the addition of any foreign matter.—I remain, dear sir, yours faithfully,

F. R. Window.

*January 13th*, 1862.

## ON DRY PROCESSES.—DEVELOPERS—FIXING BEFORE TONING.

Dear Sir,—In the News of last week you ask in your leader for the further experience of your readers upon the subject of "Collodion Dry Processes without Preservatives."

In 1857, I commenced photography as an amateur, and after wading through the wax paper process, in which I did some very tidy pictures (so my friends told me), I took up the wet collodion, to which I have directed my earnest attention ever since; in 1859, having become somewhat an adept at "The *Divine* art," I entered it professionally. In this year I had occasion to take some pictures in Bristol and elsewhere, and not being able to make use of wet, I determined upon making an experiment with *dry collodion.* I certainly had read of all kinds of preservatives, but I could not see much value in any, because I reasoned that if the collodion, which in its very nature was air-proof and waterproof, what would be gained by putting over the plate a foreign substance, which would rather mystify the subsequent operations than otherwise, and the gain—nothing?

*Experiment* 1.—I therefore took a simply iodized collodion—(Bolton's, of Holborn Bars)—coated and sensitized the plate in the ordinary way, then well washed it with filtered rain water, and set it up to dry spontaneously. This I kept a fortnight; then exposed it for two minutes and a half, and got on development a respectable negative—a little wanting in density, but this I remedied in experiment No. 2.

In this I followed out the same formula with three exceptions, viz.—that I then used *Perry's* bromo-iodized collodion, and after washing off the nitrate of silver, I immersed it in a bath of phosphate of soda—then washed and afterwards placed it in a dish containing 8 grains of gallic acid to the ounce of water for half a minute, then washed again, and then dried it by hot water; this plate I kept four months. I then exposed it, (subject, a church with trees) for a minute and a-half; I then kept it for two months. Upon developing, I got a very fair negative indeed; my developer was the same as Mr. J. F. Ward's, and in winter I added an extra grain of pyro, and diminished the citric to ¼ grain. I have used both these processes with satisfaction to myself, and I should not come forward now but for the good of your readers, and as a supporter of plain collodion dry plates.

With regard to developers for the dry and wet processes, I have tried several, but none seem to give so much satisfaction and total freedom from stains and abominations as the pyro and citric acid. I here append a very excellent developer I have often used both with the dry and wet processes, and with great success:—

No. 1.

| | |
|---|---|
| Protosulphate of Iron ... ... | 1 ounce |
| Gallic acid ... ... ... | 1 drachm |
| Nitric acid ... ... ... | 1 minim |
| Alcohol ab. ... ... ... | ½ ounce |
| Aqua pump ... ... ... | 4 ounces |

No. 2.—Intensify.

| | |
|---|---|
| Pyro ... ... ... ... | 15 grains |
| Citric acid ... ... ... | 4 grains |
| Aqua ... ... ... ... | 4 ounces. |

I always fix with cyanide, in which a little silver has been dissolved.

If amateurs generally were to make a greater use of citric acid in their developers, we should not hear so much about stains and marks on the plates. I have used it extensively for instantaneous and other views, and for pictures in which clouds or sea are introduced; there is nothing to beat it—not even iron. Indeed with it you can perform greater miracles than with iron; for should your plate, say a landscape for instance, be by accident over-exposed, by a judicious use of the citric developer, you may get a very fine brilliant negative; if an under-exposed plate, you may in some measure force your picture by repeated applications, if the developer with silver added, but they are apt to have a hard appearance. It does equally well for interiors and for architectural subjects generally. There are so many good formulas extant, that I will not recapitulate them here; suffice it to say mine were taken from the first PHOTOGRAPHIC NEWS ALMANAC, and I have personally to thank both Messrs. Crookes and Simpson for much valuable information derived from the pages of the NEWS, to which I have subscribed from its commencement.

Allow me to say one word on the subject of fixing before toning:—

This process of Mr. Tedrake I used for some time, but I gave it up. not because I could not get fine tones, beautiful browns, blacks, purples, but—because I found that while one batch of prints might be, and appeared, perfectly good, still I never could feel sure that they were perfectly safe. The formula was originally introduced by Mr. Hockin, chemist, of Duke Street, Manchester Square, from whom I had it; and there was a London firm who let me in pretty considerably from the sulphurization of this very bath; indeed it is very difficult to tell when the action of the gold stops, and that of sulphur begins. I am sure that we are much indebted to Mr. Maxwell Lyte, to "Theta," and numerous other gentlemen for the very excellent toning baths and processes they have made public, but there is still something wanting—some new fixing agent to render permanency certain. I always give a final washing in hot water, and am pretty successful; 5 per cent. being about the average loss with me throughout the year out of the many thousands that I print.

I am sorry absence from home prevents my sending you specimens to bear out what I have said. On my return I will enclose some with particulars at back.—Meantime, I beg to remain, yours very truly, W. H. WARNER.

*Ross.*

P.S.—I beg to add that I have kept a note book for jottings, from the commencement of the NEWS, which plan I cordially recommend to all.

## Photographic Tourist.

### PHOTOGRAPHIC PENCILLINGS OF AN EASTERN TOUR.*

THE chief purpose of this, my first eastern tour, being the transaction of certain affairs of business, my route was not exactly, so far as regarded myself, a matter of choice, although the time it might occupy was almost an affair of my own. When I left Malta, therefore, it was to seek Constantinople. The voyage was so very short, the sea so very calm and smooth, and the sky above so clear and bright, that I eat well, drank well, slept well, and quite enjoyed the trip. It is clear that these pencillings of mine cannot give details of all I saw, thought, and did, so that you must be content to know that as we went our way I saw the rocky coast of the Morea stretching its gloomy line of barren ridges along the distant blue sea, that soon after the Isthmus of Corinth came in sight with the majestic snow-capped mountains of the Greek coast, that the Isle of Myteline and Mount Ida, and the classic plains of Troy came to, and went from our sight; that at leas the Castles of the Dardanelles loomed mistily through the shades of evening, and that when the sun of the following morning rose grandly over the diamond-crested waves, we had reached our destination, and lay anchored in the far-famed Golden Horn. As the sun rose, brilliant and beautiful, indeed, was the view outstretched before us. Istamboul—as the Turks call Constantinople—grandly throned upon its noble amphitheatre of hills, rose like a gaily decked queen above the deeply and purely blue waters, the radiant beams of the rising day flashing from her jewellery, as one might call the bronzed and gilded domes; and the tall, slender minarets pointing silently to the clear and lovely sky. Rich with brilliant, variegated colours, its gardens, terraces, and kiosks lay grouped in broad masses of glowing light, and soft transparent shadow, with here and there the dense foliage of the symmetrical, but sombre, cypress trees, giving both contrast and relief. I

* Continued from p. 33.

cannot conceive any view more charming than this of that fine January morning, and think I shall always see it as vividly as I now do, although this, my poor description, does as little justice to my imagination as I believe that does to the real scene. Before the city, forming a very capital *foreground*—if I may use the term in speaking of ships and water—were clustered vessels seemingly from all nations of the world, prominently among which were the huge forms of those belonging to the royal Turkish fleet, and Arab boats, not unlike in their general form to the representations of the ancient galleys, such as were seen when—

> "High on the stern the Tracian raised his strain,
> And Argos saw her kindred trees
> Descend from Pelion to the main."

Flitting rapidly in and out among these were the light, frail-looking caïques, small boats with rising stems and sterns of highly polished beech wood, elaborately carved aud tastefully fitted up with cushions, &c.—something between the canoe and a gondola—rowed by one or more pair of sculls, and most commonly the property of Greeks, although not altogether shunned as a speculative investment by the Turks, whose grave and dignified egotism is in strange contrast with the former's more anxiously eager and noisy mode of doing business. You may hire the services and boats of these boatmen, or caïque-gees, for about five piastres an hour.

The preliminary arrangements having been duly made, we were set ashore, and then, indeed, the feeling with which I had first viewed this romantically beautiful city, received a strong blow. The streets are narrow, steep, excessively ill-drained, and dirty to a most repulsive extent. The gates, placed at intervals in the streets, are in a more than half-ruinous condition. The minarets which I had regarded with so much pleasure, were soon after my landing compared to extinguished rushlights; the mosques to things artificial and theatrical; the houses to some tumble-down outhouses, and the gilding and paint of the low wooden residences, looking so picturesque from afar, to the finery of some tawdry show-booth at an English fair. In walking, I every now and then tumbled into mud-holes—the paving was so miserably done, or clapped my fingers to my nostrils to avoid the effect of some awful stench, more than usually offensive, or was nearly run down by porters conveying goods slung upon a long pole, each end being supported by one of these rude stupid bears, who keep steadily on, knocking over, as a rule, all strangers who do not get out of their way, or else I frequently moved prudently aside to avoid the fangs of savage dogs fighting over some filthy offal. I soon found out how strangely new was all I saw. How far—how far I was from my own people, and my own thriving and progressing native land. Alas! the earnestness and energy of wholesome active life were no longer about me. A people whose mental and moral and natural existance made one stagnant pool, full of decay, and filth, and morbid growth of rank and poisonous weeds, became visible in all I heard or perceived. Mothers studiously kept in black ignorance and brute-like degradation, and shut out from all that refines, enobles, purifies, and exalts; or slave-nurses even more degraded, are here the teachers of each rising generation, producing and reproducing mothers like themselves, and fathers who never heard or dreamed of liberty, either in politics or religion; who recognize as virtue nothing so much as passive indolence, whose egotism and bigotry are the only relics of power in their decrepid natures, who, if poor, are the most servile of slaves; and if rich, the most exacting of masters. These form the population here. All mental life seems to have quite died out, little beyond reading or writing appears to be—at any rate publicly—taught, and if here and there the medressis, or colleges, do turn out an occasional thinker and scholar, there is no possible field for the exercise of his acquirements for the benefit of others, and so he lives and dies obscurely, together with the treasures he possesses. Having to make a stay of two months in Constantinople, I had ample leisure to observe and note the characteristics of this ignoble and degenerate race, descendants—one cannot but remember—of a people whose warlike energy, courage, and enterprise threatened to make them dominant over the whole of Europe, and founded one of the mightiest empires named in the history of the world. Sidney Smith once said that—"It is always considered a piece of impertinence in England if a man of less than two thousand a year has any opinions at all on important subjects;" but God forbid we should ever be reduced to such a state as exists in Turkey, where independent opinions upon almost any subject are about the most rare of conceivable things. As to religion, your sluggish Turk would hold it as tempting Providence to give a reason "for the faith that is within him"—"So he believes because he so was bred;" and Charles the Fifth might have here found men far more alike in their thought than his home-made watches were in keeping time. Of the Moslem, oue might fairly say—

> "No problems puzzle his lethargic brain;
> But dull oblivion guards his peaceful head,
> And lazy fogs bedew his gracious bed."

I have before said how new and strange all I saw and heard here appeared to me. The food I took I had never before met with; the language was perfectly strange to me: instead of shaven faces I saw shaven heads: instead of windows which looked *out* of my house I had windows which looked *in;* instead of chatty, pleasant women in the evening hour of rest I met only drowsy, taciturn men, scornful of infidels, and too busy with their long twisted pipes to exchange a single word of cheerful conversation. The modes of salutation were perfectly new to me; in short, all the customs, usages, and conventionalities of society—all the sights, sounds, and *smells*, especially the latter, thank goodness! were perfectly new and strange. I was, indeed, among strangers, and in a strange land.

I must, however, now turn to such adventures as were more intimately associated with my photographic experience; and as I have now about filled the space allotted for my present communication, I must postpone doing so until the next issue. M. H—n.

## MEALINESS IN TONING.

Dear Sir,—In my practice of photography as an amateur, I had until last summer enjoyed complete immunity from mealiness in toning positive prints. During the past season, not only did mealiness make its appearauce, but also a remarkable slowness in toning; my prints sometimes takiug *hours* in toning, and at the end of that time, turning ont anything but brilliant affairs.

I tried all remedies I could think of. but not knowing the cause of disease, my treatment had but little effect.

I had hitherto been using a toning bath of gold and carbonate of soda; but from what I had heard of the bath of gold with acetate of soda, I hoped it would prove a remedy. I gave it a fair trial, and at first seemed to have got rid of my difficulties, in some measure at least; but having begun upon a new batch of paper, I was quite dismayed at seeing the enemy re-appear in overwhelming strength. I did not know what to do. I tried this, then that; no—nothing would do. Amongst other things, I tried a preliminary bath of liquor potassa in water—about ten or twenty drops of the medicinal preparation to a pint of water. This for a time did some good, but did not clear away the evil. Sometimes I got a well-toned print, but the bulk of them were ruined. I blamed first one thing, then another. My silver bath, because it contained a *small* proportion of copper, got condemned, and I precipitated the silver. Since that time, I have been so occupied by business duties as to be prevented from doing anything at my favourite pursuit, but have been constantly torturiug myself with visions of grey spotted prints, and pictures refusing to toue altogether; in fact, I have been in a state of complete despair at the prospect of the coming season.

Mr. Henderson has however relieved my mind very much indeed, and has come to the rescue with his preliminary acetate of soda bath. I think that the unqualified thanks of photographers, both professional and amateur, is due to him and Mr. Fry for bringing forward a remedy which seems to prove so effectual.

Prevention, however, is better than cure, and though we may sometimes hit upon a cure accidentally, yet before we can effectually prevent we must know something of the cause of the malady.

Judging from the experience of others in conjunction with my own, I have no hesitation in saying that the paper, or rather its mode of preparation, is in fault. This is a conclusion that must, I think, have been generally arrived at, but what that fault may be is beyond my ken; most likely it has its origin in the plan of albumenizing, some change *may* have been made in the formulæ in order to produce a highly finished surface; else, why is it of recent occurrence? It did not come arm in arm with alkaline toning, but rather, I suspect, with highly glazed paper for stereo and *carte de visite* pictures. There is no such thing as mealiness in toning plain paper prints, and but little, if any, in slightly albumenized paper prints. I naturally, therefore, conclude that the evil must arise in obtaining a highly glazed surface on albumenized paper for small sized pictures.

Let albumenizers look to their formulæ, and not seek the highly finished surface so much in vogue; then I think mealiness will be less complained of. A finish can be given to the fixed print almost equal to that obtained by the use of highly glazed paper.

I have still something to say about a "new" (?) printing process, in which I propose the use of *water* as a fixing agent, but having occupied so much of your valuable time, I must defer the rest of my intended communication to another time.

If you think there is anything suggestive of good in the above, perhaps you will give it a place in your columns.—Yours truly, T. C.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 22nd January*, 1862.

Among the recent important applications of photography, is that of registering the researches of an eminent anatomist into the laws which regulate the external development of the human body. The first measures relating to the object in question were made with the aim of demonstrating the relations existing between the head and thorax, under certain morbid conditions. The results, and especially the relations between the maximum of the periphery of the head of a given individual, and the circumference of his thorax formed the subject of an important work by Dr. Liharzik. Since the date of this publication, the learned author, in order to give a general and incontestable value to the laws he has laid down, has extended his measures to the entire length of the human body.

Dr. Liharzik had no sooner entered upon this path, than he quickly recognized the artistic importance of the results he might obtain, inasmuch as he might be made to establish immutably the four fundamental proportions necessary to the construction of an imitation of the normal human body. These contours given it only remains to fill up a detail according to the rules generally adopted by sculptors.

The first model constructed according to these rules fulfilled all the conditions of harmony between the whole and each of its parts. An eminent sculptor, M. Francis Müller, modelled according to this plan statuettes of a new-born individual and of an adult, and in this manner that art became indebted to science, and placed in a position to determine the proportions of every part of the human body by direct measurements, without having resource to the slow and difficult method of induction. The results of these measures for the two sexes and for various ages were arranged on a synoptical table, by means of which we are enabled to determine, for any absolute scale, the principal dimensions of the human body, and the normal proportions of each of its parts.

M. Müller has cast in bronze a series of twenty-four statuettes, chiselled with the most scrupulous exactness. This series represents the gradual development of two individuals, man and woman, each supposed to be born with normal corporeal proportions, and to have completed their growth under the most favourable conditions. The series represents the normal couple at the time of birth, at the ages of 1, 3, 6, 15, and 21 months, and at 3, 6, 10, 13, 17, and 23 years, always under the *characteristic proportions* of each of these epochs, which nature, in her regular progress, can neither elude nor surpass. M. Auer, of Vienna, whose labours in the Imperial Printing Office of Vienna are so well known and appreciated, has heartily concurred in the object in view, maintained by Dr. Liharzik and his coadjutor M. Müller, and placed all the resources of the Imperial printing establishment at their disposal, both for the chiselling and casting of these type-statuettes, and for their photographic representation. A work is now in course of publication which contains these photographs, their contours, the synoptical tables and explanatory labels of Dr. Liharzik, which will henceforth justly become the universal code of the sound doctrine of the proportions of the human body. Multiplied in plaster, metal, or any other solid substance, the complete series of these statuettes, or at least those representing the principal epochs of development, will supply excellent models wherever art has an interest in reproducing the human form in all its perfection. Your readers will have an opportunity of inspecting this curious and important series of statuettes at the approaching Universal Exhibition, and they will be found worthy of the attention of everyone interested either professionally or by taste, in the progress of art and anthropological science.

Dr. Duchenne, of Boulogne, has applied photography to the illustration of his "Mechanism of Human Physiognomy," an electro-physiological analysis of the various modes of expression, which is based on the following remarks of Buffon, the naturalist:—"When the soul is agitated, the human face becomes a living picture, where the passions are exhibited with as much delicacy as energy; where every emotion of the heart is expressed by a character, the vivid and prompt expression of which outstrips the will, and unveils and renders apparent by pathetic signs, the images of our most secret thoughts."

The soul is, then, the source of expression, which excites the play of the muscles, and causes them to depict upon the face, in characteristic traits, the images of our affections and passions. Consequently, the laws which regulate the expression of the human physiognomy, can be ascertained by the study of muscular action.

This problem Dr. Duchenne had during many years laboured to solve, by provoking, with the aid of electric currents, the contraction of the muscles of the face, to cause them to speak the language of the feelings and passions. This careful study of partial muscular action revealed to the experimentalist the causes of the lines, wrinkles, and folds of the face in motion. Now, these lines, wrinkles, and folds are just those signs which, by their varied combination, serve for the expression of the physiognomy. It thus becomes possible in proceeding from the expressive muscle to the mind that puts it in action, to study and discover the mechanism and the laws of human physiognomy.

Dr. Duchenne does not limit himself to the formula of these laws: he also represents, by photography, the expressive lines of the face during the electric contraction of its muscles. In fine, the doctor makes known by electro-physiological analysis, and by the aid of photography, the art of correctly depicting the expressive lines of the human face—an art which may be aptly styled the *Orthography of the Language of Physiognomy.*

Another photographic contribution to anthropology has been made by M. Severtsof, who has presented to the Academy of St. Petersburg a series of photographs representing Kirghis and Tartars, dwellers in the steppes of the Ural. Special attention was invited by Herr Von Baer to the method pursued in taking these photographs, which gives to them a real utility for anthropological studies. Each figure is represented in profile and in full face, the head uncovered and shaved: thus we can, without difficulty, take the measure of the principal dimensions of the cranium. As it is much easier to photograph a great number of living individuals, than to collect as many authentic crania, it follows that similar photographs will afford good means for arriving at the determination of mean proportions of races, and of the limits of variation in a given type. Her Von Baer considers that it will be useful to recommend this method to the attention of travelling naturalists.

## CARAMEL AS A PRESERVATIVE.

Dear Sir,—Mr. Hannaford's remarks on the caramel process I think are calculated to deter many from giving it a trial, and although it is mentioned in "Sutton's Dictionary," as he states, still I maintain that the properties there ascribed to it, are in direct contradiction to my experience, for it gives the *usual* sensitiveness of dry plates when applied to a simple washed collodion film, and in combination with a Fothergill plate it acts as a *powerful accelerator*, and, moreover, in both cases the vigour of development is augmented. Again, I cannot endorse Mr. Hannaford's statement, that it is a modification of Shadbolt's honey process; in the first place, caramel is not honey, and honey is not the juice of the sugar cane; the high temperature to which sugar is subjected to form caramel, entirely alters the properties of it; no one I think would call gallic and pyrogallic acids identical, any more than honey and caramel, or wood and charcoal. In the honey process, the tendency is to give thin transparent negatives; in the caramel, it is to give vigorous opaque ones, with great rapidity of development. I did not refer to "Sutton's Dictionary" before trying it, or I most likely should have relied on the information there given, and not have done so. Its not being literally a "new" process, I hope, will not operate as a retarder to its adoption, and I willingly give up all claims to such a term; but at the same time, I say that I discovered it independently of "Sutton's Dictionary," and to me it was a "new" process. Many readers of the Photographic News will, I fear, on reading Mr. Hannaford's "Jottings," dismiss the process in the summary way he has done, thinking it only worthy to be classed with honey.—I am, dear sir, yours respectfully,

*Fareham, Hants, Jan.* 17, 1862. Wm. Bartholomew.

[Caramel has been proposed, and, we believe, tried, before, as a preservative; but not with sufficient care or perseverance to secure success. We remember Mr. Sebastian Davis speaking of its use, and remarking that from its hygrometric qualities, it was difficult to obtain complete dessication. We can testify, however, to the excellence of Mr. Bartholomew's plates, and, so far as we have seen, freedom from any tendency to tackiness. The complete change sugar undergoes in becoming caramel, removes it entirely, we think, from the honey or syrup category.—Ed.]

## SUBSTITUTES FOR YELLOW GLASS.

Dear Sir,—Substitutes for yellow glass in the dark room having been frequently noticed, allow me to suggest one, which, for durability and efficiency in arresting the actinic rays, has not been surpassed. It has had the test of *six years*, with a window facing the south, six feet by four. Sensitized plates are dried at mid-day within a few inches of the window, without the slightest injury to them. I use it myself, and have applied it in many instances without having had a single complaint of its insufficiency. The mode of preparing it is as follows:—Make a strong tincture of tumeric; say one ounce to four of alcohol, and with a large camel's-hair brush paint a sheet of *good filtering paper*, which may be laid on a sheet of glass for the purpose. When dry, it is ready to be applied to the dark room window, the squares of which must first be cleaned, and then varnished with mastic varnish; stained with stone ochre, half an ounce of stone ochre, ground fine in turpentine, to half a pint of varnish. Let the stained paper be a quarter of an inch larger than the glass, that it may lap upon the sash bars. Now varnish with the mastic and ochre over the paper; it will take a few days to dry. That completes the operation.—Your obedient servant,

H. R. Nichols.

Sir,—As many of your readers appear to have some difficulty in excluding the chemical rays from their operating rooms, I have much pleasure in making them acquainted, through your columns, with a method which I have always found perfectly successful in keeping my plates free from the least trace of fog, even with a strong beam of sunlight streaming through the window. It is as follows:—Take of Canadian balsam, turpentine, and powdered gamboge, in such portions that when mixed they may form a thick transparent varnish, about the consistence of treacle. Lay this over the glass with a brush by the aid of a gentle heat, and when dry, if the colour does not appear sufficiently intense, apply another coat. I am indebted for this formula to a painter of magic lantern-slides, who usesit for a transparent yellow, and I think for a dark room window, your readers will find it as valuable as it is simple.—I am, Sir, your obedient servant, Chemicus.

*Poole, Jan.* 13, 1862.

# Photographic Notes and Queries.

## Photographic Exchange Club.

Dear Sir,—I quite agree with all that your correspondent J. H., page 597 of the last volume, says respecting the Photographic Exchange Club, and think that the members should in every instance enclose one stamp beyond those required for the postage. If for nothing else, they must be wanted to purchase envelopes to enclose the return photographs. We certainly ought not to allow the gentlemen who so kindly give their time to suffer even in the smallest degree in pocket. I, for one, being able to speak personally of the secretary's courtesy and promptitude in answering inquiries, should be glad to be able, as J. H. says, to express my thanks in "a more tangible form than mere words."—I remain, yours truly,

*Waltham, Dec. 23rd*, 1861. W. Larchin.

## Sherry as a Preservative.

Dear Sir,—It struck me some time back that sherry wine contained all the requisites for a preservative coating. I accordingly coated a washed sensitive collodion film with some good strong sherry, dried, exposed, and developed with pyrogallic acid, and was delighted with the results; clean, sharp and purple toned negatives.

From the colour and brilliancy, I think it would do well for stereoscopic transparencies.—I am, yours respectfully, I. F.

P.S.—I have been trying the modification of the resin process proposed by a correspondont (I think H. Cooper), and have found it to answer perfectly.

## Photographic Exchange Club.

Dear Sir,—I have been much surprised at sundry gentlemen, members of this club, writing to me about the 15th, 17th, 18th of this month expressing surprise that they had not received their prints, which the rule, that all prints received in one month would be sent out next month, ought sufficiently to explain. As all the sorting, entering, arranging, correspondence, &c., has to be done at intervals of business or pleasure by me, I really must beg of them to wait till the month is out before they complain.—Yours sincerely, Frank Howard.

[We trust members enjoying the privileges of the Exchange Club will not render the duties of the Secretary more troublesome than is necessary by needless impatience or inattention to the rules.—Ed.]

## Talk in the Studio.

Photography on the Interior of Glass Vessels.—A patent has recently been obtained by Messrs. Hooman and Maliszewski for producing photographic pictures on the interior of glass and other vessels. The specification runs as follows:—"Our invention consists in printing the interior of any glass or other transparent vessel by the aid of photographic negatives, portraits, landscapes, views, pictures, arms, devices, or ornaments. To this end we take one or more ordinary photographic negatives of the portrait, landscape, view, picture, arms, device, or ornament intended to be printed on the interior of the glass or other transparent vessel upon a pliable substance, such as waxed paper, or mica, or any other pliable and transparent material. We then fix such negative upon the exterior of that part of the glass or other transparent vessel wherein such portrait, landscape, view, picture, arms, device, or ornament is intended to be fixed, and by means of a mould made of gutta-percha or other flexible material completely covering the said glass, or other transparent vessel, with the exception of an aperture of the size of the negative wherein it is placed, the light being thus wholly excluded from all parts of such vessel. We then pour into such glass, or other transparent vessel, a quantity of collodion or other suitable material, and rendered sensitive to light, which we expose to the even light in such manner that the power of light shall act equally around and through the transparency of the vessel upon the sensitized substance fixed on the interior of such glass or other transparent vessel. We then develop and fix such portrait, landscape, view, picture, arms, device, or ornament so produced by the ordinary process of photographing. When dry, we back the interior of such glass or other transparent vessel with oil colours in imitation of marble, alabaster, wood, or any other fancy decoration, by which means the portrait, landscape, view, picture, arms, device, or ornament is rendered permanent, and thus protected on the inside thereof by such body of oil paint, and on the outside it is protected by the glass or other transparent vessel."

Photographic Exchange Club.—One of our readers is desirous of asking the producer of a 9+7 picture of Chelsea New Bridge, by the Fothergill process, and received in exchange from the Photographic Exchange Club, if he will kindly state how he secures such intensity in his skies, and whether he *thoroughly* washes the plate before albumenizing, or not?

The Commercial Aspect of Photography in America.—*Humphrey's Journal*, copying a paragraph from our columns on the commercial position of photography in this country, adds:—"And here in New York we can instance several examples of parties who have taken much money in the business, but they are generally men who spend all they make, and run in debt for a good deal more! We know of but three operators in all New York or Brooklyn who may be said to have laid up money in the business. A large proportion of the operators in the country get a bare living at the practice of the art. Taken as a whole, we do not think photography can be said to be a money-making business."

Stereo-Exchange Club.—Mr. Clifford, of Hobart Town, writing in reference to the Stereo-Exchange Club, says:—I have, eight or nine months since, sent nine prints to Mr. Stafford, North Shields, and, by same mail, nine to Mr. G. B. Shepherd, Hythe. I have never got an answer, and from the circumstance, I suspect they have never been received; and I fear the same fate has been the case with some or all the others, and am very desirous of disabusing the mind of any of the gentlemen who might think I had neglected to return mine for theirs'. I have always sent them mounted by book-post; and some I sent to France in the same way have been acknowledged.

## To Correspondents.

Preliminary Coating with Albumen.—In the article on this subject in our last, some obscurity arises from a misprint in Mr. McNab's letter. Towards the close of the second paragraph, for "I used a bath for positives and negatives," read "I used it both for positives and negatives." In the last line but one of the last paragraph but two of the same letter, read "impaired," instead of "improved."

Truro.—Your print has been too feeble, and slightly fogged, before intensifying. It is very important to begin with clean shadows. In intensifying with bichloride of mercury, it is rarely necessary to flood the plate with it more than once; two or three applications of the iodide solution will give additional intensity. 2. In intensifying with pyro and silver, it is immaterial whether the solution be kept floating on the plate, or is poured on and off. It is desirable to keep it in motion, and if additional intensity be desired in any especial place, it may be obtained by repeatedly pouring on the solution at that spot. So far as we can judge from the print enclosed, your difficulty arises not from the intensifying process, but from having the image too feeble to begin with. This may result from the condition of your bath, or from the collodion. If from the bath, it is probably caused by the presence of too much nitric acid. If that be the case, neutralize it, either with oxide of silver, or with carbonate of soda. Then try a plate, and, if necessary, add either acetic acid or dilute nitric acid by a drop at a time, until it works clean. If the fault be in the collodion, procure another sample of intense negative collodion, and add a little to that you now use. This will probably be your simplest method of obtaining a more brilliant image to commence with; you will then find the intensifying give you less trouble. You are lighting your sitters too much from the front.

M. D.—When the prints turn red in the hypo bath, it is primarily from some fault in the preparation of the paper. It may be, to some extent, obviated when the tendency is observed, by toning much deeper than appears necessary. Deficiency of salt in the original preparation of the paper is a common cause of the reddening in the hypo.

H. H. H.—Statements in catalogues are not always safe guides as to the amount of field covered by lenses, the best makers generally slightly understating, rather than over-stating the power of the lenses they make. The lens described as covering 4×3, would be described by many as covering a much larger field. 2 Focal lengths being equal, the lens of large aperture will be quicker in action. 3. We should give the preference to the first mentioned maker. 4. A glass room, 20 feet in length, would not be long enough for producing card pictures with a lens of 12 inches focus. 5. A swing-back is a great advantage in a portrait camera, but it is not absolutely essential.

Hugh Bellas, Jun.—The rules of the Amateur Photographic Society will be found in the advertising pages of the Photographic News Almanac; or they may be obtained of Messrs. McLean and Melhuish, Haymarket.

Tyro.—The lens of shortest focus to cover a 12×10 plate, and give "upright perpendiculars," or absolute freedom from distortion, is the triple, by maker No. 1 in your list.

Hawke.—We are much pleased with the charming little card portrait. As a specimen of photography, it is exceedingly perfect, and a very agreeable picture withal. The only thing we would alter is the balustrade, which is rather too light in colour; it would have contributed to more perfect harmony if it were a little lower in colour. The general arrangement, the exquisite definition, the delicacy, brilliancy, and tone, are all highly satisfactory. The three prints subsequently received are also equally good; but be careful to keep the accessories subdued. We should be exceedingly glad to have a statement of your process throughout, as it is always desirable to have the precise details of a method giving such fine results.

A Distressed Photographer exposed a plate by the Rev. J. Lawson Sisson's gum process for five minutes, and on developing obtained no sign of a picture. He then exposed over 50 minutes, and obtained universal reduction. We fear he will often be a "distressed photographer," if, in his experiments, he leaps from 5 to 50 without intermediate steps. To have tried 10 minutes when 5 were insufficient would have been a long stride. But he states he developed with iron 14 grains to the ounce; he says nothing of silver: did he add any? If not that may account for obtaining no picture with the first exposure. The specimen enclosed appears to be an illustration of complete and universal reduction from over exposure. We cannot even guess at the cause of the discolouration of the print marked No. 1 without knowing its history. Some chemical action has taken place; but we have never seen a similar result. We have not tried Perry's collodion, but have heard it well spoken of. Great care to have the film perfectly set before immersion in the bath, and the use of perfectly clean and dry plates are the surest safeguards against losing films.

Ada.—We are a little puzzled as to what you require, as you ask for a formula for a developer to give fine-toned positives, from which we infer that you refer to collodion positives; but immediately afterwards you refer to some of Mayall's paper portraits as illustrations of the tone you require. If you require fine toned collodion positives we recommend you to use the protonitrate developer given in the article on positives in another page. You will find much information on this subject and on toning prints in the Photographic News Almanac.

J. Burns.—The No. 1 lens regarding which you enquire, will cover a quarter plate, and the No. 2 a five by four plate, or a little more. For card portraits the sitter will require to be placed about 11 feet or 12 feet from the camera with the No. 1, and about 18 feet with the No. 2. As each of them have a very flat field, either may be used with the solar camera conveniently. You may rely on receiving every attention, and a lens of undoubted excellence on applying direct to the maker; but we cannot undertake commissions to manage any commercial transactions.

S. Clifford (Hobart Town)—Before you receive this you will have seen the new arrangements of the Photographic Exchange Club. If you forward your pictures for exchange and the requisite stamps to cover their return to Mr. Howard, the Secretary, you will duly receive the exchanges. The specimens received are very interesting.

F. L.—The alkaline gold toning bath may be used with plain paper; but care is requisite to avoid over toning, and the production of a cold slaty hue.

J. K. M.—The preparation of Ponting's collodion is a trade secret. It has all the characteristics of a cadmium collodion.

J. W.—The stains appear to have been caused by the splashing of silver solution, caused by pushing down the slide with a jerk.

R. G.—The interiors are scarcely up to the mark. The lens does not appear to have been suitable, as the definition is very imperfect, the chandelier being little more than a blurred mass. No. 1 is the best. We recommend you to procure some of Wilson's interiors as specimens of what may be obtained: especially those of Gloucester and Exeter Cathedrals, where the depth of definition is very perfect.

E. E. L.—Your samples of coloured paper shall be duly examined and reported on next week. Your suggestion regarding albumenized plates might be useful; have you tried it?

E. F.—A sheet of salted paper floated for six minutes on a thirty-grain solution of silver would not be coated with the same proportions of nitrate of silver and chloride of silver, as if it were floated three minutes on a sixty-grain solution. The same amount of chloride may be formed, but the excess of nitrate will be less.

W. Werner., G. P., H. R. N., and several other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 178.—January 31, 1862.



## MEALY AND IRREGULAR TONING.

The results of a good deal of experience during the last few weeks, as derived from our correspondents, and opportunities of personal inquiry, indicate that the use of a bath of acetate of soda, as a preliminary to toning, has to a considerable extent removed the printer's *bête noire* of mealiness, the testimony of the majority being to the effect, that this method is, as its originator styled it, "a cure" for irregular toning.

It is important to inquire, however, and, if possible, ascertain what is the cause of mealiness, and why the bath of acetate of soda, or other methods which have been proposed, remove the tendency. The suggested causes of mealiness are singularly varied and contradictory. Many believe it is the fault of the paper, but some believe it is caused by the paper being too thick; whilst others only meet with the trouble when the paper is thin. Some attribute the fault solely to bad albumenizing, others believe it to be due to imperfect negatives; some find its origin in an acid silver bath, and some in a weak silver bath; some in the use of acid chloride of gold, and others in the excessive use of carbonate of soda in the toning bath; some to superabundant washing of the print between removing from the pressure frame and toning; some to the use of water containing substances forming insoluble salts of silver, and others to the want of washing. All these causes have been suggested in discussions, or in letters, within the last few weeks, and it is probable that all or many of them contribute more or less to the result, which, we think, is not, however, entirely dependant upon any one cause.

There can be no question that this trouble of mealiness is one of the concomitants of the alkaline toning system. It was unknown under the old hypo *regime*. It would be manifestly unfair to assume that, co-incident with the use of the alkaline toning bath, manufacturers and albumenizers combined to produce a worse paper, and a more careless method of preparing. Yet the fact that every now and then samples of paper are obtained which have no tendency to this defect, and other samples which have excessive tendency, would seem to point to the paper as the origin of the evil. To meet this view, however, comes the fact that the same sample of paper will produce perfect results with a brilliant negative, and the most mealy results with a thin or fogged one; or will, with a certain line of treatment between printing and toning, give mottled irregular results, and with another course of treatment will yield pictures as satisfactory as can be desired.

The most plausible method of explaining these discrepancies was given by Mr. Moens at a recent meeting of the North London Photographic Association, in a paper which will be found in another page. Mr. Moens attributes the tendency to mealiness to the formation of insoluble salts of silver—chiefly the chloride—in the texture of the paper. The washing waters containing chlorides, the free nitrate of silver in the pores of the paper is partly washed away and partly changed into chloride of silver, which is imprisoned in the paper in a mottled and uneven form. Where there is this excess of silver, he says, "the print is speedily toned, but the rest of the print takes a far longer time, so that you have two toning processes at work: the first one is carried on until the latter is completed, thereby you get two results, which constitutes the evil complained of." A variety of reasons in support of this view are added. For instance, in the old process where toning and fixing are effected in one bath, the chloride being dissolved out before toning begins, mealiness never occurs. It rarely appears when water containing nothing which forms an inorganic salt of silver is used for washing; it rarely occurs if the print be toned without washing, and is generally worst in rough, soft, porous papers; and so on with other reasons.

This view of the case appears in many respects reasonable: it is certainly borne out by many of the facts of the case, and is in accordance with a view we had formed of the matter. But it is, nevertheless, open to some objections, and leaves certain points still unexplained. For instance, if the mere formation and imprisonment in the pores of the paper of an insoluble salt of silver were the cause of mealiness, the use of a bath of acetate of soda, forming in the pores of the paper an insoluble acetate of silver, ought to cause, rather than cure, this defect.

But the chief difficulty involved in this view arises from an assumption it involves. It necessarily implies that the aggregation in certain parts of the print of excess of *unreduced* chloride of silver, causes more energetic toning in those parts. The exact nature of the process of toning is not well understood; but this, if not opposed to what *is* known, is at least an unrecognized action of unreduced chloride of silver. Moreover, if increased toning action, more energetic reduction of the gold, take place on parts where unreduced chloride of silver is present, it would be of little service, as the chloride being necessarily dissolved in the hypo, the gold reduced upon it would also disappear. So far as we understand the process of toning, it is only upon those salts of silver which have been reduced by light, and which form the image, that the deposit of gold is effected, and the more complete the reduction of the salts of silver, the more perfect is the toning action of the gold bath.

That mealiness arises from the existence side by side throughout the print, of two different salts of silver in different stages of reduction, colouring under the action of the toning bath with different degrees of energy, we think there is no doubt. The colour of albuminate of silver when reduced by light is always inclined to a reddish brown; the colour of chloride of silver when so reduced is a greyish or bluish black. The latter has a tendency when toning to assume slaty hues; the former passes with difficulty beyond a purple brown; and when, from the proportions in which these salts are mixed, or when from some imperfect combination of them, they lay in particles side by side; or when from the uneven texture of the paper they are absorbed in uneven or irregular proportions, the natural effect is a mottled and irregular colour. If we had albuminate of silver alone, we should have no mealiness, but we should have red prints; when we have chloride of silver alone, we have no mealiness, such a result never being produced in plain paper prints. When the print is fixed before toning, we have no mealiness, partly it may be because there is nothing left in the print but the perfectly reduced silver, all the unaltered chloride, and all the *partially* reduced chloride being removed by the hypo, and partly because in such case much of the toning is probably due to sulphur, which is not so discriminating in its action as gold.

There are several suggestions then, which will tend, we believe, to the prevention of this irregular reduction of both silver and gold, which causes mealiness. In the first place, as regards the paper and its preparation, the use of a fine paper with a hard surface and even texture, which will, to a large extent, prevent irregular absorption of the solution of salt and albumen. In preparing it, the use of a very dilute albumen solution, so as to form almost exclusively chloride of silver when excited; or on the other hand, if a highly albumenized surface be desired, the use of a minimum proportion of salt, which will not only enter into more intimate combination with the albumen, and will result in the formation of a preponderance of albuminate of silver, which will give very vigorous results, but will rarely tone beyond a purple brown. Whatever the quality of the paper, and its preparation, care should be used to secure as perfect reduction in printing, by the use of negatives, which however soft and delicate, have clean, brilliant shadows, and by the use of a strong silver bath, excess of nitrate of silver aiding reduction.

When the tendency to mealiness is present from any of the causes we have named, it appears quite clear, from a variety of evidence, that the presence of insoluble inorganic salts of silver increases that tendency, and that the conversion of the free nitrate into an organic salt of silver materially aids in removing it. Why this is the case is not so clear. In the absence of a better theory, we offer one or two suggestions. The tendency to mealiness is doubtless existing in the print when it comes from the printing frame, although not always very apparent then. Those parts of the print consisting of particles of reduced chloride of silver always tone readily; but those consisting of albuminate of silver, tardily. The presence of unreduced chloride of silver appears to retard still further the reduction of gold upon the albuminate. On the other hand, organic salts have a tendency to aid in the reduction of chloride of gold, and probably thus aid the deposit upon the organic salt of silver, enabling these particles to keep pace in toning with those of chloride, so as to acquire the desired colour before the remainder have become slaty. This is of course but a crude suggestion on an imperfectly understood subject. The practice is after all the important question. It is difficult within the limits of a short article to give all the data in the shape of evidence from competent persons, and from our own experiments; but we feel certain that the hints we have given as to prevention will be found efficient; and where prevention is impossible, the conversion of the free silver into an organic, in preference to an inorganic salt, will be found the nearest approximation to a cure.

## PHOTOGRAPHIC ALLOTMENTS AT THE EXHIBITION.

The allotments of space in the photographic department of the forthcoming International Exhibition are by this time, we believe, in the hands of photographers. The conditions for the guidance of contributors, which are few, simple, and reasonable, are as follows:—

"Conditions.

"1. All plain photographs must be framed and glazed in plain ¾-inch bead frames, and no other description of frame, and no passe-partouts will be admitted. The margin must be kept under moderate limits, not exceeding for large pictures 2½ inches, and for those under 8 by 6 inches 1½ inches. If desired, several photographs may be exhibited in one frame.

"2. No 'touched' photograps will be admitted.

"3. All coloured photographs must be framed and glazed with a careful regard to economy of space, or they will not be exhibited.

"4. All photographs must be numbered, and accompanied with a statement giving the name of the photographer, subject of the picture, and the process employed."

The only condition upon which any question can arise, is that referring to "touching"; and here it evident alarge discretionary power must be left in the hands of the committee. That photographs entirely "worked up in black and white," should be excluded, is manifestly right, and that pictures largely indebted to the improvements of the pencil should be inadmissible, where space is so precious, will be regarded as reasonable by every one. The touching out of a minor and accidental spot or scratch in either negative or positive will not, we believe, be construed into "touching" by the gentlemen to whom the supervision is entrusted. The difficulty will be chiefly experienced in regard to the question of entirely or partially stopping or masking out skies, and the practice of other "dodges" in printing for the purpose of concealing defects, or adding real or imaginary beauties. Intending contributors are warned, however, in the forms containing their allotments, that "All photographs, both plain and coloured, intended for exhibition, will be submitted to the consideration of the Committee, and will have to be delivered at the Exhibition Building, South Kensington, not later than the 31st day of March, 1862."

The "consideration of the Committee" will doubtless be largely influenced by the character of the pictures submitted to them. We must confess that we should feel sorry if, in the rigid enforcement of the rule, it were found necessary to regard as "touched" some of the skilfully managed skies of Mudd, Bedford, and others.

The limited space at their disposal, will, however, compel the committee to be more inexorably rigid in their exclusiveness than would be otherwise necessary. The total hanging space is three thousand feet, and much of that will be of course too high and too low to be of the greatest value. The room is seventy feet long by fifty-three feet wide; the width being reduced in part of the room by a passage to the educational department. The ground space for apparatus, &c., is about five hundred feet. The position will be, we believe, immediately over the entrance to the building.

The forms accompanying the allotment have to be filled in, signed, and returned to the secretary of the Exhibition within ten days of their date, upon penalty of forfeiting the allotment. These forms are four. The first is an undertaking to fill the allotment and conform to all the regulations that may be laid down by Her Majesty's Commissioners. The second form relates to the nomination of jurors. In this three names are to be proposed, so that from the persons so nominated the Commissioners may select three members of the jury in that department. It will be obvious that in addition to all other fitness for the office, the gentlemen so proposed should not be exhibitors, as any exhibitor being also a juror, would be manifestly disqualified for the reception of a prize. It would be a positive injury to an exhibitor, therefore, to appoint him as a juror, and thus destroy his chance of the reward of successful competition.

The third and fourth forms relate to the catalogues. In the shilling catalogue the name, address, and a brief list of contributions will be inserted without charge. In the illustrated catalogue all insertions will be charged as advertisements, the price being £5 per page, or £3 per half page.

From the date at which it is necessary to forward contributions to South Kensington, it will be seen that there are still two clear months for preparation and arrangement. At some seasons of the year two months would have been very valuable; at present, however, they will serve simply to prepare and arrange pictures already in existence, fresh productions at the present season being of course out of question.

We have received, during the week, several letters on the subject of the allotments. Some from disappointed applicants whose claims have been rejected, and some from fortunate allottees who fear they will be unprovided with pictures in time. Regarding the former, it was, as we have before said, impossible to avoid disappointment to many. It is possible that in some cases injustice may be done; but we feel assured that such injustice is in no case intentional. The space is very limited, and the applications very extensive: many must be curtailed; some entirely rejected. Of these may be some whose pictures are highly meritorious, and whose contributions would have graced the Exhibition. But it is impossible for the Committee, however extended their information, and however careful their discrimination, to be familiar with the exact value of all the claims made. They can only be guided by general principles, and cannot, in all cases, be acquainted with individual merits. Those who are unfortunately amongst the rejected applicants, must, with as much patience as they can command, await the next chance. We fear the time is now past for a certain remedy.

Those gentlemen who have received allotments and are unprepared or uncertain as to their facilities for worthily filling them, should, without a moment's delay, inform the Committee of their inability. We earnestly conjure them to do this. In such a course lies the only hope, which we can see, for those now suffering the mortification of rejection. If a number of allotments be returned upon the hands of the Committee it will enable them to reconsider the most urgent and important of those claims which they have been compelled, however unwillingly, to ignore. Time is now of the greatest moment, and not an hour should be lost in resigning allotments which will not be required.

## Scientific Gossip.

SPECTRUM ANALYSIS—THEORY OF THE CONSTITUTION OF THE SUN—TRANSPARENCY OF GOLD—COMPARISON OF COLOUR—ESTIMATION OF COLOUR ON THE MOON'S SURFACE—EXAMINATION OF COLOURED PAPER IN THE SPECTROSCOPE.

THE subject of spectrum analysis is still affording grounds for much scientific debate. It may be remembered that we have on more than one occasion pointed out that there were many reasons, experimental as well as theoretical, for concluding that the sweeping explanation of the cause of Frauenhofer's lines given by the German savans was, to say the least, open to great doubts. This opinion is now gradually gaining ground amongst scientific men. The Editor of the *Chemical News* has taken the same view as ourselves, and the late meeting of the Pharmaceutical Society, Dr. W. A. Miller, in his lecture on this subject, urged the necessity of still considering the views of Kirchhoff and Bunsen as theoretical, there being many points which presented anomalous features. Some spectral lines, he said, were due to the incandescent metals, but others, undoubtedly, belonged to the atmosphere or to the different gases in which the ignition of the metal took place. The rise of temperature, too, evoked different lines from the same substance. Chloride of lithium, in a Bunsen burner, gives a single crimson ray; in the hotter flame of hydrogen an additional orange ray appears; whilst the oxyhydrogen jet, or the voltaic arc, brings out a broad, brilliant blue band in addition: the same takes place with sodium and other metals. Fascinating as the German theory is, it must be remembered that it is still upon trial, and that it does not yet explain the facts known respecting the vapours of hydrogen, mercury, chlorine, bromine, sodium, or nitrogen. It was expected that spectral observations on the corona seen during the late solar eclipse on the 31st of December last would throw considerable light upon this obscure point. Up to the present moment, however, we have not heard what results were obtained. It will be remembered by our readers that, according to Kirchhoff's theory, that the sun consists of a central solid or liquid incandescent mass surrounded by luminous metallic vapours, the partial opacity of which occasioned the black lines of the spectrum—according to this theory, the light from the corona should proceed entirely from this incandescent metallic vapour and that in consequence of there being no more highly illuminated body behind it, the ordinary black lines ought to come out bright and luminous. This, if observed, would be one of the most startling results of the day, and would conclusively prove the truth of this beautiful theory, whilst the non-observance of such a reversal of the Frauenhofer lines would seriously militate against the hypothesis.

A very beautiful illustration of the transparency of the metal gold in thin films is given by Mr. Makins. As it is in some degree connected with subjects which we have recently discussed in these columns, we think a notice of it will be of some interest. Mr. Makins says that the transparency of gold may be elegantly demonstrated by taking some twenty grains of fine gold and fusing it in a convenient shallow vessel: this is to be removed from the furnace in a completely fluid state, when, if watched, it will be observed that just upon cooling, a crust of solid metal will suddenly form, through which the light of the internal red-hot mass appears of a beautiful brilliant green colour.

In the last number of the *Monthly Notices* of the Astronomical Society, Mr. Birt describes an instrument for the comparison of colours. He has for a long time been making observations on the moon, and has felt the want of some instrument by which he could give fixed values to the determinations of the extent of changes which portions of the moon's surface undergo in respect to colour. This he has at last accomplished in the following way:—the apparatus consists of a rectangular chamber having a circular opening, across which traverses a slide containing discs of coloured glass. The slide is moved by rack-work, so that any of the discs may be rendered coincident with the opening. White paper, or some other suitable reflecting surface, receives the light from the flame of a lantern through a condensing lens, and forms the means of illumination. The observer, having his telescope adjusted, brings the spot—Plato for instance—into the field; and then the illuminated discs of of the *homo-chromoscope* are successively brought in front of the circular opening, when the identity of colour, with the spot under observation is judged by the observer. We conceive that this plan cannot be very accurate, everything would depend upon the identity of the illumination from one night to another, and when this is obtained by the very crude means of a white surface illuminated by a lantern it is impossible to be sure of uniform results. A much more perfect method would be to employ the moon itself or a definite portion of the lunar disc as a source of light, and to apply the coloured glasses directly in front of the image of this at the focus of the eye-piece. By suitable arrangements of diaphragms with appropriate holes at the eye-piece and a good clock-work movement to the telescope there would be no difficulty in keeping in one corner of the field of view a standard circular spot of the moon's disc thrown slightly out of focus to render the light uniform, in front of which the coloured glasses could be readily brought up for comparison with any other portions of the lunar surface. The parts under chromatic examination should be surrounded by a circular diaphragm of the same size as the standard one, and the observations should, of course, be only made when the moon is at full, or very nearly so. In this manner really valuable and trustworthy information could be obtained respecting the different states of the moon's surface as regards colour.

A correspondent, E. E. L. has forwarded for examination in the spectroscope two pieces of French tracing-paper coloured; No. 1 with chrome yellow ground up with oil, and No. 2 with cadmium yellow, ground up as water-colour. Our correspondent states that he has found the latter colour more effectual in stopping out defects in negatives than any colour he has ever tried, and, therefore, suggests that it may prove equally useful as a substitute for yellow glass. Experiment does not, however, corroborate this suggestion. Both pieces of paper, when examined in the spectroscope by ordinary daylight, are seen to admit blue light in small quantity as well as abundance of green and lower rays, whilst when sunlight is employed the amount of active rays which are seen to come through are quite enough to injure a sensitive plate. The paper coloured with cadmium is the least *diactinic* of the two, as might have been expected from its dark colour; but even this admits too much blue light to allow it to be used with safety.

The same correspondent says that if colour applied to surfaces should prove unavailing, he would suggest the following substitute:—Coat a plate of glass with albumen containing some iodide and a good quantity of chloride; immerse it in a dish containing some strong silver solution; wash away the free nitrate to avoid the formation of crystals on the surface, and then expose to strong sunlight, till the whole of the silver is thoroughly reduced, then varnish with a good hard varnish. Our correspondent thinks "from albumen being more nonactinic than collodion, and the chloride being the most stable of the silver salts," that this would prove a good substitute for flashed glass. We scarcely think it would prove sufficiently impervious to the chemical rays to admit of its being employed in the manner suggested, but should be glad to receive a specimen so prepared, in order to submit it to an examination in the spectroscope.

## Notes and Jottings.

No. 12.

HONEY *v.* CARAMEL.

IN the last number of the NEWS Mr. Bartholomew, who has recently proposed caramel as a preservative for sensitized plates, takes objection to our remarks in a recent jotting, to the effect that the employment of this substance was but a slight modification of Mr. Shadbolt's honey process. Furthermore, we stated that the modification was not "new," inasmuch as it had been previously recommended; but to this term Mr. Bartholomew has given up all claim, stating only that it was "new" to him.

The only question really at issue is this:—Is the employment of caramel in lieu of honey a modification of Mr. Shadbolt's original preservative process; or does the substitution of the former for the latter substance involve principles of sufficient importance to entitle the "caramel process" to be termed "new?"

First of all let us consider the two compounds from a chemical point of view. Honey is composed of two kinds of sugar, namely crystallized and liquid sugar. In virgin honey there is little or none of the crystallized sort, but on exposure to air some short time, it is gradually formed. In this change the same causes are at work as when cane sugar is converted into grape sugar prior to the formation of alcohol. Crystallized honey is, in fact, "grape sugar," and the liquid portion is isomeric with cane sugar, caramel, golden syrup, &c.; and it will be found that the *sugar* of these several substances in each case contains $C_{24}H_{18}O_{18}$; with water in combination, excepting in the case of caramel.

Liquid honey, may, therefore, be considered chemically the same as cane-sugar, having, however, some sort of "ferment" mixed with it, causing a proneness to change into grape sugar. Solution of common sugar with the addition of a little albumen, gluten, or yeast, would very nearly resemble honey in its photographic properties.

Now, the formula of crystallized cane sugar is $C_{24}H_{18}O_{18} + 4HO$. By the action of heat the four equivalents of water are driven off, leaving caramel $C_{24}H_{18}O_{18}$. Caramel may thus be considered as *anhydrous cane-sugar*. The two substances are isomeric, forming like combinations.

Thus, the close alliance between liquid honey and cane-sugar, as also between caramel and cane-sugar, having been shown, it follows that the employment of one of these substances in lieu of another, does not involve any new principle of importance. Therefore, we consider that in whatever form sugar may be applied as a preservative, it will only be a modification of Mr. Shadbolt's process.

We have not tried caramel, but should consider it highly probable that intensity could be easily obtained as Mr. Bartholomew states; indeed, we should fear almost too easily. With honey we have never found a tendency for the production of thin negatives, but rather the contrary.

Mr. Bartholomew, in conclusion, says, "Many readers of the PHOTOGRAPHIC NEWS will, I fear, on perusing Mr. Hannaford's "Jottings" dismiss the processs in the summary way he has done, thinking it only worthy to be classed with honey." Now this really was not our purpose, for we consider that the best results can be produced by the honey process and its modifications. The use of honey is open to objections, chiefly in consequence of the reducing power it possesses; it is a very common occurrence in cases of long exposure to find a trace of the picture on taking the plate from the dark slide. This is one of the causes why plates thus preserved will not keep long, especially in warm weather. In using caramel we think it highly probable that these objections would not arise to so great an extent. At all events, so far from wishing to deter the readers of the NEWS from giving this modification a fair trial, we shall be glad to learn that it has been warmly taken up and tested.

We have further remarks, some of a suggestive nature, to make on this class of preservative formulæ, but must leave them for our next "Jotting." MICHAEL HANNAFORD.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

CAMERAS.

Cameras are so naturally divided into two distinct classes, the studio camera, and the field camera, each having its individual requirements, often widely differing from the other, that they must of necessity be treated apart, almost as much as if they were separate instruments. A few remarks may be made that apply equally to both, and also to several other items of the apparatus destined for the use of the photographer.

It should never be forgotten, either by those who make and sell cameras, or by those who buy them, that the chief and pre-eminent type of their construction should be the fitness for producing perfect pictures with the least chance of failure. No consideration should ever be allowed to take precedence of this. It should never *yield* to the questions of expense, portability, size, weight, or other matters which affect the design of an instrument. All these points should, of course, be carefully weighed, but they should always be second to the consideration of efficiency.

I am induced to make these remarks because I think we have hitherto a little neglected this view of the matter, and that we have been rather inclined, in things photographic, to study convenience and cost too exclusively, and to the prejudice of efficiency. If this be so, we have no one to blame but ourselves—the buyers and users of apparatus. It would be unjust in the extreme to lay any blame upon manufacturers and dealers for supplying articles that their customers sought after and approved of. These "remarks" are intended principally to investigate whether or not our apparatus *is* the most suited for taking with certainty perfect pictures, or whether in some cases we have not somewhat sacrificed efficiency to other considerations. I will illustrate my meaning by one or two examples.

I lately purchased of one of our principal firms a portable stereoscopic camera, with four double backs, lens, and all the necessary accompaniments, which packed into an inconceivably small compass, and weighed but a trifle. The material was excellent, the workmanship perfect, the price moderate: but it was not a *cheap* article. I took it with me on a journey to the other side of the globe. Upon arriving at my destination, I found that the damp of the sea voyage had unfastened the glue of all the little slides, (there was not thickness of wood to allow of screws being used), and also some other portions of the instrument, and they were in pieces. The heat had curled some of them up, and rendered repair difficult. I repaired all damage, however, at last, and set to work. The cells for the glass plates were so shallow (to make the double backs as thin as possible) that two out of three of my plates could not go into them. The

* Continued from page 41.

sliding shutters of the backs were so close to the glasses that they often scratched them in the act of uncovering the plate; and everything was so slight and fragile that each day something was strained or otherwise out of order. Now this is a case in which I think we may say efficiency was sacrificed to portability. Had two or even three backs been put in the same space allowed for four, and perhaps an additional pound allowed to the total weight, all the many advantages of this pretty and clever design might have been retained with *perfect efficiency*.

We all of us have seen cheap work. I was asked once to prescribe for a camera (bought in Paris) that the owner found did not work well. It was a double-bodied half-plate camera, intended for portraits. I found that light entered freely at the top, between the inner and outer body, while at the bottom they fitted so tightly that motion could only be obtained with considerable force, and in jerks, which of course rendered focussing very difficult. The ground glass was of the coarsest description, and the back and the sliding shutter of the single plate-holder stuck, and were smeared with varnish. The material was walnut, and the whole was highly varnished, inside and out. I did not enquire the price, but here evidently was a case where efficiency was sacrificed to cheapness. I name this particular case intentionally, because the instrument was manufactured abroad; but do we never meet with similar instances at home?

I feel sure it will not be argued from these observations that I would deny the utility of portable cameras, or that I underrate the great amount of ingenuity and ability that have been displayed in the design of many which are familiar to my readers. I merely wish to point out that our main object being to obtain perfect pictures, nothing that can in any way militate against this should be allowed to affect the design. It is better to bring home two good pictures than eight indifferent ones.

Still less should I wish it to be inferred that I object to cheap apparatus for photography. It is in a great degree to the facility with which slender purses can obtain all that is necessary to take photographic pictures, that the art owes its great popularity, and its present advanced position; for if its practice, from reasons of expense, had been confined to a few, it would certainly not have made the wonderful progress that it has achieved in so few years after its birth. But I argue that cheapness should be attained in the proper way, without any sacrifice to the efficiency of the several instruments. Cheapness should be attained by the humbleness of the material, by the simplicity of types, and by moderation in the number of duplicate parts. If a brass-bound mahogany camera, with four double backs, and all the requisite adjuncts in proportion, of the first style of workmanship and design be beyond our means, it is better to have a pine or other cheap wood camera, of equally good workmanship and design, with *one* double back, than to have an instrument like the first, but cheaper from inferior workmanship and inferior design. Cheap cameras should be of simple nature; and those instruments which, from the complication of design or the multiplicity of parts, and the many uses to which they may be adapted, require much handwork in their construction, should not be produced in a cheap form.

(*To be continued.*)

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

Lecture i.—Dec. 26, 1861.

[These lectures were delivered at the Royal Institution, and were especially intended for a juvenile auditory. They contain, however, such a lucid enunciation of principles, that we have resolved to lay an abstract of them before our readers, giving especial prominence to those parts more peculiarly interesting to photographers.]

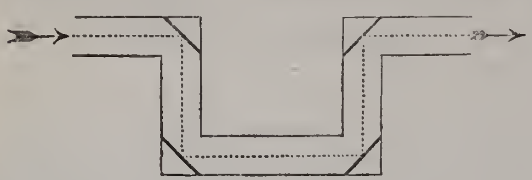
After a few words of introduction, in which it was stated that the present course were really to be juvenile lectures' and that those of mature years who attended them should consider themselves in the light of spectators only, the lecturer commenced by explaining that for the purposes of illustrating the phenomena to be described, it was necessary to have a very intense source of light. This he possessed in the electric lamp, by means of which a light almost as brilliant as the sun itself was able to be produced. This lamp consisted essentially of two pieces of coke, each in communication with the terminal wire of a powerful galvanic battery, and connected with apparatus for keeping the coke points at a proper distance apart. The whole was enclosed in a suitable box, furnished with a circular aperture opposite the coke points. The electric light was produced whenever the two coke poles were allowed to touch, and then separated a short distance. Owing to the atmosphere of the room being rather foggy, the path of the rays of light could be distinctly traced throughout its course.

Attention was drawn to the fact that the beams of light passed through the room in straight lines. The velocity with which light moves is enormous. It runs over a distance of 192,000 miles in a second, or 20 miles in the 1-10,000th part of a second; the time it takes to travel from the sun to the earth is $7\frac{1}{2}$ minutes, whereas it would take a cannon ball 15 years to perform the journey; an express train travelling night and day would also require three weeks to go round the earth, whilst light would perform the same distance in the interval between two puffs of the engine.

The speaker next proceeded to illustrate the manner in which the velocity of light was first measured by observations of the eclipses of Jupiter's satellites. The earth travelling round the sun once in 12 months, and being almost 100 millions of miles from that orb, if at one time of the year it is in that part of its orbit nearest to the planet Jupiter, it follows that six months later, it is the whole diameter of its orbit, or about 200 millions of miles further from Jupiter. Now, the proper time for the occurrence of the eclipses of Jupiter's satellites can be calculated to a fraction of a second, and it was soon observed that when the earth was at that point of its orbit furthest from Jupiter, the eclipses took place *fifteen minutes later* than they did when the earth was at the point of its orbit nearest to Jupiter. This was discovered to be owing to the light from the planet having 200 millions of miles more to travel before it got to the earth in the one case than in the other, and requiring fifteen minutes to perform the journey.

The subject of shadows was next considered. Since light moves in straight lines, it follows that if an object be placed in the path of a ray of light, a shadow of that object would be formed. If the opaque object were a sphere, and the source of light were a point, the shadow would be a sharply defined *divergent* cone; if, however, the source of light were larger than the sphere, the shadow would be a *convergent* cone. In the case also when the source of light was of sensible magnitude, the edge of the shadow would not be sharp, but would be surrounded by a lighter fringe, called a *penumbra*. This is owing to the light having sensible magnitude, so that what is shadow to one part of the light is not shadow to the other, there being only one space in the centre that is really perfect shadow. On account of the great size of the sun, in comparison to the earth or moon, the shadow cast by the latter orbs in space was shown to be a convergent cone, surrounded by a divergent penumbra: these were sometimes seen by astronomers, moving through space during eclipses.

The reflection of light was next treated of. When light strikes an unpolished surface, it is scattered irregularly in all directions; but when the surface is polished, the ray of light is regularly reflected. When the light struck a polished surface perpendicular to it, the ray was shown to be reflected back along the same path; but when it fell upon the polished surface obliquely, the reflected ray formed an equal angle with the perpendicular, to the incident ray. This was expressed by the law that *the angle of incidence is* *equal to the angle of reflection.* It was then shown experimentally that if a mirror furnished with an index perpendicular to its surface, was allowed to rotate horizontally whilst a beam of electric light was allowed to fall on its surface, the ray of reflected light was seen to travel across a graduated arc, with exactly twice the velocity of the perpendicular index. As a practical application of this law, a square wooden tube, with four rectangular elbows was exhibited, and its constructions explained. At the inside, in each elbow, a piece of looking glass was cemented across, in such a manner that the rays of light entering one end of the tube were reflected at right angles four separate times, first downwards, then horizontally, then upwards, and lastly out of the tube in the original direction. By this means, it was shown to



be possible to see objects through the tube, when opaque bodies, such as the hand or a piece of wood were interposed in the apparent course of the rays. This was the principle of the popular toy instrument used by showmen, who professed to enable people to see through their hands. A valuable application of the same law was then described; it consisted of a small tube, with a piece of looking glass placed diagonally across each end, so that riflemen supplied with these could observe anything passing on the other side of a parapet without endangering their lives by putting their heads over. This was said to have been very useful at the time of the Crimean war.

In the next place, attention was drawn to the repetition of the images of an object which was observed when it was placed between two plane mirrors. If the mirrors be parallel to each other, and a lighted candle be placed between them, there is seen a series of luminous images, diminishing in brightness to an indefinite length; but if the mirrors are inclined to one another at an angle, the images of any object placed between them will be seen ranged symmetrically round about in a circle, the centre of which is the point where the mirrors meet. The larger the angle enclosed between the mirrors, the fewer the images; and the smaller the angle, the larger the number of images. The number of images (with the object itself) may always be found by dividing 360°, or the number of degrees in a circle, by the number of degrees in the angle enclosed by the mirrors. This is the principle of the kaleidoscope, and also of the debusscope. The construction of the former instrument was explained, and its action illustrated, by means of the electric light. Respecting plane mirrors, there was one point which was not generally remembered by the public. The image seen in an ordinary looking-glass was shown to be a lateral inversion of the object. "For instance," continued the Professor, holding up a looking-glass before him, "I believe that my hair is really parted on my left hand, but if I look here, I see a person in this looking-glass with his hair parted to the right hand, and thus we are laterally inverted when we look into a looking glass. Photographers often have people complaining when they find themselves represented exactly as they are, because they quite forget that they do not know themselves really as they are; and when a photographer sets the parting of their hair on the proper side—the side on which other people see it, they are sometimes very angry with the photographer. They say he has misrepresented them, forgetting, in fact, that they have been using an instrument all their lives which inverts them in this lateral way."

In conclusion, the lecturer explained the different actions which concave and convex mirrors had upon a ray of light falling on them. Starting from the law of reflection of light from a plane reflector, it was shown that both a concave and a convex mirror might be regarded as a collection of an infinite number of plane reflectors set side by side, so as to form a curved figure; each of these little mirrors would reflect the incident ray of light at an angle equal to that at which it fell on the mirror, and if each of these mirrors were to be set at a certain angle, it would be easy to imagine that they might reflect all the rays of light to one point. This indeed was what took place in the case of a concave mirror; if parallel rays fell on a mirror of this sort, they would be reflected back again, and converged to a single point where they all crossed. This point was called the principal focus of the mirror. The action of a convex mirror on the incident rays of light, was shown to be exactly contrary to that of a concave mirror; convergent rays being rendered less convergent, parallel rays being rendered divergent, and divergent rays more divergent after reflection. These properties of concave and convex mirrors were beautifully illustrated by allowing the rays from the electric light to fall upon their surfaces, the path of the beam before and after reflection being shown in a most perfect manner by the haziness in the atmosphere of the room. By allowing the light to fall upon the mirrors, and then rotating them, it was rendered evident to all that in a concave mirror the principal focus was a real point in front of the mirror, where the reflected rays actually crossed each other: whereas in a convex mirror, the reflected rays did not actually intersect: hence the focus of the convex mirror was called an *imaginary* focus, in opposition to the real focus of the concave mirror.

## ON MEALINESS IN POSITIVE PRINTS.

BY W. J. C. MOENS.*

For some time past I have been convinced that the mealiness complained of in alkaline toning is almost entirely attributable to the way the prints are treated between taking them from the printing frames and immersing them in the gold toning bath. The usual treatment is to put the prints into two or three changes of water, in order to wash out the free nitrate of silver from them. Now, this water nearly always contains inorganic matter, which converts the nitrate into chloride of silver, therefore the free nitrate in the paper is partially removed and partially turned into chloride, and left in the body of the paper immediately under the albumen, which no washing can remove; and, besides this, the first and second waters are saturated with chloride, which settles in the open pores of the paper (this is the reason why a loose porous paper is more prone to the evil than a thin hard one). It is, therefore, evident that after washing in water containing inorganic matter the paper on which the picture is printed has two conditions, being, in fact, mottled with an uneven surface of chloride of silver.

Now, after washing the print, the next step is to immerse it in the gold bath, and what is the effect? Where there is an excess of silver it is speedily toned, but the rest of the print takes a far longer time, so that you have two toning processes at work—the first one is carried on till the latter is completed, thereby you get two results, which constitutes the evil complained of. It, of course, does not show in *full force* till its immersion in the hypo bath.

I will now bring forward a few facts to prove my theory:—

1. Mealiness is never experienced with plain paper, the albumenized surface being the great obstacle to the proper removal of *all* the excess of the silver salts.

2. It is never experienced in the old toning, when the chloride is dissolved before the toning takes place.

3. Or when you wash well with distilled water.

4. Very seldom when you do not wash the prints at all before toning.

5. Wherever there is an accidental excess of albumen, such as a streak running across the paper or the edge of a

* Read at the North London Photographic Association, on Jan. 22, 1862.

sheet where the drainings have accumulated and dried, and therefore there is an excess of chloride. These parts always tone quicker than the rest of the print.

6. It is not so prevalent in thin hard paper, when the the silver salts are removed more easily.

7. It never appears if the print be immersed in hypo, and the silver entirely removed before toning.

8. If the silver is converted into an even film of acetate, it never occurs according to the testimony of many given during the few last weeks.

9. When the silver is entirely reduced by exposure to a strong light it never occurs.

I repeat then it is absolutely necessary in alkaline toning to have an even surface of chloride of silver, or none; in either case you get rid of the complaint; but if you have a mottled and uneven surface of chloride, the print tones accordingly, and the result is useless.

## THE NEW IRON PRINTING PROCESS.

Dear Sir,—In the last number but one of your valuable journal my paper on "A new Iron Process for Photographic Printing" was criticised by Mr. Hannaford. That gentleman does not appear to be pleased at my using the word "new," the unfortunate monosyllable being in his opinion wholly misplaced. I am sure you will agree with me in saying that any process which has not been brought forward before and which possesses any features of novelty and interest, has an undoubted right to be styled "new." The absolute foundation may not be novel, but the method pursued in working out the original observation and applying it to practical purposes has everything to say to making the claim valid or otherwise. I now know that Döbereiner has already observed that light exerts a reducing influence over the peroxalate of iron, but I am wholly ignorant of any regular process for printing photographs, based on this reaction, having been proposed. If it were otherwise do you think it is very likely that I should have wasted my time and labour endeavouring to work out a process which had been proposed before? Although Mr. Hannaford does not say that any other process exists, depending on the reduction of peroxalate of iron to the state of protoxalate, yet he implies that I have adopted the same means for developing the picture as that used by Sir J. Herschel and Mr. Burnett. Now, though Sir J. Herschel and Mr. Burnett used nitrate of silver as a developer, I do not see it stated anywhere that *ammonio nitrate of silver* was used by either of them. The presence of the alkali you will at once perceive makes a very great difference in the final result, as not alone reduction takes place with much greater rapidity, but the oxalate of silver formed is immediately dissolved by the ammonia, the bath playing the double part of developer and fixer. Supposing the paper contains chlorides, the moment it comes in contact with the silver solution, chloride of silver will be formed; but the ammonia which is present in the developer is capable of dissolving a large quantity of chloride of silver, consequently where there is nothing to prevent solution taking place, we have every reason to believe that the chloride of silver will be dissolved. In conclusion I may mention that the whole process originated in a few accidental observations made while conducting some experiments with a far different object in view. Being an *amateur* photographer it occurred to me that the reactions which I had noticed might be made use of in a photographic sense. I immediately followed up the idea, and the result is the process which I have communicated. Such is a simple statement of facts, from which I shall leave your numerous readers to draw their own conclusions, and remain, faithfully yours,

Emerson J. Reynolds.

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## PHOTOGRAPHIC EXHIBITION AT EDINBURGH.

[We extract the following notice of the exhibition in connection with the Photographic Society of Scotland from the *Photographic Journal.*]

From the wretched weather with which Scotland, and particularly its western districts, was visited in 1861, we were prepared to anticipate a scanty supply of contributions from that quarter, and to doubt whether these would possess their usual excellence. These anticipations, we are happy to say, have not been realized. Among our resident Scotch photographers the specimens sent equal the best contributions of former years, while Mudd, Dixon Piper, and Vernon Heath from England, and Mr. Maxwell Lyte from the Pyrenees, have filled the walls with specimens of their characteristic styles (for a difference of style among photographers is just as perceptible as a different touch among artists), which leave nothing, we think, to be desired. On the whole, we cannot hesitate to say that the exhibition of this year is at least equal to any of its predecessors. The number of photographs exhibited amounts to 635, many of these (such as the cartes de visite) embracing twelve in a frame. To the old list of exhibitors have been added some new ones of distinguished merit; and some of the productions of amateurs, who have only recently become votaries of this delightful art, maintain their places beside the performances of veterans and professionals.

In an exhibition of this kind the chief point of interest, so far at least as photographers are concerned, is the comparison of different processes and their results. Does wet collodion still maintain its pre-eminence? or are its finest effects emulated by dry collodion, with all its superior conveniences? If so, which of the dry processes appears to most advantage? or do they all appear in skilful hands to produce equally happy effects? Are the paper processes going out entirely? Do specimens of the simple Talbotype, with which in the outset such admirable artistic effects were produced, still fill a niche on the walls? or is that process becoming added to the catalogue *De rebus deperditis?* To some of these questions the Catalogue of the Exhibition of the Photographic Society of Scotland may help to afford an answer.

In point of numbers, wet collodion, it may easily be imagined, stands first. Nearly nineteen out of every twenty specimens are the result of that process; and when the names of Mr. Maxwell Lyte, Mr. Dixon Piper, of Ipswich, and Mr. Vernon Heath are numbered as among the most distinguished representatives of this school, it may be imagined that their productions can hardly be surpassed. But when we place beside them Mr. Mudd's exquisite specimens, produced by the collodio-albumen process, it is impossible to doubt that in all that gives beauty and character to a photograph—softness, aerial perspective extending to the most remote and vanishing distances, distinctness without harsh opposition of light and shadow in the delineation of reflections in water—in all, in short, which tests the merits of any one mode of manipulation, this form of the dry process is capable, at the least, of equalling the effects of wet collodion. Of the Fothergill process we see no specimen but one. Some specimens of the oxymel process are noticed; but plainly that mode of operating is on the decline, Of the tannin processes, there are several specimens, and of a very high order, such as the "Fountain at Holyrood" (469), by Kirkland; the "Last Stoops of Summer" (62), and "Loch Ranza, Arran" (101), by Annan. For fine aerial effect, the latter view can hardly be excelled. From the number of names and performances of considerable merit to which the word "tannin" is added in the catalogue, it is obvious that this process is coming into favour; and although among our own friends we have heard quite as much of failures as of successes, its capabilities in the hands of a skilful manipulator seem indisputable. Another of the dry processes (that of Mr. McNair) —the malt process—appears here to great advantage, though in the hands of an amateur who has only recently adopted it. The Rev. Mr. Drummond exhibits several specimens, some of an architectural character, such as Elgin Cathedral, and Urguhael Castle on Loch Ness, others of Highland scenery, which already leave little to be desired. We wish that our English friends could give a fuller trial to this exquisitely simple and, as these specimens prove, most efficient process, which has as yet been little practised beyond the borders.

In our hasty glance round the room we have not noticed a single calotype; and the wax process retains apparently but few adherents, though the specimens contributed by the secretary, Mr. Adam, and still more those of Mr. Harris, which are more devoted to general landscape, are highly are highly artistic, and show that it possesses great capabilities, along with great conveniences as to transport and manipulation.

The present rage for carte de visite portraits, of which some hundreds over the walls of the exhibition, and many of great beauty and artistic skill in arrangement, has obviously been unfavourable to the larger style of portraiture. Indeed, in Scotland, the demand for anything beyond the album size we understand to be exceedingly small. Much as we admire these charming little specimens, some of which exhibit a taste and beauty of composition, combined with a truth of characteristic portraiture, which will always render them most valuable recollections of friends living and dead, it is yet delightful to see how a great artist in portraiture, like Claudet, can give us portraits on a larger scale, which, with the assurance of likeness, combine the chiaroscuro and middle tint of the finest painting. Three portraits of ladies (58, 313, 331), and one of a gentleman (106), are of first rate excellence. Beside these beautiful portraits may be placed one by H. Hering (103), "Portrait of a Lady," which is perfect, with the exception that the figure does not appear to have sufficient support. If we do not refer to the performances of our own photographers, Moffat, Tunny, Dallas and others, it is not that their contributions are not up to the mark; for they are equal to the best of former years, and one in particular by Moffat, of the eminent Scotch artist, Mr. Harvey, struck us as of peculiar merit. And though the larger portraits of Messrs. McGlachan and Hill are best seen at some distance, their artistic disposition and fine effect of light and shadow are very striking. While on the subject, we may just notice two very fine specimens in this line by an amateur—(484) "the Wanderer," and (519) "Portrait of Mr. C. H. Inglis,"—both skilfully arranged and perfect as to manipulation.

In what may be called composition pictures, beyond mere *pièces de genre*, there is nothing important but Mr. Robinson's "Lady Shalott" (323); but it only proves to us that when a first rate photographic artist, with a strong feeling for art, can produce nothing more interesting, the range of this branch of photography is limited. With all its technical dexterity, it produces no impression.* For rustic and domestic groups, such as the Wood Scene of last year, these got-up scenes and artificial scaffolding may be available; for the higher department of art, we are satisfied they never will. We say this with the utmost respect to Mr. Robinson, for whose talent we have a high admiration.

It is in landscape, as might be expected, that the strength of the exhibition lies: and, as already said, collodion wet or dry, monopolizes the field. But here the difficulty of attempting to enumerate, among so many peculiarly fine and varied specimens of the art, becomes extreme; indeed, consistently with our limits, impossible. As a general feature, subjects of an architectural character are gradually becoming exchanged for rock, wood, water and aerial effect, as the resources of collodion are becoming more understood. Of the purely architectural class the finest specimen, we think, is (327) "Ancient House, Ipswich,"—"King's College Chapel" being less picturesque, and somewhat deformed by the leaning inward of the lines at the extremities. Two landscapes by the same hand (Dixon Piper)—(566) "Stone Bank and Foliage," and (578) "Brignall Bank"—form a charming pair, though in the opinion of some a smaller landscape, (545) "Junction of the Tees and the Greta," marked by a peculiar delicacy of atmospheric effect, is even superior. Mudd's contributions are distinguished by exquisite clearness, softness, and gradation of distance, with a remarkably pleasing tint—a point on which some otherwise very beautiful works by Kirkland are defective, the tone being too deep and too black. Among Mudd's we would particularly direct attention to:—(544) "Yewbarrow Crag," in which the characteristic peculiarities of the Lake Country are admirably rendered; (54) "On the Tay, Dunkeld," which has no defect save the ungraceful form of the hill in the background; (597) "Wood and Water, Perthshire;" (402) "Borrodale;" (324) "Eskdale, from Berker Fell"—a long view consisting of two portions very dexterously joined, where the eye ranges over a whole country, follows up long valleys, and mounts to distant hills, all soft yet well defined as in a bright summer day in nature itself. Of the numerous contributions of Mr. Maxwell Lyte, we are compelled to say that we find them somewhat monotonous in their grandeur; and are more and more led to the belief that the photographer will find better materials among the streams of Derbyshire, or the soft valleys of Devon, than among the passes of the Alps or the gorges of the Pyrenees. A proof of this, we think, will be found in the Alpine and Glacier Scenery of Bisson Frères. The first emotion on looking at them is that of surprise; but after examining a few, the result is weariness and disappointment. To some extent the same remark is applicable to the Pyrenean views of Mr. M. Lyte: they are too ambitious; more would be effected by selecting a more limited range. Yet in their own way they are admirable: for they certainly recall the spirit of the place; and to those who have once explored these valleys, and lakes, and mountain passes, it must be delightful to revive their old recollections by studying these photographs of Mr. Lyte. The two to which we should be disposed to award the palm would be (111) "Vallée d'Argelez de Bigorre" and (97) "Vallée d'Azure."

We scarcely like Mr. Vernon Heath's subjects so well as those of last year. The rich and wooded slopes of Endsleigh please us better than the Perthshire scenes which he has chiefly selected this year. An English cottage, with its overhanging eaves, its windows carried up into the roof, its porch, its little scrap of garden, and rustic gate, is a ready-made picture: not so the flat and almost windowless Scotch cottage, fronting a dirty road, and garnished only by a peat-stack or something worse. Several of Mr. Heath's efforts have this year been wasted on subjects of this kind, incapable, as we think, of photographic treatment.* We congratulate him when he makes his escape from these, or from comparatively formal ploughed fields and flat distances, and gives us two such exquisite specimens as Nos. 354 and 355, both marked "Burn, St. Fillans," or the one (358) entitled "Cottage Porch, Sherwood." What would not a sketcher in Scotland give for a few such cottage porches?

In the few lines that are left to us, we can only indicate at hazard a few pictures that have caught our attention, satisfied at the same time, that we must have overlooked many, perhaps equally deserving of notice, and regretting that neither time nor space enable us to do justice to all.

Among those by Mr. Bedford the finest is (411) "Rocks at Ilfracombe," almost equal to anything in the exhibition; (559) by Mr. Mitchell, jun., amateur, "Scene on the Eye Water;" (360) "St. John's College, Oxford, garden front;" (403) "Roadside on Isle of Wight," R. Gordon; (418) "On the Maclury, Strathallan," J. B. Stewart; (483) "In Hawthorne Grove, Phœnic Park;" (92) "The Dargle, Wicklow," by J. M. Brownrigg, (99) "View on the Don," Lamb (who, by the way, has this year tried the experiment of printing on unglazed paper, and, as we think, with manifest advantage to his prints); "Portrait" (273), H. Hering; (307) "Portrait of Miss M. Wilson," Tunny; (328) "The Bass," D. Campbell; (288) "Fountains Abbey, from the West," A. F. Adam (wax-paper); "Wooden Bridge, St. Fillans," Vernon Heath; (485, 486) "Studies of Trees," A. J. Harris (waxed paper).

Four very remarkable studies of skies are contributed by Mr. Kibble, of Glasgow, who some years since exhibited several specimens which might be fairly called instantaneous, since they bore to have been produced by an exposure of a mere fraction of a second. In three of these, it may be said, nothing is represented but sky; but in the fourth we have a combination of sky with foreground, and with a cart and some figures, which give life to the picture. But it is evident that the exposure, which was just enough for the sky, has been insufficient for the foreground; and we fear we must still submit to the drawback attending

* We cannot reproduce this remark without protesting against the statement. Whatever faults this picture of Mr. Robinson's may possess,—and we have before this alluded to some of them—we can aver that it *does* produce an impression. No picture excited greater interest at the Exhibition at Manchester where it was much admired. We have had opportunity of showing a copy to many persons connected with art as well as photography, and so far from "technical dexterity" being its chief merit, we have found photographers have found more fault with it than artists, many of whom have at first been struck with it as what they deemed a clever copy of a painting! We protest against these remarks, because nothing can be so repressive to the photographer striving to enlarge the range of his art than to be told, he is not successful, and "never will" be.—Ed. Photographic News.

* Those of our readers who visit the forthcoming International Exhibition will doubtless see Mr. Heath's scenes in Perthshire. As to the choice of subjects *chacun a son gout*; but we think some of these the best pictures the artist has exhibited, and a decided advance upon those of last year, perfect as many of them were. We should point to some of Mr. Heath's productions this year as the finest combinations of the most perfect delicacy combined with great brilliancy, which the art has produced.—Ed. Photographic News.

the introduction of skies, that sky and foreground, to be equally effective, must be printed from separate negatives.

We conclude this hasty notice by expressing our strong sense of the fairness and discretion with which the Hanging Committee have performed a delicate and difficult task.

## Proceedings of Societies.

### North London Photographic Association.

The usual monthly meeting of this association was held at Myddelton Hall, on the evening of Wednesday, January 22nd. In the absence of the Vice-President, Mr. C. J. Hughes occupied the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman called the attention of members to the presentation print for this year, a copy of which was on the table. It is a very fine photograph by Bedford, "A Study of Rocks, at Ilfracombe." The size is 12 in. by 10 in., and is an exquisite specimen of photography—delicate, brilliant, and well defined. Its photographic merit is, however, superior to its pictorial interest.

An ingenious instantaneous shutter, by Messrs. Horne and Thornthwaite, was exhibited. It consists of a frame, having caps to fit on to the hood of the lens; in the frame is a guillotine shutter, which, released by touching a spring, descends rapidly by its own weight. This shutter has an aperture in the middle: in its first position, before the spring is touched, its lower end covers the lens; when it has descended, the upper end covers the lens; the exposure taking place whilst the central aperture is passing over the lens.

Mr. Moens showed some samples of Messrs. Silver and Co.'s photographic vessels of Ebonite, in the manufacture of which, so far as neatness and convenience was concerned, a great improvement had been made. He remarked that it had been stated in a former meeting that ebonite was liable to fracture on falling to the ground. This was manifestly an error; ebonite was not at all liable to break under such circumstances, as the members might ascertain by trying. Probably the gentleman who had mentioned the circumstance was confounding ebonite with the old vulcanite, which resembled it, and might easily be broken.

Mr. G. Wharton Simpson remarked that he had kept seventy ounces of silver solution in an ebonite bath for about three months, without the slightest injurious result. He was satisfied that no injurious action was to be anticipated.

The Chairman then called attention to a letter received by the Secretary, who was addressed as "Sir J. Baruett." The letter was in German, and was accompanied by several photographs. He would read a literal translation which had been made. It was as follows:—

"Duchy Schleswig, Mehlbye in Angeln, 7 January, 1862.

"I take the liberty of forwarding, enclosed, to the Honourable Society of Photography of North London some specimens which are taken without chloride of silver, and without $SO^3$ natron [hyposulphite of soda, $NaO\ S_2O_2+Aq$, is meant, we presume], and which in consequence of their unchangeableness will enter into competition with other photographs.

"These photographs possess the following valuable preferences:—

"1. They remain unchangeable against light, air, dampness, and other matters to which they may be exposed.

"2. They are taken in the most simple manner.

"3. Several impressions may be taken quickly, should no essential re-touch be required, in less than an hour, of one and the same negative.

"4. Any thick satin letter paper may be used.

"The discovery was made by myself without the aid of Poitevin's method, and, I should think, is open to improvement, though based upon the most sure and simple manner of taking.

"My practical knowledge of photography is but of short duration, and, possibly, the representations of the negatives and copies may not satisfy the artists, a practical man would, no doubt, with my means of discovery at his disposal, obtain better results.

"The copies are left, as may be seen, without any artificial additions.

"Against some favourable offer the discovery is at the disposal of any photographical society.

"Begging your pardon for having addressed you in my mother tongue, as I cannot find a proper translator.—I remain, yours obediently, (Signed) "O. Kohnke,
Chemist by trade."

The specimens, which were portraits, were soft and full of gradation, being more pleasing than most of the pictures we have seen produced by the aid of salts of chromium. They have more the colour and appearance of gallate of iron pictures than carbon prints.

After some conversation on the subject it was resolved that the secretary should write to Herr Kohnke, asking for further particulars of the process, and in what way he desired the society to aid him?

Mr. G. Wharton Simpson, at the request of the Chairman, then gave the meeting some detailed information of the final determination regarding photography at the International Exhibition. The particulars appeared in an article on the subject last week.

After some conversation on the subject,

Mr. Moens read a paper "On Mealiness in Positive Prints" (see p. 54).

A desultory conversation on the subject ensued, in which a general opinion was expressed that mealiness rarely occurred where perfect reduction was secured in printing by the use of brilliant negatives.

The Chairman remarked that when, some time ago, he read a paper at that society on printing and toning, he brought some hundreds of specimens, all toned by the alkaline gold bath, and in none of which there was any trace of mealiness. They were all produced from vigorous negatives.

Mr. Hill met with mealiness in his prints, and they were all produced from strong negatives.

Mr. Simpson coincided with many of the remarks in Mr. Moens' paper. The mottled, irregular toning was, doubtless, due to two distinct tonings being in operation at once—one on the chloride of silver, which rapidly assumed a blue black, and the other on the albuminate, which remained more or less of a reddish brown tint. He referred to the practice of one of the first professional portraitists, who, in albumenizing his own paper, used a much less proportion of chloride than was customary; he never was troubled at all with mealiness, but his prints always retained the warm hues in toning.

The Chairman believed mealiness was mainly due to the use of paper with uneven texture and rough surface, which absorbed the albumen solution unequally, so that in minute hillocks all over the surface of the paper albumen was deposited, which hillocks, in toning, obstinately remained red, whilst the remainder was becoming slaty.

Mr. Hill rarely met with it in slightly albumenized paper.

The Chairman suggested that to test the efficiency of the means proposed for remedying this defect, a print should be cut down the middle, and one half treated with the proposed remedy, and the other half in the usual way, the halves when completed and brought side by side, would effectually illustrate the value of the remedy.

Mr. Moens had found it occurred when washing with water containing chlorides, &c., but not when using distilled water.

Mr. Foxlee has tried the use of distilled water, and had not found that it made any difference.

Mr. Shave asked if the same result were observed when printing on albumenized glass.

The Chairman said the operations were different. Albumenized glass was printed by development.

Mr. Simpson said that sun-printing on glass had been proposed, but never carried out, he believed.

Mr. Seeley had a sample of albumenized *Saxe* paper, which at first yielded him perfect results, but after keeping it a few months he could not get good prints from it.

Mr. Blanchard had found the best remedy was careful washing in water containing no salt.

Mr. Moens said the more perfect the washing the better, so long as the water did not contain any salt.

Mr. Foxlee had found slow toning the best remedy.

Mr. Blanchard had never met with it when using the toning bath quite hot. He had found the use of acetate of soda gave him entire freedom from it, but with the same bath his assistants somehow or other contrived to get more mealiness than ever. He used Canson's paper.

Mr. Moens had found no mealiness when the preliminary washing were in sea water.

The Chairman observed that if the formation of chloride of silver was the cause, that was surely the way to get it. He believed many operators immersed the print in the washing water. His plan was to float the print silver side down for about five minutes, when it first came from the pressure frame. The free silver, instead of being formed into an insoluble salt in the pores of the paper, was thus gradually soaked out, and precipitated into the dish.

Mr. Simpson suggested that the use of hot solutions prevented mealiness, and the use of weak solutions and slow toning, although it appeared paradoxical, might really be based on analogous principles. Slow toning was recommended, and was more or less efficient because it kept back the over-readiness of the particles of chloride of silver to tone, whilst the more horny albumen particles were getting permeated with the solution, and thus enabling both to keep pace with each other, preventing the chloride from over-toning until the albuminate could come up with it. A hot solution, on the other hand, rapidly permeated the horny albuminate without accelerating the toning on the chloride in an equal degree, and thus aided the production of a uniform colour.

After some further conversation the discussion terminated.

Some very good stereoscopic slides were exhibited by a member, from negatives taken on the dry plates of Dr. Hill Norris.

The usual votes of thanks terminated the proceedings.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 29th January*, 1862.

A method of extracting the silver from old hypo baths is suggested by the Abbé Pujo. He remarks that every positive proof leaves a comparatively large proportion of its silver in the hyposulphite of soda solution. In fact, it may be admitted, in general, the white portions, the half tones, and the sky, from one half, at least, of the total surface of a photograph, from which it may be concluded that one half of its silver is given up to the fixing solution. Besides, even in the most intense blacks, the greater portion of the nitrate and albuminate of silver is not decomposed, and that these salts also pass into the hyposulphite solution. We may safely reckon that out of 1000 grains of silver (contained in 1500 grains of fused nitrate), employed in printing positives, more than 500 grains are left in the fixing solution; and, therefore, if the photographer can extract this unused silver without much trouble and expense, he will realize a saving of at least 50 per cent. in the cost of his positives.

To effect this desirable object, M. Pujo proposes the following simple process and method of treating hyposulphite baths.

Procure a glazed earthen jar capable of containing four or five gallons, in which collect all the old baths of hyposulphite of soda as they become useless. When it is desirable to extract the silver from them, add some hydrosulphate of ammonia, or a solution of sulphide of sodium, and stir the mixture thoroughly. The silver is immediately precipitated in the state of sulphide, and after a few hours of repose it settles at the bottom of the jar. Then put a small quantity of the supernatant liquid into a test tube, and add to it a few drops of the hydrosulphate; if it blackens it shows that a sufficient quantity of the hydrosulphate has not been added to the hypo solution, and a fresh quantity must be added, the mixture stirred again, and left till the precipitate is deposited. Then it must be tested again, and the operations repeated until no precipitate is formed in the supernatant liquid upon the addition of hydrosulphate. When all the sulphide of silver has collected at the bottom of the jar, the liquid is carefully decanted, and the jar filled with water, the precipitate well stirred so as to become washed, and again left to subside; the water is then decanted and added to the first decantation. This washing is then repeated four or five times in the same manner, but the washing-waters are thrown away.

The sulphide of silver collected is heated very strongly in a crucible, to drive off the moisture and the sulphur in excess, which arises from the presence of a polysulphide in the hydrosulphide, or even from decomposition of the hyposulphite.

We then take a quantity of chlorate of potassa equal in weight to the sulphide of silver obtained, and pulverise it finely in a mortar with 5 or 6 times its weight of chalk, and then add it to the sulphide; this intimate mixture of chlorate of potassa, chalk, and sulphide, is strongly heated in a crucible during 15 to 20 minutes. The mass resulting from this calcination is mixed with water. The chalk and sulphate of lime then formed remain in suspension for some time when the liquid has been stirred, while the silver, now in a granulated state, immediately falls to the bottom of the vessel. Then the metallic silver can be separated from all impurities by levigation.

The granulated silver is carefully collected, melted in a crucible and cast into ingots. This silver, which is quite pure, is then ready anew to run the circle of its numerous photographic metamorphoses.

There are one two precautions to be noted in this process, one of which is to carry on the operations away from the photographic laboratory, on account of the sulphurous vapours which arise upon precipitating the silver from the hypo solutions; the other is, that as the mixture of sulphide of silver and chlorate of potassa is explosive, the operator must not neglect to add the proper quantity of chalk, to avoid serious accidents.

### DRY PLATES WITHOUT PRESERVATIVE.

Sir,—In your recent article "On Dry Plates without Preservative," you have inadvertently fallen into an error in stating that I "invariably" use "albumen" as a foundation. My original point was, that pictures could be obtained on simply washed and dried collodion plates, equal, if not superior, to those obtained after the use of any preservative whatever. I stated further that it was difficult to keep the film on the plate without some foundation, and that I preferred albumen for this purpose without at all confining myself to this substance or to any other. Finding it difficult to convince some people that my pictures were due to the collodion, I, in December last, exhibited at the meeting of the North London Association, two plates, one prepared with the albumen foundation and the other without it. No appreciable difference was manifest in the two plates, *even in colour*.

I have to thank your correspondents, Messrs. Ward, Window, and Warner, for their corroboration of my statements, and I trust now that attention is fairly directed to the subject we shall soon be in possession of a collodion which shall adhere firmly and yet give us the required vigour of picture,

I believe that the first suggestion of dry collodion is due to Mr. Barnes, who in 1856 published a pamphlet on the subject. Mr. Barnes, however, used *camphor in his collodion*, one effect of which was to retard the drying, and which I have proved to be unnecessary.

Permit me once more then, sir, to state broadly as the result of my own experiments and practice, confirmed by that of others, that *no "preservative" medium whatever is required for dry collodion plates.*

Further than this, permit me to express the opinion that such preservatives merely modify the tone and intensity of the resulting picture when such picture comes unscathed and perfect out of the unnecessary ordeal.

Starting, therefore, from the simple washed collodion as a base, we have it in our power to modify all the canditions of the case, so as to suit our requirements, by introducing organic matter into the collodion.

If any difficulty is found with the film slipping from the plate, we can firmly fix it by using as a foundation a solution of india-rubber, a *very thin* solution of albumen, or by grinding the surface of the glass plate; but as I have before remarked, I believe it to be possible to obtain a collodion which shall need nothing of the kind.—I am, sir, yours obediently, W. Hislop.

*January 27th*, 1862.

[We understood that it was Mr. Hislop's regular practice to use the albumen coating, and that the specimen, without preliminary coating, shown at the North London meeting, and duly described in our report, was exceptional. It proved, however, as did the pictures of other correspondents forwarded to us, that the albumen was not necessary to the production of a perfect image. We are inclined to believe with Mr. Hislop that the production of a suitable collodion is all that is wanted to secure a simple, certain, and efficient dry collodion process without any preservative whatever.—Ed.]

### CARAMEL AS A PRESERVATIVE.

My Dear Sir,—Would you have the kindness to permit me to apply to Mr. Bartholomew for such details as may be necessary to be observed in order to secure an increased sensibility of Fothergill plates by a final application of caramel solution. It is true that during our experiments in connection with the South London Society, I reported trials made with melted sugar, and sugar converted into caramel.

I did not obtain, however, any satisfactory indications in this direction as to induce me to attach any importance thereto, and I met, moreover, with the oftentimes repeated annoyance of a moveable film, common to this and similar methods of manipulation. The latter difficulty would not, however, apply to the application of the solution to a Fothergill plate, and if, under such circumstances, a solution of caramel acts as "a *powerful accelerator*," the discovery may fairly be regarded as very valuable.

I have applied gallic acid solution to plates prepared according to the albumino-raisin process, but am somewhat doubtful whether the simple raisin extract solution is not to be preferred as a final wash similarly applied. In either instance, I obtain an increased facility and vigour of development, but certainly no material exaltation of sensibility.

As the members of the experimental committee of the South London Photographic Society have their attention still directed to the acceleration of exposure in connection with the practice of dry plate photography, they would be glad of the opportunity of fairly testing the proportionate extent of the action of caramel as an accelerator, provided Mr. Wm. Bartholomew would favour your readers with the necessary data. In the interim, the suggestion will be fairly and impartially tested upon the ordinary Fothergill plates, and the results recorded.

The absolute difference between caramel and honey as regards composition, chemical and general properties, and other characteristics, are too obvious to require more than a parting notice.

*If* your correspondent, Mr. Barthololomew, *can* show that a solution of caramel applied to a Fothergill plate acts as a *powerful accelerator*, he is justly entitled to the merit of having made an independent and valuable discovery.—Your's truly, T. Sebastian Davis.

*January 29th*, 1862.

## Photographic Notes and Queries.

### Intensifying with Iodide of Mercury.

Sir,—I forward for the use of the readers of your valuable pages, a method of intensifying which I have found very efficient, should you think it worth insertion.

I operate as follows:—After fixing, drying, and moistening the plate, I pour over a solution of iod. hydrarg., the strength being one part to seven of water. The film will change colour, first to a slaty grey, and then to a yellowish tint, when it must be well washed and treated with pyrogallic and silver, till the density required is obtained, which will be in a very few seconds. By the use of one part of the solution of iodide of mercury to three or four of water, and prolonging its action on the plate, dense yellow negatives may be obtained without the application of pyro and silver.

I prepare the solution of iod. hydrarg. as follows:—Take one ounce of a saturated solution of bichloride of mercury, and add drop by drop a saturated solution of iodide of potassium, shaking well till all the precipitate is dissolved; then to this add pure iodine in excess, well shaking the mixture, and using one part to seven of water, as stated above.

Should any of your readers try this, I shall be happy to hear the results.—I remain, Sir, yours obediently,

49, *King William Street*. A. L. Henderson.

### Mealy Toning.

Sir,—From experiments I have made I am convinced that mealiness in toning arises from want of sufficient alkali in the gold bath, a want which is proved by the recent recommendations of a preparatory bath of alkali—acetate of soda. The paper being washed after immersion in acetate of soda may contain alkali enough on entrance into the toning, but the quantity cannot be known with accuracy.

If a photograph be put into a simple bath of chloride of gold it will fade very much, and perhaps become mottled with red spots; now to make a good toning bath, the alkali—carbonate of soda for instance, must be added till that disposition to fade is reduced as much as possible, which is not always the case when the bath is neutral to test paper. The right plan to adopt after neutralizing is to place a slip of darkened paper in the bath, and observe the colour; if it become mealy, add carbonate of soda until the bath tones properly. This will be found a perfect remedy in most cases.—I remain, sir, yours respectfully, James Vincent Maginn.

*Manchester, January 27th*, 1862.

[The subject of mealy toning is so important that every suggestion which promises to get rid of it should receive attension. You are in error, however, in some of your surmises, Acetate of soda is not an alkali; although some samples have a slightly alkaline reaction. The action of the bath upon a piece of blackened paper would not always be a test, as mealiness rarely occurs when the reduction by light has been perfect.

### Methylated Spirit.

Dear Sir,—Will you please reply to the following queries in your column for correspondents:—

1st. Can I rectify a small quantity of spirit (alcohol) in a flask over a lamp, by connecting it with a flask in a receiver?

2nd. Do you find methylated spirit and ether answer in collodion as well as the pure kind?

3rd. I have some methylated alcohol that has been standing in a bottle for some time, and has deposited a quantity of fine muddy-looking precipitate. Is this usual with this kind of alcohol? On adding it to developers that had been previously filtered they become quite clouded. The bottle was new for the purpose, so, I suppose, was clean.

Your kind attention to these questions will oblige—Yours truly, An Old Subscriber.

*January*, 1862.

P.S.—Do you think a good ½-plate Lerebour's Lens would take a carte-de-visite portrait? it is about eight inches focus. Have you any idea what length of room such a lens would require for this purpose? I must apologize for asking so many questions at one time.

[1. By agitating alcohol with quick lime, and then distilling as you propose, you can rectify it; but unless you are familiar with such operations the process is not without danger. A simpler plan is to fill a perfectly clean bladder with the spirit, and suspend it in a warm place. The water will evaporate through the bladder, but not the spirit, and you will thus increase its strength.

2. The use of methylated solvents in collodion is a disputed question. We have used it largely without any evil results. If the most highly rectified samples be used, we believe that no difficulty will be experienced.

3. There should not be any such precipitate as you describe. We have never met with it. The turbidity of the developing solution will generally occur on adding methylated spirit, but no evil result will follow.

4. A good lens by the maker named, and of 8 inches focus, will produce good card pictures, but will probably be slower than a lens made expressly for such a purpose by our best English opticians. A lens of 8 inches *equivalent* focus would probably require a room about 20 ft., or from that to 25 ft., for producing card pictures.—Ed.]

## Talk in the Studio.

The Tannin Process.—We had the pleasure of inspecting, a day or two ago, a series of 10 by 8 stereo prints from tannin negatives, produced by Mr. Hurst, an amateur. Many of these were equal in all photographic qualities to anything we have seen produced in dry plate photography by any process. In some of them, containing white houses, dark foliage, and running water, each was rendered with perfect detail and gradation, free alike from monotony and chalkiness. The negatives themselves have just the desirable colour for satisfactory printing; their density is not obtained by piling on silver until opacity is secured, but by the non-actinic character of the deposit; thereby securing delicacy and crispness. Mr. Hurst always gives his glass a preliminary coat of gelatine. His collodion was a mixture of Powell's and Ponting's; the silver bath slightly acid with acetic acid; the washing conducted by changing the plates to three or four successive dishes of rain water; and the general strength of the tannin solution fifteen grains to the ounce. His golden rule is to give sufficient exposure; the stereo negatives having been exposed for various periods, of from three minutes to twenty; and one of the 10 by 8 negatives was exposed towards the decline of day for a full hour, with a lens of fourteen inches and a quarter inch stop.

Photographic Copyright in France.—The correctional tribunal of Paris has just decided that impressions obtained by means of photography are not to be considered works of art, and susceptible of being pirated, as the proofs given by photography are the result of a mere material operation. The tribunal also founded its judgment on the fact that M. Daguerre had formerly sold his process to the state, which intended that the public should enjoy the full benefit of it.

## To Correspondents.

*** The Fifth Volume (for 1861) of the Photographic News is now ready, neatly bound in cloth, price 15s. Covers for binding each of the Volumes, 1s. 6d. each. Reading Covers, to preserve the Numbers clean, 2s. each.

An Aspirant.—Marine glue is the best cement for fastening a ledge of glass to the bottom of a strip of glass for a dipper. 2. Acetic acid is better generally for an iron developer for negatives than citric acid, because a very small portion of citric acid with iron is apt to retard its action very much, and because the colour it gives inclines to blue, and is not sufficiently non-actinic with a thin negative.

John Crabtree.—Probably you make your developing solution with "hard" water, that is, water containing organic matter, which forms insoluble salts of silver. If the water contain chlorides for instance, or carbonate of lime, these on coming in contact with the silver on the plate, will form chloride or carbonate of silver, and cause the curdy appearance of which you speak We will consider your suggestion. It would doubtless be useful; but it is, we fear, impracticable in a commercial point of view.

Acetate.—See articles on Mealiness in the present number, and the discussion at the North London meeting. 1. The best plan is to keep all your prints of one day in a dark, dry place until you are ready to commence toning; then immerse them in the bath of acetate of soda, after which rinse and tone. 2 It is better to wash with cold water. 3. When a solution of ammonia is used previous to toning, the bath of acetate is not to be used, and *vice versa*.

A. Harding.—You will lose too much light by covering all your glass with white lead and turpentine. Blinds to shut out the sun when necessary, will be better, because you can remove them when the sun is not strong. 2. Gum is not a good substance with which to varnish a photograph, because it will readily absorb damp, and aid in injuring the picture. A suitable varnish, or a slight application of wax, will be better.

F. H. W.—Your slides are very interesting; their chief fault is a little under-exposure. Add a little bromide to your collodion, and develop with iron; you will then obtain more detail and softness, which is very desirable in snow scenes.

Sigma.—For most purposes we think the lenses of the two English opticians you name preferable to others, notwithstanding the higher price. In buying cheaper lenses, you may by chance get good ones, but with these makers you have certainty. 2. We prefer the maker you mark as B. 3. The instantaneous stereo lenses will answer your purpose. 4. Choose A or B decidedly in preference to C. 5. This question is not stated explicitly enough; we do not quite understand what you want. 6 The lenses mentioned by Mr. Hardwich in the passages referred to are the "aplanatic." It is a moot point, both amongst opticians and practical photographers, whether any advantage is gained in that form of single lens over the ordinary achromatic meniscus. We have never used them.

Susanna.—Marine glue is a good cement for fixing the glass in the dark slide for paper negatives. Shellac may be used, but it is not quite so good. A cement made of resin, beeswax, and powdered brick is also useful for such purposes. 2. The mottled discolouration in your print is due to imperfect fixation. The hypo has been too weak or too old, or the print has not been in long enough. The dirty yellow mottling is undissolved hyposulphite of silver, which has decomposed.

A Constant Reader.—To colour the hair in glass positives, powder colour of the right tint must be applied to the lights and half tones. If the picture is to be varnished, apply the colour first, using a tint a little more brilliant than the hair. For instance, for auburn hair, apply orange or "horizon" tint to the lights and half tones; then varnish, and the colour will be subdued to the natural tint.

Argent Nitros Pur.—Of the two landscape lenses named, we should prefer Ross's. You are correct, we believe, in supposing the other to be less perfect in definition The quick-acting lenses of the other maker you name, we know to be good; the larger lenses will do all that the stereo will do quite as well, and its own especial work besides. We believe there never was a better field for really able men in photography than there is at the present time. No better test can be found than the salaries of assistants, and, at the present moment, good operators, are commanding rates of remuneration twice or three times as large as was customary a few years ago.

A.—It is not necessary to wash the print before immersing it in the acetate of soda bath; but it is as well to rinse it before placing it in the toning bath.

M. A.—Your glass shall be examined and reported upon. Regarding collodions, No 1 is very good; for iron development the bromo-iodized samples of either No. 2 or 3 will probably be better suited. It is an error to suppose that the addition of a bromide ever makes a collodion slower. A simply iodized collodion will sometimes produce a picture which, although very much under-exposed, may please an uneducated taste, and so pass. The addition of a bromide to the same collodion would not permit a picture to be produced at all passable without sufficient exposure. These remarks refer to pyro development. With iron development the addition of a bromide, always, in our experience, materially accelerates, and produces more perfect results.

R. T.—A silver bath, which has been used for exciting paper, is altogether unsuitable for producing collodion positives; and it is very improbable that any doctoring would make it fit for that purpose. 2. Whenever carbonate of soda is added to a silver solution until precipitation ensues, it of course weakens the solution, seeing that the precipitate is carbonate of silver. It may be re-dissolved by adding minute doses of nitric acid, until it is just taken up.

A. K.—We are not aware that any work on the Fothergill process in tropical climates has been written by Mr. Tawse. An article on that subject, by that gentleman, appeared in the Society's *Journal* for November, and also on p. 566 of our last volume; but we know of nothing else. Probably, from the mode in which that article commenced, you are regarding it as a review of a work: that we think is a mistake.

R. C. R. B. (India).—Messrs. Le Page and Co. have sent out a large stock of the Photographic News Almanac to their British Library, Calcutta; you will be able therefore to procure a copy. 1. Larger pictures can be used in the reflecting stereoscope than can be used in the lenticular or refracting stereoscope: about whole plate is a good size. The same principles apply in taking the pictures for each. 2. In taking stereoscopic pictures with a single lens camera, it is simply necessary to move the camera a little laterally for the second camera, so as to obtain a view from a slightly different point. A few inches movement is generally sufficient. You can produce pictures for the stereoscope by taking two copies of a single picture. 3. For card portraits any good portrait lens, with sufficiently long focus and flat field to define a standing figure properly, will do. 4. To prepare arrow-root paper dissolve 5 drachms of chloride of sodium and 30 grains of citric acid in 15 ounces of distilled water, with this mix carefully 4 drachms of arrow root, and boil in a glass vessel. Whilst hot apply it evenly with a sponge to fine *Saxe* paper, the sheet being fastened on to a board by the corners. Excite and print as usual. 5. Various articles on the construction of glass houses have appeared in our pages, and another will appear shortly. 6. Sir D. Brewster's work on the stereoscope. 7. Crystal varnish is gum dammar dissolved in benzole, about 30 grains to the ounce. 8. You may copy engravings for your own use; but you must not reproduce copyright pictures for sale.

G. P.—Albumen is a very complex organic compound: its solvent is water and a little alkali, and white of egg is an aqueous solution of it. By evaporating white of egg you will obtain albumen in combination with certain salts. By adding acetic acid to white of egg to neutralize the alkali present, and then adding cold water, you will precipitate the albumen in translucent flocculi; this is tolerably pure, but still contains some earthy and alkaline phosphates. This is not soluble in pure water, but is so in weak saline solutions. When you add 12 grains of salt to the white of an egg, you have not salt in the proportion of 1 to 40 of albumen, but to 40 of albumen solution. What is the exact proportion of pure albumen in white of egg we have not data at hand for stating; but the Abbe Pujo, in stating that the proportion of salt to albumen is as 1 to 3 is manifestly referring to pure albumen, and not to albumen solution; to that, in fact, which forms a compound with silver, the same as the chloride does, and not to the water which is driven off in drying. Your error is in confounding white of egg with albumen; the solution with the solid; in mistaking colloquial phraseology for exact scientific phraseology.

W. May.—Your glass being lighter in some parts than others will account for its not entirely keeping out actinic rays. Use two thicknesses of No. 4, and that will probably answer; two thicknesses of No. 2 would not be efficient with a bromo-iodized collodion Plenty of non-actinic light is always desirable in the dark room. We shall be glad to see a description of your tent.

Exhibitor.—Allotments are now made, and we have reason to believe exclusively to those who have complied with the necessary conditions.

Geo. Smith.—We are obliged by the paragraph and for your kind letter. Such assurances of appreciation make our labours pleasant.

Capt. de Langue, J. Hawke, J. F. Taull, No Chemist, Cymao, W. Werner, Borsen, S. P. E., and several other communications will receive attention in our next.

*** Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Letters intended for the Editor should be addressed expressly to him.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 179.—*February* 7, 1862.



## PROPOSED ADDITIONAL PHOTOGRAPHIC EXHIBITION.

We have pleasure in announcing that it is in contemplation to open a photographic exhibition, independent of, but in no sense in opposition to, that in connection with the International Exhibition. The Committee of the South London Photographic Society have for some time contemplated the propriety of opening an auxiliary exhibition in the course of the coming summer. The circumstance that an amount of space so exceedingly circumscribed has been devoted to photography, at South Kensington, and that there are consequently so many able photographers disappointed in obtaining space, has, however, precipitated this intention, and involved the necessity of immediate action.

Details of arrangement, locality, &c., are at present undecided. For many reasons a central and independent position in the metropolis would have been desirable, and we are able to state that many influential gentlemen have offered to come forward with money, contributions, and effort, to give *eclât* to such an undertaking, and guarantee it from loss. The great difficulty in this respect arises from the fact that every eligible building for such a purpose is already engaged, and it is very doubtful that any suitable room, in a central position, could be obtained. In view of this difficulty, the value of a good position in the Crystal Palace, at Sydenham, has been contemplated, and the committee are already in communication with the authorities of the Crystal Palace Company, endeavouring to make suitable arrangements, and, we believe, with every hope of success.

If the arrangements desired by the committee can be obtained, there can be no doubt of the advantages of a good and distinct position in the Crystal Palace. The number of visitors under ordinary circumstances, when stated in figures, is almost startling, considerably over a million and a half of persons having entered the Palace at Sydenham during last year. In the coming summer it is not improbable but that that number will be doubled or trebled, so that an exhibition of photographs there will secure a publicity far exceeding that of any former exhibition.

The necessity of an auxiliary and independent exhibition is felt on all hands: by persons who have received allotments in the International Exhibition, and by those who have been disappointed. It need not be in any sense regarded as having a hostile spirit to the international undertaking. Every photographer who has prepared photographs for that exhibition, even if he have the opportunity of exhibiting them, will possess duplicates; and those who have been long preparing, and have no opportunity of exhibiting, will find the opening here. This may really be a complete and universal exhibition, for an opportunity can be afforded for hanging in juxta position, admitting of definite comparison, the productions of every nation where the art is practiced throughout the world.

We may add here that some thought had been entertained by gentlemen connected with the parent society of inaugurating a distinct exhibition, seeing that the space at South Kensington was so inadequate to represent the art fairly. When this was mooted, it was intimated on behalf of the South London Society that they would willingly withdraw from their project, if the parent society thought well to carry out an independent undertaking. It was, however, we understand, thought by the council of the latter, that whilst there could be no impropriety in such an auxiliary exhibition, yet it might scarcely be graceful that it should be initiated by them officially. We hope shortly to be able to announce some definite arrangements; as no time should be lost if the exhibition be opened in May next, coincident with the opening of the world's fair at South Kensington.

Whilst on this subject, we may say in answer to a large number of disappointed applicants to Her Majesty's Commissioners, from whom we have received communications, that we understand a further reconsideration of some of the most important application will be made, and any space not occupied, apportioned to those whose requirements have the highest claim to attention. Beyond this there can be no appeal, and those of our correspondents who have sent us letters on the subject, intended for publication, will see the impolicy of occupying space in discussing a question concerning which the decisions cannot be reversed. We remarked in our last that disappointed applicants must await with patience the next chance. We are glad to be able to announce the probability of that chance being so near at hand.

## Notes and Jottings.

### No. 13.

Respecting Preservatives: in Conclusion of Remarks in Jotting No. 12.

Sugar is capable of combining with several bases, thereby generally losing its sweet tase. With chloride of sodium a compound, crystallisable, soluble, and deliquescent, is formed. Cane-sugar here loses one equivalent of water on entering into relationship with the salt, whilst grape-sugar, on the contrary, gains an equivalent. On the latter, however, being heated to about 260°, two equivalents of water are driven off, and the compound then bears the same resemblance to grape, that the first does to cane-sugar.

It will thus be seen that in using sugar and common salt in certain proportions, a distinct chemical substance being formed, it is probable that the effects as a preservative may be different from what we might have expected had we considered the solution in the light of a *mixture* only. We mention this circumstance respecting sugar, not from expectation of the knowledge proving practically of value, but rather because it might be interesting to the reader. Chloride of sodium and sugar, the former in excess, would very likely give much better keeping qualities than sugar alone, but we should be fearful of its crystallizing. Probably the compounds of sugar with baryta, protoxide of lead, &c., would afford subject for interesting experiment.

It may, perhaps, be of service to some of our readers to know that the juice of fruits can be imitated by adding a few drops of lemon juice to a thick boiling solution of common sugar, which immediately becomes limpid, and yields a thick syrup only, on being evaporated. Grape sugar is in fact formed, which, in this state, in presence of an organic acid will not crystallize.

The juices of fruits, and the fermented drinks obtained therefrom, as decoction of malt, malt liquoris, &c., have been, and will doubtless continue to be, brought before us as preservative agents. The principles involved are the same as in the use of honey, although it is evident the presence of other matter, such as organic acids, alcohol, essential oils, mucus, &c., in addition to sugar, have some effect on the results obtained. We do not consider the originally proposed honey by any means the best preservative of this class; and any modification of a distinctive nature will always be welcome. A few numbers back, sherry wine was suggested as containing all the requisites for a preservative. Undoubtedly it does; but we should consider it a waste of good liquor when so many equally effective substitutes are at hand. Besides, it would be likely to get into the head, we fear. Michael Hannaford.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Hyposulphite of Silver.*—In addition to the facts respecting this salt, a few more particulars remain to be mentioned in order to render its description complete. The salt is not easy to prepare, owing to its ready decomposition. It may be obtained in a state of purity by adding a tolerably dilute solution of nitrate of silver to an excess of a strong solution of hyposulphite of soda; a greyish mixture of hyposulphite and sulphide of silver will be precipitated, which must be filtered and well washed with cold water; the mixture is then to be stirred up with dilute ammonia, which dissolves out the hyposulphite of silver and leaves behind the insoluble sulphide. This is to be again filtered, and then the hyposulphite of silver may be precipitated from the ammoniacal solution by exact neutralisation with nitric acid: the precipitate must be rapidly filtered and dried as quickly as possible by pressure between folds of blotting paper. Hyposulphite of silver thus formed is a snow-white powder, slightly soluble in water, and of a very sweet taste; it readily decomposes into sulphuric acid and sulphide or silver:

$$AgOS_2O_2 = AgS + SO_3.$$

When a rather dilute neutral solution of nitrate of silver is gradually poured into dilute hyposulphite of soda, with constant stirring, a white turbidity is at first produced, which, however, disappears immediately. As the nitrate of silver continues to be added, and its quantity in the liquid increases, grey flakes are produced, whilst the supernatant liquid acquires a very sweet taste, owing to the hyposulphite of silver which it has dissolved in it; it is not now precipitable by a chloride, but gives a black precipitate with sulphuretted hydrogen. As the nitrate of silver, which is being added, increases in quantity, the precipitate suddenly turns from grey to brown, and is afterwards converted into black sulphide of silver. At this point the supernatant liquid no longer tastes sweet, and gives a white precipitate with common salt. If the solution of hyposulphite of soda be mixed at once with the exact quantity of nitrate of silver solution necessary to decompose it, the precipitate, which is white at first, soon passes through pale yellow, greenish yellow, yellowish brown, and red brown, into the brown-black colour of sulphide of silver.

Hyposulphite of silver has a great tendency to combine with other hyposulphites forming double salts. They may be formed generally by dissolving in the alkaline hyposulphite, either hyposulphite of silver, oxide of silver, chloride or some oxygen salt of silver. These double salts may then be precipitated from the mixture by means of alcohol, filtered and washed with the latter liquid. As a rule they have a very sweet taste, and are decomposed by a slight elevation of temperature; they must therefore be dried by pressure between blotting paper, and lastly over oil of vitriol in a vacuum. The ammonia salt prepared in this manner has for formula—

$$2(NH_3S_2O_2) + AgOS_2O_2.$$

It crystallizes in six-sided prisms, has a very strong, pure, sweet taste, and is readily soluble in water. Its taste is such as to communicate perceptible sweetness to 32,000 times its own weight of water. When a larger quantity of chloride of silver is added to the aqueous solution of this salt, a white crystalline precipitate is produced, which is quite insoluble in water, and readily decomposed into sulphide of silver. This precipitate contains equal parts of the hyposulphites of silver and ammonia.

The double soda salts are of more importance at present than the ammonia compound. They were briefly referred to in our last article. The following particulars will complete the description. There are two salts of this kind; the most soluble one may be formed by dissolving chloride of silver in hyposulphite of silver until the liquid begins to become turbid by the deposition of the white sparingly soluble salt. Upon filtering and adding alcohol, the double salt is precipitated in the form of a white crystalline powder, which must be quickly filtered and washed till the filtrate contains no chlorine. It must then be dried between blotting-paper and *in vacuo*. The salt has the formula given to it in our last article (two of soda- and one of silver-hyposulphite); it forms silky laminæ united in tufts, which have a very sweet taste. It is not altered by exposure to air or light, but at the boiling point of water it gradually darkens from formation of sulphide of silver; the same change likewise takes place upon continued ebullition of the aqueous solution, the liquid at the same time acquiring an acid reaction from the formation of sulphuric acid. Hydrochloric acid added to the aqueous solution acts slowly on it at the ordinary temperature, forming a black precipitate from which ammonia dissolves chloride of silver. The salt dissolves readily in water and ammonia, and likewise to some extent in warm or dilute alcohol. From its aqueous solution upon evaporation *in vacuo*, crystals are obtained in large plates.

If more chloride of silver be added to the above-mentioned solution of the double hyposulphite, or if the liquid be cooled artificially, the difficultly soluble double salt (equal atoms of soda- and silver-hyposulphite) separates out in small, hard, lustrous crystals. They have a sweet taste, and when heated fuse and turn black, yielding sulphide of silver: when white they are with difficulty soluble in water, but readily so in hyposulphite of soda, forming the soluble salt just described: ammonia likewise dissolves them. After they have commenced to darken by heat or exposure to the air hyposulphite of soda no longer dissolves the crystals. These reactions explain many troublesome phenomena which are noticed during the operation of fixing positives.

*Hyposulphite of Gold and Soda* (*Sel d'or*).—This salt is largely used in the Daguerreotype process as a fixing and gilding agent, and also as a toning salt for positive prints. Its composition is rather curious, as it contains protoxide of gold instead of the ordinary teroxide; its formation is the result of a somewhat complicated reaction, which, however, as it expresses at a glance what would take half a column to describe, we give in chemical symbols:—

$$8(NaOS_2O_2) + AuCl_3 + 4HO = [3(NaOS_2O_2 + AuOS_2O_2 + 4Aq] + 2(NaOS_4O_5) + 3NaCl.$$

The hyposulphite of soda and the chloride of gold must each be dissolved in a very small quantity of water, and the solutions mixed together: upon the addition of alcohol a precipitate is formed consisting of the salt in question, the formula of which is $3(NaOS_2O_2) + AuOS_2O_2 + 4Aq$, whilst tetrathionate of soda and chloride of sodium remain in solution. By redissolving the precipitate in a small quantity of water, and reprecipitating with alcohol, the salt is obtained in a state of purity. It forms colourless needles, having a sweet taste; they are insoluble in strong alcohol, and very easily soluble in water. When quite pure and free from adhering water the crystals contain 37·65 per cent. of metallic gold. When heated in a glass tube the salt first gives off water, then sulphur and sulphurous acid. The water does not go off till the temperature rises to 150°C when the 4 equivalents of water of crystallization are evolved, and the salt is left in the anhydrous state. Upon exposure to the atmosphere for twenty-four hours the dried salt re-absorbs this water, and regains its original composition and properties. When heated suddenly it decomposes, leaving metallic gold and sulphate of soda. Nitric acid attacks it rapidly, forming sulphuric acid: sulphuretted hydrogen, and soluble sulphides precipitate the gold from its solution in the form of a brownish-yellow powder. Tincture of iodine forms no precipitate in a concentrated solution of this salt, but on diluting with a large quantity of water after saturation, pure yellow protiodide of gold is immediately precipitated, iodide of sodium and tetrathronate of soda remaining in the liquid: this proves that all the gold is contained in the salt in the form of protoxide. The presence of gold cannot be detected in the double hyposulphite of gold and soda by any of the ordinary reagents; thus, neither green vitriol, protochloride of tin, nor oxalic acid throw it down. Hydrochloric, dilute sulphuric acid, and vegetable acids added to the solution, neither separate sulphur nor sulphurous acid; nitric acid alone decomposes it at the ordinary temperature. These reactions show that this salt is much more stable than the corresponding silver salts, and not likely to be attended with injurious results, when employed with care, in toning positives, provided other sources of hyposulphite of soda are absent. By the further action of hyposulphite of soda on chloride of gold other products are formed: and amongst the rest, a brown substance soluble in water and insoluble in alcohol. It appears to be richer in gold than the salt above described, and when the chloride of gold is in excess, is resolved into sulphuric acid and metallic gold.

## THE PHOTOGRAPHIC PLANE TABLE OF M. AUGUSTUS CHEVALLIER.

BY LIEUT. PATE.

THE application of photography to topography was pointed out in July, 1839, in the reports made to the Paris Chamber of Deputies, by Arago and Gay Lussac. The merit of inventing a very simple combination which should render this application practicable is due to M. Chevallier, who devoted himself to a task beset with many difficulties, and demanding great sacrifices, with a courage and perseverance sustained by the implicit faith he held to the opinion expressed by the two illustrious academicians.

When, in 1856, M. Chevallier communicated to me his ideas on this subject, he had ascertained—1st, that the photographic image might be very sharp, although taken with a lens in motion; 2nd, that a panorama surrounding an observer may be taken by preserving the azimuth angles. But he wished to obtain his view of the horizon at once, as M. Bardin had long previously done with the ordinary plane-table; to this end, he thought of receiving the image through a very small fixed sector, upon a vertical plate having a rotary motion upon an horizontal axis. M. Chevallier, having constructed his instrument, patented it, the 18th February, 1858, and presented it to the Society for the Encouragement of the Arts, which awarded the inventor its medal.

This apparatus, applicable in the same circumstances as the ordinary camera, resolves, in a new and complete fashion, the problem of the application of photography to topography, by giving at one and the same time the station-point, the azimuths, and the differences of level, so that the picture, without the intervention of any geometric construction, serves at once for the construction of a plan.

When M. Chevallier presented his instrument to the Society, he made known only one mode of operation, that which he termed "the operation with fixed and successive sectors."

*Operation by continuous motion* (*Nadiral.*).—It is not exactly true that the straightened and fixed sector gives a perspective; but let us suppose that the sector straitened indefinitely, the difference between the representation due to the lens, and that which will be due to a perspective upon the same picture, will diminish indefinitely; each of the indefinitely small sectors will be a more and more exact perspective, whatever be the approximation of these sectors to each other.* Therefore, if we gave a continuous horizontal motion to the camera, which imparts to the sensitized plate an identical vertical motion of rotation, the very small sector which replaces the vertical hair of which it has almost the same dimensions, passing before the objects in succession, will give an impression on the plate only successively, so that there will be no fear of superimposed images, as it will reproduce a view of the complete horizon, all the azimuths of which will be equal to those obtained by a thedolite or an exact gonimetric instrument.

*Operation by continuous motion* (*Zenithal.*)—In the preceding operation we have supposed that the centre of the objective corresponded with the inferior radius of the plate; the image is reversed, the sky is carried towards the circumference and the objects near the station towards the centre, so that the latter are excessively diminished in size. A very simple arrangement of the apparatus permits of our avoiding this difficulty; a table with a slide carrying the objective, and in turning it over we place the latter at the height of the middle of the upper radius of the plate, the image still being reversed, the base of an edifice, for example, being uppermost, or towards the circumference, while its summit and the sky will be carried from the side to the centre, all the objects which interest the operator forming, on the plate, a zone surrounding a central circle, which is the picture of the sky; and it is evident that if we have made a complete sweep of the horizon, by a continuous motion, we shall still have a complete representation of the panorama with the conservation of the azimuths.†

*Altitudes.*—By the continuous circular motion of the apparatus, the horizontal point traces a circular image on the plate, which is the curve of the level of all the points situated on the same height as it, and gives a plane of comparison to which we may refer all the other heights.

The height of a signal is known by its distance from the station, and by the tangent of its visual angle. Here the plane constructed gives us the distance, and the relation between the length of the image and the corresponding focal length gives us the tangent, and the calculating rule renders this method very expeditious in practice. Beside, the focal length, invariable for the entire sweep of the horizon, is fixed directly upon the apparatus.‡

Thus it is, in examining the combinations at which M. Chevallier has arrived by a method purely synthetical, that we have been enabled to verify the geometrical accuracy of his results; with the azimuths and the heights above and below a plane of comparison, we obtain the elements of a plan with two sweeps of the horizon taken from the extremities of a base, and when properly oriented, we construct this plan by simple settings off.

*Application and Comparison with the Ordinary Plane Table.*—The first application of this instrument is the same as with the ordinary plane-table when we take sweeps of the horizon from the two extremities of the base, or any number of stations whatever; but in comparing the apparatus of M. Chevallier with the ordinary plane-table, we perceive that it possesses many advantages over the latter.

1st. The errors of aim so frequent when employing the plane-table are no longer to be apprehended, for we obtain every direction around the horizon with complete images of the points situated in these directions.

2nd. With the ordinary plane-table, if we neglect to take an aim in a given direction, the fault cannot be repaired by

* It is scarcely necessary to remark that the distinction will be in the vertical direction.

† We call these two operations *nadiral* and *zenithal*, because the vertical lines *appear* to concur, in the first instance, to the nadir, and in the second, to the zenith of the operator.

‡ Operating by continuous motion destroys the effect of distorted images due to the lenses in the direction of the azimuths, but allows them to remain in the vertical direction. Moreover, the comparison between the image taken in a fixed sector, and the image of the same objects obtained by continuous motion gives an exact and graphic measure of these distortions due to the lens in proportion as they recede from the centres.

This very practical result may be turned to account for measuring the curvature of lenses. When our opticians turn their attention to this question, they will probably obtain marvellous results from it.

returning to the station; here, however, on the contrary, the image gives all the points of the horizon, and we have only to select those which we wish to transfer to the plan.

3rd. A single focus being obtained, the apparatus itself sets up all the bearings, and supplies the data necessary to the calculation of the sides, while with the ordinary plane-table, every point demands two bearings, one of direction, and another of inclination.

4th. If in constructing the design with the bearings there are errors arising from some of them being badly drawn, they are easily remedied by placing the image properly oriented; but with the ordinary plane-table they are irremediable.

5th. We can only have a limited number of bearings on the plane-table without causing confusion; here the image gives distinctly all the bearings of the station possible.

6th. A single negative will furnish as many positive proofs as may be desired; several draughtsmen can prepare the plan at the same time, while the photographer, continuing his operations, will be preparing fresh materials.

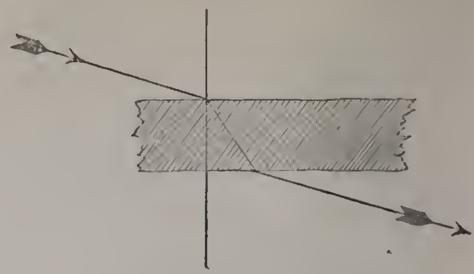
(*To be continued.*)

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

Lecture ii.—Dec. 28, 1861.

The lecturer commenced by making a few experiments with concave and convex mirrors, in continuation of the subject of the first lecture. An ordinary concave mirror being regarded as a small slice cut from a large hollow sphere, the principal focus was shown to be midway between the centre of the sphere of which the mirror is a portion and the surface of the mirror. If an illuminated object be placed between the principal focus and the surface of the concave mirror, the image formed would be *erect* and *magnified*, and would appear as if it were behind the mirror. If, on the other hand, the object were placed between the principal focus and the centre of the sphere of which the mirror is a part, its image would be formed in front of the mirror, and beyond the centre, appearing *inverted* and *magnified*. In the case of the object being placed beyond the centre of the sphere, its image would appear in front of the mirror between the focus and the centre, and would be *inverted* and *diminished*. This is the case observed on looking at the concave surface of a polished silver spoon. In a convex mirror, on the contrary, the image always appears *upright* and *diminished*, as may be seen by looking at the back of a polished silver spoon. These different effects were beautifully illustrated by means of the electric light, images of medals and of the assistant's face being projected on the screen.

The speaker then introduced the special subject of the day's lecture by asking his hearers to imagine rays of light as particles shot off from a luminous body. When these particles strike against an unpolished surface they act like elastic balls shot against a rough wall. If, however, the rays of light, or the elastic balls strike against a perfectly smooth surface they are reflected. Further—if a stone is dropped into water it falls perpendicularly downwards, but if cast from the hand obliquely, its path would not be straight, but bent, owing to the attraction of the earth pulling it down. The lecturer then proceeded to illustrate the behaviour of particles of light when they fell upon a surface of glass. When a ray of light falls perpendicularly downwards on to the surface of any transparent solid or liquid; it goes *straight* into it, but if the ray strike the surface obliquely, it is bent on entering the solid or liquid, in such a direction as to approach a line passing perpendicularly through the medium. A thick plate of glass with parallel sides was employed to illustrate this, and an intense beam of electric light being taken, it was shown that although the ray of light was bent out of its original course upon entering the surface, yet it was bent back again upon quiting the glass, and thus the original direction of the ray was perfectly restored, although it went forwards, not in the same straight line, but in a line parallel to the incident ray, thus:—



This was well illustrated by allowing a ray of electric light to fall on the screen, where it formed a sharply defined point of light. Its position on the screen being marked, it was seen that the introduction of the plate of glass into the path of the rays made no difference when the surface was exactly at right angles to the beam, but if it was inclined on one side or the other, so as to cut the beam obliquely, the dot of light on the screen instantly shifted its position sideways. By projecting the image of an arrow on the screen, and using a narrow bar of glass for this experiment, the centre part of the arrow was caused to move in either direction out of the straight line. This effect of bending the rays of light was called *refraction*.

Instead, now, of taking a piece of glass with parallel sides, the lecturer took a piece shaped like a wedge—a prism, in fact. In this case the bending produced upon entering the glass was no longer undone upon its emerging from the second surface, but was actually increased; so that the beam of light was permanently deflected, and its direction entirely altered after passing through a prism, the ray of light being seen to be jerked up and down by introducing one of these pieces of glass in its course. Owing to the rays of light being bent upon passing obliquely from one medium into another, the bottom of a quiet pool of water always appears shallower than it really is. Hence, also, if a straight stick be thrust obliquely into water, its immersed end would appear higher than it really was, the stick being apparently bent upwards where it quits the water. These different results were clearly illustrated by experiment, and it was explained that the bending of stick must be carefully distinguished from the bending of the rays; they being in opposite directions.

The path of a ray of light through a prism being well understood, it was at once seen that the section of a convex lens was nothing more than two prisms placed base to base, and that of a concave lens two prisms placed edge to edge; the outlines being in each case curved instead of straight. The former, it was evident, would refract the rays of light inwards,—would squeeze the light together and produce a spot of bright light in the middle of its shadow, whilst the latter would scatter the light outwards, forming a luminous rim round it.

It was next explained that all transparent bodies—gases, liquids, and solids, refract light. The quivering observed over a heated surface is due to the refraction of the heated air, as was seen when a hot iron was placed in front of the electric light so that its shadow fell upon the screen. Tubes of hydrogen and of olefiant gas were also placed in front of the light, and their contents allowed to escape into the air. By the different shadows which these gases formed it was easy to perceive that the refracting power of hydrogen was less, and that of olefiant gas greater, than that of air.

Returning again to the subject of lenses, the Professor exhibited the powerful converging action possessed by a large convex lens on the divergent rays of the electric light. The fine divergent cone of rays to be seen issuing from the coke points was converted into a converging cone after passing through the lens, and after coming to a point called the *focus* it diverged again. This was beautifully seen in the rather hazy atmosphere of the room. A screen was then interposed in the path of the rays, and it was seen upon approaching the focus that an image of the coke points could there be seen; the lens, like a skilful architect, actually building up the particles of light like so many bricks into an edifice of exactly the same kind as that from which they issued. The image was, however, rather blurred and indistinct, and the lecturer proceeded to explain the reason of this. By means of diagrams it was shown that a ray of light from the electric light falling upon the centre of the lens would form an image of the coke points at a certain spot in front of it, but that rays falling from the same coke points upon the edge of the lens would not come to a focus at the same spot as the former, but would cross *nearer* the lens; thus, when one set of rays was in focus the others were out of focus, and hence the indistinctness observed. If, however, the circumferential rays were cut off, and only those passing through the centre of the lens used, a beautifully clear and sharp image of the coke points would be produced upon the screen. In this manner the lecturer exhibited to the audience the curious phenomena attending the production of the electric light. The highly magnified image of the coke points being projected on the screen, it was seen, when they were brought near together, how one appeared to devour the other—to eat it up, the substance of the one being heaped up on the other, so as to form one into a point and the other into a crater.

In conclusion, the formation of images by convex lenses was briefly exhibited; medals, &c., being highly illuminated by means of the electric light, their inverted and magnified images were thrown upon the screen in the same way as with the concave mirror exhibited at the commencement of the lecture.

Professor Tyndall said that at the next lecture he should explain the construction of that most beautiful of all optical instruments—that most wonderful collection of lenses in nature—the human eye.

## WET OR DRY COLLODION.

BY THE ABBE' DESPRATZ.

Various Reactions, &c.—Before concluding what remains to be said upon the developing bath, we shall touch very lightly upon what is undoubtedly the most important part in the photographic art, viz.—*luminous influence.* The action of light, although surrounded with mystery hitherto almost impenetrable, very often nevertheless bends itself to the requirements of the photographer, and in this particular *appreciation* bears no inconsiderable part. When a portrait, or even a view it to be taken, the choice of light ought to be determined at once, according both to theory and experience, and the former should be derived from the latter.

As to what especially concerns portraiture, we shall be a little explicit. Here the photographer must be guided by his own taste, if he has any, and will show himself an *artist*, in the true acceptation of that word: but it may be said of the artist as of the poet, *Nascimur poetæ.* Still, upon the occasion of taking a portrait, we may enter into extremely interesting details.

A visit to the operating room of some of those artists who excel in portraiture, would doubtless be worth more than any detailed description of the arrangement of the light, the accessories, the *pose* of the model, and the means of securing an agreeable expression of the features. We smile at the pompous and flowery description of the *mise en scene* which the photographers on the other side of the Atlantic indulge in, with the view of exciting pleasing emotions in the minds of their sitters; but if we do smile, it ought to be in approbation. The portrait photographer has a double *role*; dry and formal as the science from which he derives his most powerful resources. In the operating room he will be cold and precise; out of it, he will display all the amenities of the artist. We need not, however, dwell upon this point, but proceed to the consideration of the luminous influence in connection with portraiture.

All that we have to say on this subject is almost exclusively related to a fact, the existence of which we have fully proved; and the results of which cannot be neglected in practice with impunity. It is this:—a good portrait can never be taken in the open air, even in diffused light. It will generally be more or less spotty, and the half tones will leave much to be desired. In the open air, even with a northern aspect, the light, however much diffused, is never sufficiently so to compensate for the too vivid action of the direct light; or, to speak more correctly, of the light regularly reflected in its plane of incidence. Hence it follows that the least defect of harmony in the various tints of the model is reproduced very forcibly by contrasts more or less harsh, and always very unpleasing to the eye. But it is not so, when instead of operating in the open air, we work in a glass room. Here we find but little direct light; there is only diffused light, and diffused in the strongest acceptation of the word; for the sides of the room which receive the direct light from without, reflect it more or less in every direction, so that the model inundated with a soft light will give a most harmonious image upon the ground glass, where the lights blend with the shades with a grace that can only be found under similar circumstances.

Thus for a portrait, the more the light is reflected in various directions, the more possible it becomes to approach perfection. In this respect, the glass room presents inappreciable advantages, against which its inconveniences are as nothing. But what are theseinconveniences? Do they really exist? It may be said, that with less light than in the open air, the longer the exposure; and this is the strongest objection that can be urged against the glass room. But is this objection even well founded? We think not, and at the risk of appearing paradoxical, we are disposed to say that there is more *truly efficacious* light under a glass roof than there is in the open air. What strengthens our conviction in this particular is the fact that, if we wish to obtain in the open air shades as transparent and broken as those obtained under a glass roof, we must give an exposure quite as long in the one case as in the other; but then all the lights of the open air picture will be solarized, and the portrait be lost.

If reflected light is so efficacious in a glass room, it cannot be the same in the open air. Frequently the reflections from surrounding objects have a mischievous influence. The green reflection from grass and trees is equally injurious. Again, if in the open air, the model is lighted only by a uniform bluish grey sky, without clouds, as very frequently occurs with a north wind in summer, complete success is scarcely possible; most frequently only a cold, flat image will be produced. Under such ungenial atmospheric influences, the glass room would retain almost all its advantages; the numerous reflections developed in its interior would in some measure imprison the light, and at the same time moderate and soften the tone. If to the action of the glass that of reflectors of linen skilfully arranged near the sitter be added, we may understand that in a glass room a good portrait is always possible, whatever be the state of the sky.

But the photographer does not always require portraits, sometimes he desires views. Even for this class of productions, we must also take the preceding considerations into account. It will not, it is true, be possible any longer to modify the luminous action artificially; but even the efficacy of this action may be foreseen, and employed only with discernment. Thus, we should select not only the season, but also the day and the hour. What we have said above respecting the disastrous influence of a bluish grey sky upon a portrait, applies also to the taking of views. If the numerous reflections produced in a glass room are advantageous, the same advantages attends views when fine clouds are moving towards the zenith, or float immovable at the horizon. It may sometimes happen that by atmospheric refraction, the red rays predominate in the transmitted light, especially at morning and evening. It is well known that these rays are but slightly photogenic; therefore, when they prevail, the photographer must wait, or even postpone his operations, until this malignant influence has passed away.

We shall now treat on clouds, and their influence upon the good lighting of a view, and why we cannot always reproduce the clouds themselves; this enquiry will be doubly profitable, and the second question more so than the first.

It unfortunately happens that clouds can be reproduced only under certain exceptional conditions of light. Some preparations of extraordinary sensitiveness may doubtless be employed very advantageously, but we do not think that they are strictly necessary. We know from experience that the clouds can be obtained in the same time as the earth only with a slow collodion, that is to say, *sensitive only to the action of the most efficacious rays*, but we also know that with a suitable lighting and a collodion sufficiently sensitive not to require an exposure of two or three seconds, a landscape may be produced with very distinct clouds.

The following are the conditions of light which have most frequently given us successful pictures:—

Operate an hour before or an hour after mid-day: this is the time when the light has its greatest efficiency; besides, every object receiving light from above, the shadows are inconsiderable. Thus, the earth, in respect to brilliancy, is in the greatest possible harmony with the clouds above it; all objects will, therefore, produce an equal impression in the camera, and nothing will be solarized.

If it be desired to be placed in circumstances still more favourable for obtaining a good view sumultaneously with the earth and clouds. Then the operator should place himself on the shores of a lake or wide river, so as to have the foreground reflect the light much more abundantly than the sky; if mountains fill up the distant horizon, or if the operator is placed at a sufficient elevation to take in a long succession of planes receding to the horizon, as the light of the distant planes is always more efficacious than that of the foreground, we shall necessarily have a plate equally acted upon throughout the whole extent of its surface.

We can say nothing regarding marine views, as we have not experimented upon this class of subjects; but it seems to us that with so harmonious a lighting, the simultaneous reproduction of clouds and water may be accomplished with great facility. This leads us to think that during winter, when the ground is in great part covered with snow, if the sun shines in one part of the sky—the east, for example, and fine clouds appear in the west, generally the earth and the clouds are reproduced with all the harmony desired.

From what is stated above, this fundamental principle may be derived, that to obtain details both in the sky and in the ground of a landscape, we must operate in such conditions that the light be everywhere of equal intensity, or everywhere equally efficacious. This is entirely an elementary principle. In taking a portrait, we only require that the various articles of clothing be nearly the same in a photogenic point of view. Otherwise, the operator will incur the risk of having a spotty picture. The rules we have laid down, although elementary, are none the less of undoubted value, and for this reason we have thought it useful to give all their importance in detail.

## SUGGESTED NEW PRINTING PROCESS.

Dear Sir,—In my last communication I spoke of a "new" printing process, in which I intended to make use of *water* as a fixing agent.

I daresay you are somewhat incredulous as to the possibility of fixing a silver print by means of water simply; indeed, I have considerable doubt whether my theory will stand the test of practice or not.

You will at once judge from the foregoing that I have not tried the fixing powers of simple water; 'tis true I have not: but when I lay my plan before you, you will, I think, agree that my proposition is not altogether unreasonable.

Acetate of silver, as you are aware, is but very sparingly soluble in cold water, but pretty freely so in hot; now I meant to make use of this property of the acetate, in its employment as a sensitive agent for printing.

A formula something like the following might be made use of in salting the paper.

| | |
|---|---|
| Gelatine ... ... ... | ... 20 grains |
| Acetate of potass ... ... | ... 14 ,, |
| Water ... ... ... | ... 1 ounce. |

The solution had better be used warm, as the gelatine is in sufficient proportion to cause coagulation when cold.

The paper is to be floated on the salting bath in the usual manner of salting, and when dry may be made sensitive as a nitrate bath, as follows:—

*Nitrate Bath.*

| | |
|---|---|
| Nitrate of silver ... ... | ... 25 grains |
| Water ... ... ... | ... 1 ounce |
| Acetate of silver ... ... | ... To saturation. |

Filter.

The paper when dry after salting may be floated on this bath for two or three minutes, then dried, and used as in other printing processes.

After the paper has been exposed to light under a negative, it is to be freely washed in boiling distilled water, and the washings are to be repeated till the drainings from the paper produce no trace of precipitate, with a fresh solution of nitrate of silver.

If the washing water be free from chlorides and other salts, producing insoluble precipitates with nitrate of silver, it need not be distilled, but must in every washing be used nearly boiling.

After the hot washings the print should (if the paper has been suitable, and the washing water pure), require no further fixing.

As a substitute for distilled water common water might be used, if freed from chlorides, &c., in the following manner.

To a large quantity of common water add a solution of nitrate of silver till precipitation ceases. Allow the precipitate to settle, and pour off the clean water, which will now very likely contain a trace of free nitrate of silver. In order to get rid of this throw into the water a piece of brightened zinc, and in a few days the water will be freed from nitrate of silver, and may safely be used as washing water in the above process.

It is some months since I found the plan of this process, but have never got time to put it to the test, and as I see little prospect at present of being able to test it for some months to come, I throw out the suggestion that others may act upon it if inclined.

I shall be glad to have your own opinion on the above process, and if you think it is likely to be of any service please give it a place in your paper.—Yours truly,

T. C.

## BENZOLE—ITS NATURE, PROPERTIES, AND USES.

Robert Nichol, in his beautiful poem "Do not Scorn," has taught us a moral lesson in regard to the wrong of despising the meanest of God's creatures; and a far higher teacher of morals—the Saviour—has rebuked the pride of man by placing "the glory of Solomon," in his kingly robes, beneath that of the flower which blooms in the valley. As it is with moral lessons drawn from natural objects, so is it in regard to useful lessons derived from art and science. Perhaps there is not a more fœtid and offensive substances to be found than coal tar, and yet from it we derive some of the most useful, pleasant and beautiful substances adapted to the wants, the pleasures and tastes of refined and common life.

Who would have imagined that this fœtid substance could be made to yield a product which "the fair and the gay" would use as a perfume for the toilet, but it is even so. And from that dirty, black substance, who could have ever imagined that dyes, rivalling the Tyrian purple, the cochineal crimson, and orchillo lilac could be obtained, and yet it is even so. At the present day rich perfumes and brilliant colours are manufactured very extensively, as profitable branches of the arts, from coal tar. But beside these, there are other useful products obtained from the same source, and none more so than the liquid *benzole*. Many persons have heard of it and have wondered what it was —whether solid, liquid, or gas; or whether it grew upon a tree, or came up out of the caves of the earth like petroleum oil.

Benzole was first discovered by Professor Faraday, many years ago, when experimenting with the condensed vapours of oil; but it derived its name afterwards by having been obtained in distilling benzoic acid with lime. Benzoic acid is a product of the odorous gum-resin obtained from the *styrax benzoin* of Sumatra and Borneo. Benzole is a clear colourless liquid of a peculiar ethereal, agreeable odour; it boils at 168° Fah.; its specific gravity is 0·85, and it freezes at 32° Fah., and becomes a white crystalline mass.

When solely obtained from benzoin it was very expensive, but, in experimenting with coal tar, about the year 1847, C. B. Mansfield, of Manchester, found, among several of the oils obtained at different degrees of temperature in distillation, benzole, as the second of six—all of different specific gravities. This discovery led to its becoming comparatively cheap, and from that day to this its application has been extending. It is now manufactured from the naphtha obtained from coal tar, in large quantities, in London, Manchester, Glasgow, and nearly all the large cities in Great Britain. A few years since its manufacture was introduced from London into this section of our country, and is now conducted in North Second Street, in the Eastern District of Brooklyn. Crude naphtha is distilled in an iron still; at a temperature varying from 176° to 194° Fah., benzole passes over and is condensed. It, however, contains some impurities, which are removed by redistillation and washing with dilute sulphuric acid, water, and weak alkali, in succession. A fluid called "benzole" is obtained as one of the products of petroleum oils.

When atmospheric air, slightly warmed, is passed through benzole, it takes up a portion of it, and becomes a vapour of great illuminating power. In 1836 a patent was taken out in England by M. Beel for forcing common air into a reservoir containing benzole, and burning the vapour thus obtained in the same manner as common coal gas. Since that period several apparatuses have been devised for using it. Were it not that it condenses in cold weather and chokes up the pipes, it would be the most convenient known substance for making gas to illuminate large houses, schools, colleges, &c., in the rural districts.

Benzole dissolves resins and fatty substances, and is used for removing tar, resin, and grease spots from light kid gloves and silks. It has been imported from Europe, and sold in small bottles at extravagant prices for such purposes. Since the war commenced, and turpentine has become so high in price, petroleum benzole has been used to a large extent, as a substitute for mixing with paints, and in the making of varnishes. In England it is used for scouring greasy wool in carpet manufactories. As it is a powerful solvent of india-rubber and gutta-percha, it makes with them a very adhesive cement.

By adding benzole cautiously to strong nitric acid, assisted by a gentle heat, a compound is formed in the form of a yellow oil, which, when the mixture is diluted with water, sinks to the bottom of the vessel. This oil has a sweet taste and the odour of bitter almonds, is used in perfumery, and is sold under the name of the oil of bitter almonds.

By combining nitro-benzole with hydrogen, aniline is formed, which is the basis of the beautiful purple and red colours that have lately been introduced into the arts of dyeing and printing. As heretofore manufactured, such colours have been subject to deterioration by fading when exposed to sunlight; but this defect, we have reason to believe, has been surmounted. Several samples of fabrics coloured with aniline products manufactured in France, have lately been furnished us for trial by exposure to solar light, and thus far the test has been favourable.

Benzole is a carbide of hydrogen. It consists of twelve atoms of carbon and six of hydrogen. As a solvent it is nearly similar to ether and alcohol, and it may be used as a substitute for these fluids. Many of the most beneficial improvements that have been made in recent years have been in reclaiming and applying to useful purposes things which were formerly held to be positively useless. This has been the case pre-eminently with such products as benzole.—*Scientific American.*

## HINTS ON PORTRAITURE.

BY JOHN HAWKE.

[We have repeatedly received from Mr. Hawke some of the most perfect card portaits we have seen for delicacy and brilliancy. At our request he has sent us a brief statement of his method for the benefit of our readers. Whilst we always affirm that as much is due to the man as to the method, it is always interesting to know the exact details of a process giving very fine results, as being suggestive of new ideas, or confirmatory of old ones.—Ed.]

Dear Sir,—As you have been pleased with the results of my humble efforts in photography, and have expressed a wish that the method of producing them should be made generally known. I am much gratified in being able, through your useful journal, to add my mite to the stores of practical photography. I have nothing new to tell, my success being the result of careful working, and not of any new discovery. I have no difficulty in obtaining the results that you are already acquainted with. The method is at the service of your readers, and is as follows:—

*The Silver Bath—Recrystallized.*

| | |
|---|---|
| Nitrate of silver ... ... ... | 40 grains |
| Distilled water ... ... ... | 1 ounce |
| Iodide of potassium ... ... | 2 grains. |

Dissolve the silver in 3 or 4 ounces of water in one measure, and the potassium in another, then filter, and add sufficient water to the quantity of silver dissolved to make the bath of the above strength. Slightly acidify with acetic acid.

*The Developer.*

| | |
|---|---|
| Proto-sulphate of Iron ... ... ... | 2 drachms |
| Water ... ... ... ... ... | 8 ounces |
| Best glacial (acetic acid, solid at 50°)... | 1 drachm. |

The iron is dissolved in boiling water, and enough common spirits of wine added to make the solution flow evenly. When cold filter and add the acetic acid.

*The Intensifying Solution.*

| | |
|---|---|
| Pyro-gallic acid ... ... ... | 2 grains |
| Citric acid ... ... ... ... | 1 grain |
| Water... ... ... ... ... | 1 ounce. |

This is for winter. In summer one quarter less of the above quantities of acid will suffice.

*Fixing.*—With a weak solution of cyanine of potassium.

I have tried all sorts of collodion, but at present I am using Huggon and Briggs' quick acting negative 1 part; and Cook's (Hoxton) positive, 2 parts.

*Toning.*—By the usual alkaline gold process. Fixed as usual with hyposulphite of soda. The paper I use is Sanford's thin paper *Saxe*, and the lens one of Dallmeyer's No. 2 B, which I would advise all who can afford it to purchase.

You will perceive that there is nothing in any method but what is for the greater part already known to most of your readers; the difference in result being mainly to be attributed to manipulation, lighting, pose, &c. In the first place, I am extremely careful in cleaning and coating the plate, to obtain a perfectly even and clean surface; should any inequalities or marks appear, I cast the plate on one side. I again always carefully wipe the back of the plate, and place blotting paper to absorb the drainings. In lighting the figure, I am very careful to prevent any harsh contrasts—the cause of failure in so many; the picture often being a mere mass of black and white, the light appearing to come nearly all from the top, forming great deep masses of shadow under the prominent parts of the face. I am careful also to have my background painted perfectly even in distemper, of a warm grey colour, without gloss, as it would be impossible to produce a good picture with a bad background. The background should also be adapted to the age and character of the sitter; for this, a series of painted profiled backgrounds are necessary. The pose is most important; anything common and stereotyped must be avoided; but this must be left in a great measure to the taste of the operator, and the ease of manner of the sitter. I often take three or four portraits of a sitter before I can get one exactly to my mind, so that I am necessarily slow in a certain sense; but I think if any photographer starts with the idea that he will take a certain number of portraits *per diem*, he had better give up the idea of quality, and be satisfied with quantity; for without entering into the question as to whether a photographer be an artist or not—a question arising, in my opinion, simply from the difference in the definition of the word—it is certain that to be a successful photographer, a man must have a great deal of artistic feeling, and the power of close observation.

If these hasty notes will be of any advantage to your readers, they are at their service.

I may as well add that I expose about twice as long as for a positive, and develop fully; that is, while there is any bit of detail to be brought out; there will be no danger of fogging.

## Proceedings of Societies.

### The London Photographic Society.

The annual meeting of the Photographic Society was held on the evening of Tuesday, the 4th instant, at King's College. Sir F. Pollock, the Chief Baron, in the chair.

The minutes of a former meeting having been read and confirmed, the Chairman called attention to some stereoscopic views in Ireland by Mr. Browning, and a large and interesting collection of slides by Capt. Allen Scott, embracing a variety of Indian subjects in poirtraiture and natural scenery. A pair of coloured miniatures, Her Majesty and the late Prince Consort, being Mayall's album portraits, coloured by Madame Mansion were exhibited. A water-tight bath, invented by Dr. Wright was also handed round for inspection.

Dr. Wright, at the invitation of the Chairman, explained the advantages of the contrivance. It was an ordinary gutta-percha bath, with the water-tight cover in the usual form; its peculiar advantages consisted in the mode in which the cover was fastened. Instead of being held by the ordinary clamping screws, each part of which being loose and separate, involved much trouble and attention in travelling, the screws were attached by a hinge to the shoulder on the bath, and when unfastened, hung attached to the sides of the bath. To fix the top, these screws being brought into a perpendicular position, fit into a notch at each end of the cover, and when screwed tight, hold the top firmly in its place. The top was also arranged so that when the bath was standing, it might be used as the oblique support of the bath.

Votes of thanks were passed respectively to the gentlemen who had exhibited the objects named.

The Secretary then read rule 7th, relating to the election of officers, and stated, that as none but those proposed by the council had been nominated, the gentlemen whose names were announced in December were virtually elected, it was a mere form, therefore, to proceed round with the ballot box.

The Chairman remarked that he did not know of any greater improvement in modern times than the omission it was now customary to make of the practice of going through forms which were found to be useless and unneccessary. Speaking as a lawyer, they had in the practice of the law, both in public courts and private suits, amputated every proceeding of mere useless form, such as all those proclamations which used to take up time, without serving any useful or necessary end. The practical question just raised by the Secretary was that it would be simply useless to go round with the ballot-box, without any names from which selection could be made, and when only one result could arise.

The Secretary read the names of the gentlemen who had been proposed in December as officers of the society. Sir F. Pollock for re-election as President, and Mr. Hamilton as treasurer. Mr. F. Bedford as Vice-President, in place of Professor Bell. The retiring members of the council were Messrs. Crace, Maskelyne, Stokes, Delamotte, Bedford, and Dr. Fane; in place of these, Messrs. Vernon Heath, Glaisher, Joubert, H. P. Robinson, Sedgwick, and Dr. Wright, had been proposed, and were now elected by general consent.

The Chairman said he felt very much honoured by their confidence and re-election. He had not been able to be present so often as he could have wished; but when an occasion had come during the past year when it was necessary to make a determined resistance and energetic protest against what had much of the appearance of an insult to photography, he had endeavoured to place at the disposal of the society his time and powers in reasoning, illustrating, and expressing, he believed, the universal sense of every photographer in the kingdom.

The report, which was read by the Secretary, and afterwards adopted by the meeting, presented in many respects a more favourable aspect than that of the last and preceding years. We hope to have space for it *in extenso* in our next. The balance sheet, which we give below, contrasts favourably with that of last year, inasmuch as it shows a slight excess of income over expenditure, instead of as before a deficit.

*Dr.* Income and Expenditure Account. *Cr.*

| Dec. 31, 1861. | | £ s. d. | Dec. 31, 1161. | £ s. d. |
|---|---|---|---|---|
| To Entrance Fees | £25 4 | | By General Expenditure | 276 16 3 |
| To Subscriptions | 258 18 | | By Soirée Account ... | 37 3 4 |
| | | 284 2 0 | By Property Account ... | 19 17 0 |
| To Interest Account ... | | 5 15 3 | Capital Acc. per Balance | |
| To Exhibition Account | | 36 14 5 | Excess of Income over | |
| To Photographic Journal | | 7 6 2 | Expenditure ... | 0 1 3 |
| | | £333 17 10 | | £333 17 10 |

*Dr.* General Balance, Dec. 31, 1861. *Cr.*

| | £ s. d. | | | £ s. d. |
|---|---|---|---|---|
| To Sundry Persons for Balance owing to them | 284 11 6 | By Sundry Persons for Balance owing by them | | 185 6 9 |
| To Capital Account for Balance... ... ... ... | 539 12 2 | By Subscriptns. in arrears, say ... .. ... ... ... | | 100 0 0 |
| | | By Cash Acc., Balance at Bank | £70 7 4 | |
| | | By Interest on Consols ... ... | 5 15 3 | |
| | | | | 76 2 7 |
| | | By 3 per cent. Consols ... ... | 192 14 4 | |
| | | By Property Acc. estimated value | 100 0 0 | |
| | | By Stock of Photographic Journal ... ... ... | 170 0 0 | |
| | | | | 462 14 4 |
| | £824 3 8 | | | £824 3 8 |

The Secretary mentioned as a fact interesting to photographers, that Mr. F. Bedford had been appointed to accompany the Prince of Wales on his tour through the East.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 5th February*, 1862.

M. Oppenheim sets up a claim for the superiority of positives on paper obtained by the negative process. He admits that there is nothing new in the idea of obtaining pictures in this way, but that the method has never become general because the pictures, obtained by processes exactly similar to those intended for negative proofs—the picture being in the substance of the paper—is always deficient in sharpness and vigour on the surface.

Starting with the idea that a positive picture intended to be viewed by reflected light should be on the surface of the paper, he has invented and successfully applied a process which gives excellent results, which may be briefly described as follows.

Serum of milk is prepared by acidifying warmed milk by tartaric acid. It is then filtered, boiled, and clarified with white of egg, and again filtered. To this clarified serum 5 per cent of iodide of potassium is added. On the other hand, albumen is prepared by beating whites of eggs to a froth, then allowed to settle, and mixed with an equal quantity of iodurated serum. The positive paper is floated for half a minute on this liquid, then drained and hung to dry. The paper not only keeps well, but improves by keeping.

It is sensitized by being floated for a minute on nitrate of silver solution of the strength of 5 per cent., without the addition of acetic acid; the sensitized paper is washed in two successive waters, and either hung to dry or dried between sheets of bibulous paper. This washing is performed by floating the paper during a minute upon a dish of distilled water, and, afterwards, during five minutes upon a second dish of water. The first water must be used for not more than three or four sheets of paper. It serves afterwards for developing. The printing is made in the usual manner, but by diffused light only. The time of exposure is from two to ten seconds. The picture should be little or not at all visible on removal from the printing-frame. Develop the picture with gallic acid with a little aceto-nitrate, and suspend the operation as soon as the desired intensity is attained, for it loses very little in strength in the hyposulphite. It is fixed in a solution of hyposulphite, strength 20 per cent., and washed in plenty of water. The picture is then of a fine sepia colour, and may be toned with chloride of gold in the ordinary manner.

The remarkable experiments of Kirchoff and Bunsen upon the spectra of flames coloured by metals have been fully described in your pages. M. Debray has conceived the happy idea of projecting these spectra upon a screen by means of the Drummond light. The combustion of coal-gas sustained by atmospheric air gives too pale a flame when metallic substances are introduced into it to enable us to see the spectra clearly except with the aid of a telescope; but if we take the exceedingly hot jet of oxyhydrogen blow-pipe, coloured by various metals, the splendour it acquires is so brilliant that it becomes very easy to project the spectrum upon a screen, so as to be seen distinctly by an audience. To this end, the flame is introduced into Duboscq's photogenic apparatus, now so generally employed in optical experiments, and proceed precisely as in obtaining the spectrum from an oil-lamp, or from the voltaic arc. We then obtain upon a screen, suitably adjusted, the series of brilliant and vari-coloured rays which characterise the metal introduced into the flame. These experiments are successful not only with the alkaline and earthy alkaline metals, but also with other metals, such as copper and lead, although these bodies give with a gas flame, and the ordinary apparatus only a very confused phenomenon. As platina melts instantaneously in the flame of the blow-pipe, the metallic substance is introduced by means of the small piece of retort coke, or by a match strongly impregnated with the matter to be experimented upon, which will be preferably selected from the metallic chlorides; with a little practice we can sustain the phenomenon long enough to study all its details at a very great distance.

By employing the Drummond light, we can also project the development of the brilliant ray of sodium, as first observed by M. Foucault, by the aid of the electric light. The Drummond light placed in the photogenic apparatus, gives a continuous spectrum, in which a black ray appears in the place occupied by the brilliant ray of sodium in the spectra of the flames containing this metal, upon placing in front of the slide of the apparatus the flame of a lamp fed with alcohol containing chloride of sodium.

The Academy has elected Mr. Lyell, the distinguished geologist, as correspondent in the section of mineralogy and geology. The first scrutiny showed that he had obtained no less than 49 votes, proclaiming an unanimous election. There were eleven other candidates.

Some very extraordinary results have been arrived at by M. Testud de Beauregard in his experiments upon superheated steam. The details would occupy too much space here, but I may mention among numerous other applications of his *steam gas*, desaturated of water and supersaturated with heat, engendered at a very high temperature, such as the production of steam of every degree of temperature with or without pressure; the suppression in blast furnaces of blowers and their motive power; the superabundant and economic generation of pure and of carburetted hydrogen; the suppression of steam chimneys and of the smoke of furnaces; the easier and quicker reduction of a multitude of minerals, and of oils and fats; the distillation of schists; the heating of glass and porcelain furnaces, brick kilns, &c. Such are the inestimables advantantages to industry offered to the civilized world by M. Testud de Beauregard.

The photographic camera has become an indispensable adjunct of the observatory. At Greenwich and Kew in England, at Paris and Marseilles in France, at Greiffwald and Vienna in Germany, at Pulkowa and Wilna in Russia, at Washington in America, and in Italy at Padua, Modena, Milan, Rome, Florence, Turin, Naples, and Palermo, are observers ready to examine, compare, and verify the various mysterious hidden phenomena of light.

Sig. Zantedeschi, of Padua, in examining the spectrum for Frauenhofer's lines, tested the dogma "that the lines of the solar spectrum have changed neither in number nor position since they were laid down by Frauenhofer." But among the experiments conducted during the months of July, August, and September, Sig. Zantedeschi was never able to obtain an identical system of black and luminous lines, although the experiments amounted to nearly a thousand in number. During serene and quiet days only he observed constant systems at intervals of four or five hours. He appeals to experimentalists to test his observations by means of a camera with fixed elements—constant aperture, invariable distance and position of the flint prism of 60°, and permanent distance from the plane of projection, in order, by taking all these precautions, to make sure that the solar spectrum be absolutely fixed. By proceeding in this manner in his experiments, Sig. Zantedeschi was soon convinced that in Frauenhofer's spectrum, both *fixed* lines and *moving* lines exist. The experiments were made agaiust the comparison of Frauenhofer's spectrum given in fig. 5, table II, *Astronomische Abhandingen, heraus. H. C. Schumacher, Altona*, 1832. It is to this fundamental experiment of confrontation that M. Zantedeschi refers to excite the attention of astronomers and physicists who desire to aid in the progress of science.

The mobility of the lines being established, it was a sure index of the influence of the medium through which the solar light passed, and of the variations to which bodies in combustion are subject; this naturally led him to suspect the modifications which occur, not only in the solar photosphere, but also in the whole universe, and he finally concluded that the spectrum is as excellent a photosphere as possible, that it is the faithful mirror which reflects the most delicate images of the incandescent bodies, and the changes to which our planetary system is constantly submitted. Thus the photographic camera is called upon to solve one of the grandest problems of the age, for it will be evident that photographic images of the spectrum, taken at various stations at the same moment of time, must afford positive means of comparison, which will place the question raised by M. Zantedeschi beyond the possibility of doubt.

M. Civiale has presented to our Photographic Society a large number of positives obtained from negatives on paraffine waxed paper, by a process described to you in one of my recent letters. He prepares the paper with a mixture formed of 1 part of wax to four of paraffine; the manipulation is the same as with wax alone, and is also quite as quickly performed. Forty-five hours suffice to prepare 200 sheets 12×16.

Mr. Ross, the optician, has addressed to the Society the following letter respecting Mr. Sutton's panoramic lens:—

"I have read before the Photographic Society of London a note upon the panoramic lens, which will appear in the forthcoming number of the Society's *Journal*. It will, I hope, reach your Society, for I have not time to write another, my regular business, and the construction of various optical instruments, are so pressing that I cannot at present occupy myself further with this subject, I constantly make the panoramic lens, and am prepared to execute orders for it."

At the conclusion of the reading of this letter, M. Girard remarked that the description of the panoramic lens had already been inserted in the Society's *Bulletin*, and all that was necessary to be added was the dimensions and the price of the apparatus.

M. Antony Thouret addressed some further remarks upon the employment of iodine in the silver bath as recommended by the Abbé Laborde ; he says :—

"Since the remarks offered in my name at the last meeting, upon the introduction of iodine into the silver bath as proposed by the Abbé Laborde, I have further experimented upon the subject. As, in the former, I employed a quantity of iodine comparatively large, this time I took only ½ per cent. of iodine. The acid reaction took place as before, but after a much longer time. Next day, at the bottom of the bottle, I could very clearly perceive scales of iodine covered with iodide of silver. I made another essay with iodine in an alcoholic solution, that is to say, in a very divided state, and, as I had anticipated, the reaction was instantaneous and complete.

From these experiments it appears to me to follow that the transformation of iodine into iodide of silver, at the expense of the nitrate bath, and with the production of nitric acid, takes place in every instance, but that the rapidity of this action is in proportion to the quantity of iodine put in immediate contact with the nitrate of silver. It is clear that by putting very little iodine there will be scarcely any more nitric acid liberated than when we make use of a collodion coloured by traces of free iodine. But in all cases it introduces an unknown quantity of nitric acid into the bath. Now, the addition of this reagent must be made with so much delicacy, that it seems preferable to be able to measure it very accurately by employing a very dilute aqueous solution of known strength, and adding it in drops carefully counted."

M. Frank de Villecholles remarked that daily practice verified the explanations given by MM. Girard and Thouret. Every photographer well knows that a silver bath which causes fogging may be brought to a working condition by the addition of a small quantity of nitric or acetic acid. It is probably to the same cause that must be attributed the good effect of the iodine recommended by the Abbé Laborde. He added, that for some years operating in a warm climate, and not then knowing the effects produced on the bath by the addition of acetic acid, he succeeded in an empirical manner, in correcting the fogging which baffled his operations, by diffusing an abundance of acetic acid in his operating-room.

## PRINTING AND TONING.—NEGATIVE VARNISH.

Sir,—I cannot refrain making a few remarks with regard to printing and toning, &c. ; but some of your readers will think I am very extravagant, but I do not consider beauty is found in cheapness, and moreover say that there is quite as many pictures fading for want of soda, as the latter plays a grand part in toning and permanency, and a strong hypo solution will only dissolve all chloride of silver remaining in the paper ; but if any addition of acid be made to the hypo bath a precipitate of sulphur takes place in the paper, and there is no remedy for such prints. For further permanency it might be tried to wash such prints in a solution of spirits of wine, pure, which will only dissolve the sulphur in the paper.

My mode of manipulation in producing prints which you have praised, is as follows : I sensitize the paper on a silver solution from 60 to 80 grains to the ounce of distilled water. I print very deeply ; the prints are then washed in running water until no more precipitate of silver takes place. I tone as follows : in a pint of water—warm water this season is best—2 ounces of carbonate of soda, to which I add 5 grains of chloride of gold to tone about 50 pictures of various sizes. When toned in this preliminary solution well wash again in running water for ten minutes ; this should be conducted in the dark. Then the prints should be taken, one by one, and thrown in the following solution. Having an old hypo toning bath, containing 5 or 6 grains of gold, and strong in hypo, 14 ounces to the quart, would not be too strong. The prints should change colour as soon as immersed in this bath, if that is not the case, a handful of hypo is added, and a few more grains of gold. The prints should remain in this solution until the tone you wish is attained, and lastly fixed in a strong new hypo solution for 15 or 20 minutes. I then keep blotting-paper ready, and every print is blotted both sides and then washed in running water till next morning, and a last washing in warm water and cold again for a few minutes, dried and mounted, &c.

I hereby give you in addition a receipt for negative varnish, which I make without any trouble.

| | |
|---|---|
| White shellac ... ... ... | 40 grains |
| Gum sandrach ... ... ... | ditto |
| Oil of lavender ... ... ... | ½ ounce |
| Spirits of wine, 50 over proof ... | ½ pint. |

Mix and dissolve by gentle heat. This varnish is very bright, and not brittle, and the more exposed to sunlight the harder it will get. It is to be used by turning the plate before and after varnishing.—I am, your's truly,

111, *High Street, Oxford.* W. Werner.

## CARAMEL AS A PRESERVATIVE.

Sir,—I have much pleasure in sending my formula for the caramel Fothergill plates.

The preparation of them is conducted as for Fothergill plates, up to drying them, prior to which, I coat them with caramel solution, of about the colour of dark brown vinegar, and then dry as usual, develop with pyrogallic acid and water, and intensify with the usual solution. In my estimation the alkaline gelatine process is preferable, as it admits of iron development, is more sensitive. and I infer from the materials, possesses good keeping qualities ; but there is no need of any preservative.

Whilst writing, I must refer to Mr. Hannaford's jotting in last paper. I have not claimed any "important principle" in the use of caramel, and how can the sugars he names be *isomeric* with caramel ? when, to his own showing, they contain water in combination, which caramel does not ; it must be remembered that it is in *chemical* combination and cannot be eliminated at the temperature which usually evaporates water. Mr. Hannaford considers the use of sugar in any form as a preservative to be only a modification of Mr. Shadbolt's honey process ; now caramel is *not* sugar, but sugar subjected to a process which alters its constituents, its taste, its appearance, and its photographic properties, or its reaction when applied on a collodion film ; altogether Mr. Hannaford has lucidly demonstrated that caramel is a very different substance to sugar or honey. Allow me to cite a passage from the October number of the *Quarterly Review*, and I think the observance of the rule there laid down will prove very beneficial. "It is now happily a settled axiom that he alone discovers who proves ; and the principle serves not only to adjust the claims of rival discoverers, but to establish a far sounder philosophy of invention than that which places a random, or even an intelligent surmise, on a par with successful demonstration."—I am, sir, yours respectfully, Wm. Bartholomew.

*Fareham, Hants, February 1st*, 1862.

### THE NEW IRON PROCESS—CARAMEL AS A PRESERVATIVE.

Sir,—Nothing can be more satisfactory or more to the honour of Mr. Emerson J. Reynolds than his letter (p. 55) in the Photographic News. The manner in which persons are treated who modify, improve, or make available, or rediscover and apply in new forms, what others have not been able to use, is much to be condemned. They are, as it were, strangers in the Stock Exchange, jostled, pushed, kicked, turned round, the word "new" chalked on their backs, and their hats jammed down over their eyes. This ought not to be. It is bowie knife treatment. The sincerity and good faith of persons who publish, with their names, what they find to be useful to themselves, and which they believe may be useful to others, ought to be assumed. If they fall on an old track, they are entitled to be treated with courtesy and be accepted as friends; if they make a new and good road with old materials, they ought to be equally cheered and well received.

The letter of T. Sebastian Davis (p. 59) is most courteously written. I think the film of caramel is a preservative, and that its merit is, that it is a very slight film. I cannot think it has an acceleratory effect; but I think, as a film, it would be improved by a small addition of gallic or formic acid, provided the sensitized plate is well washed.

Much is said about the film of plates slipping, and it is an awful disappointment when it occurs. If you gelatinize or albumenize the surface of the glass, you subject yourself to numerous probable defects in a picture if any dust catches the plate. If, however, a thin edge of the albumen is passed along the edge of a plate, it will be found that collodion so adheres to it that you may give a plate any amount of washing without fear of the film slipping in its development; but this is not "new" though it deserves repetition in dealing with large plates. T. F.

[We think our correspondent somewhat exaggerates, or rather misappreciates the intentions of those gentlemen to whom he refers. No one can more strongly deprecate than ourselves discourtesy of language, or the tendency to put down novel suggestions which we have occasionally seen manifested. We have studiously endeavoured to eliminate from the pages of the Photographic News anything which could be repressive or uncourteous. But whilst avoiding this we must also avoid interfering unduly with the freedom of discussion. The great advancement of photography is largely due to the ready and unreserved publication which has generally been liberally made of every new or good idea; but is also largely due to the jealousy with which the landmarks of ascertained theory or fact have been guarded from the more indefinite domain of suggestion or conjecture. The maxim "prove all things; hold fast that which is good," is not less true in science than in theology. "Progression by antagonism" is one of the recognized laws of the universe. We are always glad to receive every communication and suggestion from our correspondents, at the same time we endeavour to exercise a judicious selection as to what should be published, only allowing such matters to come before our readers as we conceive possess sufficient interest. And we would urge upon all correspondents and readers to write and read in a good spirit, never attributing a bad motive when a good one is equally applicable.—Ed.]

### ALKALINE DRY PROCESS.

Dear Sir,—Struck with the suggestion of Mr. William Bartholomew, that in a dry process we require freedom from nitrate of silver, *alkaline reaction, and organic matter*, I prepared a plate with collodion containing 1 grain of gum guaicum to the ounce, and 4 drops of a five-grain alcoholic solution of *glycyrhizine*, sensitized and washed, first with distilled and then with common water. I then placed it in a bath containing 5 grains each of carbonate of soda and chloride of ammonia; washed well, dried and exposed for a very little longer than I should have done for a wet plate, and developed with 2 grains of pyrogallic acid to the ounce of water, without nitrate of silver or any retarding agent; as the image was, of course, very thin and phantom like, I intensified in the usual manner with pyro and silver. The resulting negative was quite long enough exposed, full of detail, and very free from stains, fogging, &c.

You will notice that my formula differs in three essential points from Mr. Bartholomew's; the use of a resin in the collodion, to which the organic matter is added, and washing after the application of the alkali.

In preparing some plates by his method, which he gave in the number for January 3, 1862, I found, after drying, that the lower part of the plate was covered with minute crystals of the carbonate, which produced spots upon the negative. I got rid of this annoyance by applying the alkali, and then washing before coating with gelatine; but this makes the formula rather more troublesome, and more prone to fogging, &c., than the one I have proposed. As we shall, I hope, soon have better light than at present, I shall defer further experiments until I can better test the relative sensitiveness. The results of which I will let you know. As I am sure that experiments in this direction will not prove useless, any of your readers who turn their attention to the new idea of Mr. Bartholomew will not think their time thrown away.

I did not intend to trouble you with so long a letter, but the importance of the subject must be my excuse.—I am, yours respectfully, H. Cooper, Jun.

5, *Aberdeen Park, February* 1, 1862.

## Photographic Notes and Queries.

Composition or Art Photographs.—Backgrounds to Groups or Figures.—Stereograms from Flat Surfaces, &c.

Sir,—I have long thought that the system pursued for the production of art photographs from several negatives (so artistically described by Rejlander, and followed by Robinson and others), was not only imperfect, but troublesome and expensive, as, notwithstanding the care and skill bestowed upon the printing, the joinings in many cases were apparent, and the effect produced upon the eye unpleasant and hard, the figures in many cases appearing to sink into the background, instead of standing out in relief. Not being much addicted to appearing in print, and supposing that the idea must have occurred to many others, I deferred wrinting, expecting it would have been brought forward by an abler pen. The proposition I have to make is, that the artist having made his sketch, and having the idea of the future picture fully in his mind, proceeds as described by Mr. Rejlander to obtain his negatives of the various groups, figures, &c., required, on as large a scale as possible. Perfect prints from these are now taken on paper, toned, and pressed. Each group, &c., is then carefully cut from its background, stiffened at the back so as to stand upright, and the whole arranged on a board or flat surface so as to form the picture required, in the same manner, in fact, as the figures and scenes are arranged in a boy's theatre, all with the proper distances and relief. The copying camera is now brought to bear upon the whole, and the arrangements perfected until the picture seen upon the ground glass is satisfactory to the artist's eye. A negative is then taken of the whole. Accidental lights and shades may be thrown upon the picture; natural skies and other artistic effects produced.

In the same manner, backgrounds to portraits, figures, and groups may be added;—figures introduced into landscapes, and many groups of figures may be formed into one picture.

In the same manner also stereograms from flat surfaces can be taken. A large negative is reproduced from the original picture, a print taken therefrom, the different portions cut out and arranged as before described, and a binocular negative produced. Boisen.

[There would be many objections to your plan. The inferiority of any reproduction, from a variety of causes, would be fatal.—Ed.]

Varnishing Negatives.

Dear Sir,—You have several times explained the necessity of varnishing negatives with spirit varnish, but all the spirit varnishes that I have used not only partially dissolve the film, but wash a part of the silver off tho high lights on to the shadows, giving them the appearanco of ground-glass. As a preservative, I varnish first with positive varnish (I use Whitaker's) and then the spirit varnish. By this process the intensity is not altered, and the shadows preserved as clean as when wet. If you consider this note worthy of insertion you will obligo yours truly, R. H.

## Talk in the Studio.

The Prince of Wales and Photography.—We have much pleasure in announcing tho first public act which illustrates that the heir to England's throne takes as deep an interest in photography as his late royal father. In tho Eastern tour, which he is about to tako in as private a manner as possible, accompanied by a very limited suite, eight gentlemen only accompanying, Mr. Francis Bedford, photographer, forms one of that eight. A complete equipment for photographic operations will be taken so as to secure, under tho best possible conditions, photographic mementoes of a journey through scenes so fraught with historic aud sacred associations. Mr. Bedford has, we believe, received permission to publish the series of photographs, when, after their completion, the requirements of Her Majesty aro supplied. The 13th instant is fixed for the Prince leaviug England.

The Photographic Society.—The Annual Soiréo of the Photographic Society will be held in the Great Hall at King's College, on tho 25th of April next. It has been suggested that it would have been desirable to hold it a month later, to admit of the opportunity of a re-union of Continental and English photographers, as many foreign artists will doubtless be present at the Exhibition. The evening appointed is, however, the only occasion upon which the hall is at liberty. It is not impossiblo that many foreiguers who may be iuterested in being present will be in England a few days before the opening of the International Exhibition.

Bromides in Instantaneous Collodion.—At the recent meeting of the French Photographic Society, Major Webster Gordon, whose instantaneous and other pictures excited so much admiration iu the Paris Exhibition, presented some iustantaneous pictures to the society. In a letter which accompanied the prints he stated that the point of especial interest connected with them, was the unusually large proportion of bromide iu the collodion, which contained equal parts of bromide and iodide of cadmium. The negatives were developed with pyrogallic acid, with which developer somo authorities have regarded bromides as rendering the collodion slow. Major Gordon, however, secures instantaneous pictures by their use.

Egypt in the Stereoscope.—Mr. Bonomi has arranged a hundred stereoscopic views in Egypt, taken by Mr. Frith in 1859 and 1860, into a volume, which Messrs. Smith and Elder have published. Our readers know the very high interest and all but perfect beauty of Mr. Frith's Egyptian views, a great number of which are already familiar in the stereoscopic form to lovers of Oriental scenery and ancient art. Mr. Bonomi has supplied the letter-press, and Mr. Samuel Sharpe added a few notes.—*Athenæum.*

South London Photographic Society.—The usual monthly meeting will be held at Sussex Hall, Leadenhall Street, on Thursday evening next, when Mr. Sebastian Davis will read a paper on the "Mauufacture of Collodiou."

## To Correspondents.

⁂ To Advertisers.—Tho unusual press upon our advertising columns this week compels us to omit mauy advertisements.

Henry Hele, referring to our remarks on toning after fixing, where we remark that in such case "much of the toning is probably due to sulphur," asks where the sulphur is to come from if the hyposulphite have been carefully removed from the print by washing, prior to its immersion in the toning bath. Our remark was founded on the fact that in the majority of the methods proposed for toning after fixation, a mixed bath of hyposulphite of soda and gold is recommended, and that where the simple gold bath is used, the print is often immersed before the hyposulphite of soda is entirely removed from the priut by complete washing. If all traces of hypo be removed, there will not, of course, be any risk of sulphur. The only difficulties then existing will be tardiness in toning and troublesome multiplicity of processes, as the print must be submitted to two thorough washings instead of one. Our meaning in stating that sulphur is not so discriminating in its action as gold, was simply this: toning by gold is regulated carefully by the surface of silver; a particle of reduced albuminate of silver is toned a purple brown, when a particle of reduced chloride by its side would be toned blue black. Whereas in sulphur toning, the effect being produced by the decomposition of hyposulphite of silver throughout the print, the distinction between the organic and inorganic salt of silver does not become apparent in the tone. It is a moot point whether acetic or nitric acid should be added to the silver bath for printing. We prefer a little of the latter, as the paper keeps better without discolouration after sensitizing, and we think the prints are more brilliant.

A Constant Reader.—No. 76 of the Photographic News will not be reprinted at present.

C. A. R.—Marine glue is a better cement for glass than Canada balsam in making a bath. 2. The yellow stains in your print are due to imperfect fixation. It has not remained long enough in the hypo, or the solution has been too weak. A print on *Saxe* paper would fix in a much shorter time, because being of a softer texture it is more easily permeated by the solution *Rive* paper is horny, and requires a longer time to be permeated by the solution.

Clifton.—The quantity of oxide of silver necessary to neutralize a nitrate bath, will depend entirely on the quantity of free acid. There is no danger of adding too much, as any excess will be removed on filtering. The case which you describe of adding a large quantity, which remained in excess whilst the solution turned litmus paper red, arises probably from the fact that the oxide had been made some time and stood in the light. In that case it is much more tardily acted on by the nitric acid. Make a little fresh and use it when made. 2. The pictures called *alabastrine*, when properly produced, we believe to be permanent. We have some before us now, which have been done four or five years, and are unchanged. Much depends on allowing the solution to act upon them for a sufficiently long time. 3. Craping of the film in drying generally proceeds from the presence of too much water. It may be that the collodion is made with too weak solvents. In that case the remedy is a better sample. A very common cause is immersing the plate in the nitrate bath before the film has thoroughly set; care in this respect will often remove the evil.

T. P. E.—The residue which does not dissolve in your solution of gold, is probably silver, which is converted into a chloride by the hydrochloric acid. The quantity of protosulphate of iron is immaterial so long as there is sufficient to precipitate the gold; to ascertain which, after adding what you believe to be sufficient, let the solution stand until it is clear, and then decant the supernatant liquid, and add more iron to it. If all the gold be thrown down there will be no turbidity, but if any gold still be present in the solution it will be thrown down as before. The amount of dilution in the first place, the amount of iron in the second, and the amount of acid in the third, are all comparatively unimportant, so long as they each do their work, after which they are removed. After first dissolving the gold, dilute well: then take care to precipitate it all. Now wash the precipitate to remove any iron; then redissolve and afterwards evaporate the acids. There may be gold in your old hypo bath; but it is doubtful whether it is worth the trouble of recovery. We can only explain the anomaly in the registration of your hydrometer by supposing it is incorrectly graduated.

Exhibitor, G. H., J. T., Solar, F. S., N. C., Apparatus, A Disappointed Applicant, A. C., W. A. H., and other correspondents, are referred to the first article in the present number.

J. Lea.—Consult the recent articles on mealiness, which have appeared in our columns. The specimen sent is a virulent case of that evil. 2. An article on varnishes for prints in our next. 3. We believe both the collodions you name are good, but we cannot say which is best.

R. J. D.—More light on the face would probably be better, but the image is too feeble altogether. Intensifying *does* alter the relative degrees of light. It increases the light, and leaves the deep shadows in their original condition. A collodion giving a little intensity to begin with, would probably be better.

C. J. P.—We have seen very good results produced by the single lenses of both the makers you name; they are each, we should say, equally good.

S. Hill.—There is not, that we are aware of, any book giving instructions for using the photogen. A paper descriptive of the operations is supplied, we believe, with the instrument. The dealer in second-hand apparatus you name is a respectable man. Second-hand articles will be, of course, of all qualities.

Vortex.—If you place the painting in such a position that it gives a perfect image on the ground-glass without false reflections, you ought to be able to produce a picture without fogging. Probably it is a question of exposure. Take care to give long enough, and use a weak iron developer, with plenty of acetic acid. Sometimes inclining the top of the painting a little forward, taking care to keep the camera parallel to it, is useful in avoiding these reflections.

E. E. L., William Clark, W. H. Bolton, John Hollingsworth, Tom Gardner, W. W., J. B. Y., Jacobus, J. F. Ward, A. L. H., James Caldwell, Toby's Ghost, and several other correspondents in our next.

No Chemist.—Crystals of chloride of barium, as sold in the shops, contain Ba Cl × 2 HO = 122. The two equivalents of water may be driven off by heat, when the formula becomes Ba Cl = 104, or *anhydrous* chloride of barium. The chlorides of ammonium, potassium, and sodium, do not contain water of crystallization, their equivalent weights are, therefore, 54, 76, and 60, respectively. Hence in

54 grains of chloride of ammonium,
60 ,, ,, sodium,
76 ,, ,, potassium, or
122 ,, ,, barium, (crystals,)

will be 36 grains of chlorine, which combine with 108 grains of metallic silver, or 170 grains of nitrate of silver, to form 144 grains of chloride of silver. If, therefore, 10 grains of chloride of sodium to the ounce in albumenized paper be taken as a base for comparison, we find that in substituting the other salts, we should have to employ 9 grains of chloride of ammonium, 12⅔ grains of chloride of potassium, or 20⅓ grains of chloride of barium In this calculation, you will perceive that the anhydrous chloride of barium is omitted, as the crystallized salt is that invariably used. Whenever a salt contains water of crystallization, such must of course be taken into account on calculating the equivalent weight.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32, Paternoster Row, London.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 180.—February 14, 1862.

## THE PROJECTED ADDITIONAL PHOTOGRAPHIC EXHIBITION.

The negotiations for holding a photographic exhibition in connection with the South London Photographic Society, to which we referred in our last, are in progress with every probability of a satisfactory and successful termination, under conditions most favourable to photographers. It is hoped that facilities will be secured for the exhibition of new appaiatus and inventions in connection with the art, which will be satisfactory to many houses who have failed to secure allotments at South Kensington. If the arrangements terminate as successfully as we have reason to hope, the causes for regret arising out of the inadequate representation of photography at the International Exhibition during the coming summer will be deprived of very much of its force. We hope shortly to be able to announce full particulars.

## Scientific Gossip.

Preparation of Pure Nitrate of Silver—Properties of the Pure Salt—Not Alkaline, as usually reported, but Neutral—Solution under Pressure.

We have considered it of interest occasionally to lay before our readers in these columns short abstracts of what has lately been done by the Belgian chemist, M. Stas, in his researches on the atomic weight of silver, and its compounds. Perhaps amongst all these facts, the most interesting and important (to us) are those which relate to nitrate of silver; we will therefore follow up our previous articles on the subject by condensing from the voluminous memoir before us a few particulars respecting the formation, purification, composition, and properties of this salt. The most advisable way to prepare nitrate of silver was ascertained by M. Stas to be to dissolve the pure metal in an excess of nitric acid in a Bohemian glass flask, to the neck of which was attached an arrangement of tube, and bulbs containing liquid so as to prevent silver being carried away by the evolved nitrous gas. The silver being dissolved, which requires from twenty-four to forty-eight hours, according to the quantity of the metal employed, (M. Stas worked upon from 100 to 200 grammes of silver at a time,) the flask is inclined, and a receiver attached to the neck. The liquid is then carefully evaporated to dryness; the temperature being raised near, but not quite, to the boiling point; this takes from forty-eight to seventy-two hours. After the evaporation of the liquid, the temperature of the dry nitrate is raised to its fusing point, and kept there until it is of a constant weight. To hasten its drying, and especially to drive away the last traces of nitric acid which the salt retains, there is passed through the vessel a current of air, which has been first deprived of organic matter by being passed through a red hot glass tube containing tarnished copper (which yields its oxygen to the carbon and hydrogen of the organic matter), and then through tubes containing dried chloride of calcium to remove the moisture. These precautions were necessary, since it was found that the air of the laboratory, or even the external air simply filtered through cotton and then dried, slowly but continuously reduces nitrate of silver heated to its fusing point, and still more quickly when fused, with elimination of nitric acid. When it is found that the weight of the dried salt is perfectly constant, the temperature is again increased, so as to fuse it, and it is then kept in fusion in a current of air deprived of organic matter and water until its weight becomes absolutely constant. M. Stas states that in many experiments he has kept nearly 500 grammes of nitrate of silver in a fused state, from eight in the morning till ten at night without in the least diminishing its weight.

Whenever purified air was made use of in any of these experiments, the nitrate of silver obtained was perfectly colourless in the fused state, and after solidification was of a pearly white colour, with a radiating fracture. It was found to be very slightly hygroscopic after fusion; a property which the crystallized salt does not appear to possess, *and was always neutral to test paper.* This is a very important observation, as it is in opposition to statements which have frequently been made by photographic authorities when writing on this subject. Thus, Hardwich in his "Photographic Chemistry" says, that the aqueous solution does not redden blue litmus paper; on the contrary, the pure recrystallized and dried nitrate of silver restores the blue colour of paper previously reddened. This statement has been repeatedly made and copied into other works. It is probable that the slight decomposition which M. Stas mentions as always taking place when nitrate of silver is prepared in contact with air not previously purified, and which consists in the decomposition and removal of nitric acid, and the separation of metallic silver or its oxide as a black powder, may be the cause of this alkaline reaction. It is not yet definitely settled whether the black deposit is silver or oxide of silver, but in either case it might give rise to an alkaline reaction. Supposing it to be the metal, it is known that when finely divided metallic silver is boiled with nitrate of silver in solution, it is dissolved with evolution of nitric oxide forming a light yellow liquid, containing basic nitrite of silver, which has an alkaline reaction. If on the other hand it be the oxide of silver, it is equally certain that this would dissolve in the nitrate of silver solution, and give it an alkaline reaction. In either case then, nitrate of silver made in the way universally adopted, would, even if all the usual precautions were taken, be liable to communicate a blue colour to reddened litmus paper. This, however, after the experience of M. Stas, does not prove that pure nitrate of silver has an alkaline reaction, but merely shows that the specimen, upon the examination of whose property this character has been ascribed to it, was not absolutely pure.

To return to the properties of the pure nitrate. The crystallized salt when dried in a current of air at its fusing point, still loses weight when it is actually fused. The loss is however very trifling. Pure crystallized nitrate of silver kept for six months under a bell-jar in an atmosphere artificially dried with concentrated sulphuric acid, lost in an experiment tried on a tolerably large scale, one four-thousandth of its weight upon fusion. This salt which would be considered by all chemists as anhydrous, loses therefore three times as much water as the salt obtained by direct synthesis and dried at its fusing point. It appears probable, however, that all the loss experienced by the crystallized salt upon fusion should not be attributed to the disengagement of water; it may possibly be that the air, condensed by the surfaces of the small crystalline plates, has something to do with it.

The nitrate of silver was not in every case prepared in the manner described above. It was found that there is a slight loss of silver when the metal is dissolved in nitric acid in the ordinary way. The following modifications were therefore introduced into the mode of operating. The silver was introduced into a white glass flask, with the stopper well ground in with emery, and having very thick sides, so as to enable it to withstand an internal pressure of at least ten atmospheres. On this metal was poured about ten times its weight of pure strong nitric acid. The stopper was put in, and fastened strongly in its place with thick cord. The flask was then closely surrounded with thick wire gauze, and placed in a bath where the temperature could be raised to 45° to 50° C. At the end of twenty-four or thirty-six hours, all the silver is dissolved quietly, like sugar would dissolve in water, without a trace of gas developing itself, and without anything escaping from the flask. Indeed, the binoxide of nitrogen as fast as produced reduces the nitric acid into the state of nitrous or hyponitrous acids, which at this temperature remain perfectly dissolved in the large excess of nitric acid employed. If the temperature of the bath does not exceed 50°, there is really nothing to fear; indeed, M. Stas states that he has made under these conditions, and without any accident taking place, upwards of a hundred solutions of silver in a closed flask, employing from three to fifty grammes of silver at a time. Twice only, the temperature of the bath rising much too high, did two flasks, which were immersed in it, yield to the internal pressure, and produced a rather violent explosion.

It is probable that this process of dissolving silver in nitric acid could be advantageously employed on a large scale in manufacturing the salt for commercial purposes. There is an appreciable quantity of silver carried off by the gas and acid vapours evolved when the metal is dissolved in nitric acid in the ordinary way, and this, when we take into consideration the large scale upon which manufacturing operations are conducted, would in time amount to a considerable quantity. Dissolving the metal in closed vessels would entirely obviate all danger of loss from this cause, and would likewise be of use in another way. Whilst the metal is being dissolved with free exposure to the air, there is always the danger of—nay, the impossibilty of avoiding—the absorption of floating atmospheric organic matter in the acid; but when the solution is effected in a closed vessel, there is a chance of the nitrate being less contaminated, inasmuch as the most critical part of the operation has been performed out of contact with the air.

We have to report upon three samples of illuminating media for the dark room. One is a brown glass of a rather dark colour, sent by M. A. It cuts off all the active rays, except a trace of the upper green and lower blue. In a dark situation, and with an iodised collodion, it would answer very well, but would not be safe to use under all circumstances. M. A. also sends a piece of varnished yellow muslin. This is worthless, the blue rays coming through in quantity.

W. L. likewise sends a piece of calico prepared with four coats of glue and $\frac{2}{3}$-grain of nitrate of silver to the ounce of solution. This is far inferior both in appearance and absorptive properties to those we recently reported on. It allows abundance of active rays to pass through, and an attentive examination with the naked eye shows that it is covered with minute holes admitting white light. It is, therefore, quite unfitted for the purpose for which it is intended.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

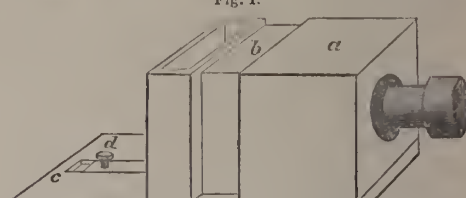
CAMERAS.—*Continued.*

*The Studio Camera.*—The office of a camera is extremely simple. It is to support the lens and the sensitive plate, at a proper distance apart, in such a manner that no ray of light shall shine upon the prepared surface of the latter, excepting those passing *directly* through the former.

The studio camera consists of the body, generally formed in two parts, called the outer and the inner body; the focussing-screen, and the plate-holder or slide.

*The Camera Body.*—It has been remarked above, under the head of *lenses*, that a double-bodied camera is to be preferred for portraiture, the focal distance being adjusted by sliding one body within the other. The ordinary form of camera is not very conveniently arranged for this purpose. The outer body, *a*, (fig. 1) carries the lens, and is fixed on to the table or base. The inner body, *b*, sliding upon this table carries the plate-slide. In the slot *c*, in the table,

Fig. 1.

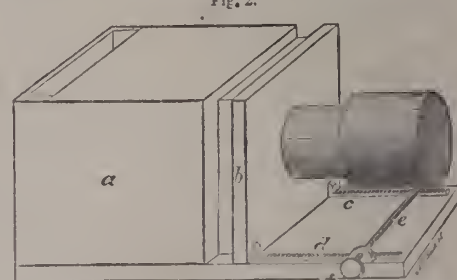



runs a metal rod attached to the inner body, which serves more or less to preserve the parallelism of its motion, and, by means of a screw, *d*, and a nut underneath the table, can be clamped tight, retaining the sliding body in any required position.

Thus, the only means of obtaing a correct focus of an object with this camera is to take hold of the projecting portion of the inner body with both hands, and push it inwards or pull it outwards, as the case may require; and when the desired position is attained clamp it with the screw. This is so inconvenient in practice that it has almost necessitated the use of a lens having a rack and pinion, with which the exact focus is ascertained, after having obtained it approximately by moving the body.

I lately suggested to one of our first opticians a movement for the sliding body, and an arrangement of the parts, which he at once adapted to all his cameras; and I perceive that many houses are already beginning to adopt the same design, which I will describe, as I believe it is a considerable improvement upon the old form, which I have just given.

Fig. 2.




In this camera the body, *a*, (fig. 2) fixed to the table, carries the plate-holder, and the moveable body, *b*, carries the lens. To the bottom of the front of the moveable body, *b*, are screwed two racks, *c* and *d*, one at each side and within half an inch of the edge. These racks, parallel to each other, lie upon the table of the camera, and both work in one pinion, *e*, terminating in a milled head, *f*. By turning the milled head the sliding body is moved backwards and forwards smoothly, and the parallelism of the motion is assured with a certainty which could not well be attained in any other way. This quality is especially valuable for binocular stereoscope cameras, or for carte de visite cameras in which two or more lenses are used simultaneously.

Another advantage possessed by this form of camera is that the plate-holder is in that portion of it which is fixed

* Continued from page 53.

to the table, and, therefore, there is no chance of disturbing the focus by putting it in or taking it out, which, if the body be not well clamped down, sometimes occurs with the ordinary camera.

The addition of the racks and pinion, of course add a little to the expense of the camera, but they replace the guide bar, clamp, and screw of the old system which diminishes this extra cost. In any case this form is not so expensive as the rack and pinion adjustment to one lens, it is more practically efficient, and one camera so fitted will serve for all lenses, which may be mounted in a simple rigid tube. To the purchaser of the complete apparatus consisting of camera and lens, this form would be cheaper than the usual design of camera with a lens having a rack and pinion motion.

The endless screw movement for advancing the inner body, or for any purpose of focussing is open to objection. The movement is too slow, and the eye has great difficulty in appreciating the exact value of the gradually changing image on the screen. The precise point of focus is mostly estimated by *contrast* with positions a little on either side which appear less perfect; but if this contrast is brought about very gradually the power of appreciation is less sensitive. Those who are accustomed to use the microscope well know how difficult it is to get the exact focus with the fine adjustment.

The inside body of the camera is always made to enter flush into the outer body, depending upon the exactness of the fitting to exclude all light, as shown in the section, (fig. 3). This is a fault, for two wooden surfaces cannot well make a light tight joint, unless they are kept by pressure in intimate contact. This is the cause of much inconvenience; of light getting into the camera, or of the bodies not working smoothly one in the other. The former is the more common consequence, but it is the most difficult to detect, and to remedy.

The danger of light entering the camera becomes greater as the inner body is more pulled out, and it is never safe

Fig. 3.

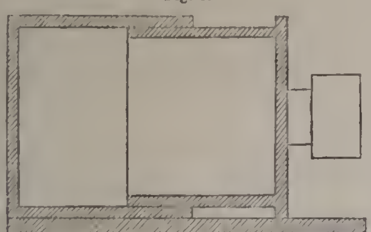
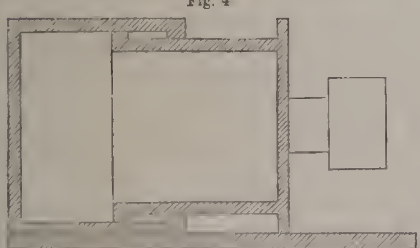


Fig. 4



to employ to the utmost the powers of extension. A piece of cloth or velvet is sometimes placed upon one or both of the surfaces to make the joint more light tight, but this produces as great an evil as the one it is intended to correct, the friction soon partially wears these substances, and every movement of the body inward or outward scatters their dust about the inside of the camera.

A proper way to make this joint is to run a strip of wood one-eighth of an inch thick, and a quarter of an inch wide, round the inner edge of the outer body, and also round the outer edge of the inner body, as shown in fig. 4. In this manner light is entirely excluded without the necessity for a very tight fit, or recourse to packing of any description. The frictional surfaces also are reduced to a trifle and the movement is rendered easy and regular. This plan of adjusting the inner to the outer body decreases the dimensions of the former by a quarter of an inch, which if it carries the lens, as it ought, is of no consequence; but if it is made to carry the plate-holder, the difference must be allowed for by increasing the outside body by so much.

The front of the camera which holds the lens should have a vertical movement in order that the image upon the screen may be brought into the required position without altering the level of the camera. This is usually made so that when the lens is in the middle of the instrument, the moveable front is at its lowest point, and allows, therefore, only of an upward motion. For this reason it is called a "rising front." But, as it as frequently happens that the image requires to be lowered, as to be raised, the movement should be contrived so that the lens is in the centre of the instrument, at the middle point of the motion of the front; by this means both an upward and downward movement is at command.

The amount of vertical movement that can be given to the camera front depends upon the nature of its construction, but in all cases it should be as much as possible.

A camera for the studio, where size is of no object, should be considerably larger in all directions than the largest picture it is intended to take; and a diaphragm should be placed about an inch and a half in front of the plate, with an opening just sufficient, and no more, to give passage to the direct rays from the lens on to the plate.

This is seldom found in the cameras ordinarily offered for sale; but it is very important, as it shades the plate from much of the light which would otherwise reach it by reflection from the sides, top, and bottom of the camera. It must be remembered that while a picture is being taken the camera is full of white light, which, coming in through the lens strikes directly upon the surface opposite, that is, the prepared plate, and (if there be no diaphragm) the polished plate-slide; and also, if the camera be narrow in proportion to the angle of the range of the lens, upon the surrounding portions of the top, bottom, and sides. These direct rays are reflected upon other parts of the camera, and ultimately are returned upon the sensitive plate.

These effects will evidently be diminished by the use of such a diaphragm, as I have described. Properly, this diaphragm, which is a fixture, should have fitted to it carriers, or moveable diaphragms adapted to each size plate that the camera is intended to employ.

The fact of the camera being deeper and broader than the glass plate does not necessitate the plate-holder being larger in the same proportion; as, if it is considered advisable, the grooves to hold this latter can be constructed to hold slides of the ordinary dimensions.

It is not necessary to state here that every part of the inside of a camera should be black; but it is as well to remark that a perfectly *dead* black should be employed for this purpose. I have seen a large number varnished brilliantly in the interior with some black spirit varnish. There is an excellent dead-black varnish in the market, which every one can use for himself for this purpose, to which it is well suited.

It has been proposed to line the camera with black velvet. No surface could be more perfect for the purpose, as it is unequalled for its non-reflective properties; but it would be a source of dust and dirt, and for that reason I do not think it is to be recommended.

A shade to protect the lens from all side and top light must be attached, outside, to the front of the camera. This is usually made as if it were a continuation of the four sides of the camera, and projects forward considerably beyond the lens. Care must be taken, however, that it does not project sufficiently far to interfere with the range of the lens, or to offer any inconvenience in taking off and putting on the cap. There is clearly no necessity for the dimensions to be the same as the sides of the camera, provided the lens be well shaded; it is only constructed so usually for the sake of the uniformity of its appearance. The whole of the inside of the shade should be coloured a dead black, or, better still, lined with black velvet, for this being outside the camera there is no reason to fear about dust.

(*To be continued.*)

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

### Lecture III.—Dec. 31, 1861.

Professor Tyndall commenced this lecture by making a few concluding observations on the refraction and reflection of light. He took a large piece of glass with parallel polished sides, and by means of a bundle of rays from the electric light, showed to the audience that when a beam of light fell upon it a portion of it was reflected, making the angle of incidence equal to the augle of reflection; a portion, however, of the light passed through, and might be found on the other side after having passed through the glass. The light, after having passed through the first surface, and arriving at the lower surface of the glass, did not, however, all escape into the air; some was reflected back again, although the greater portion was refracted through the surface below. The portion of the light reflected upwards from the bottom surface was again split up, on arriving at the top surface, into a refracted ray, which passed out into the air, and into a reflected ray, which went downwards again to the bottom surface. Here, again, the same thing happened, and thus were obtained a series of reflections from the two internal surfaces of the piece of glass. This can readily be observed by any one: take a looking-glass, and, having placed a candle near it, look obliquely at its image in the glass. First of all there is perceived a tolerably bright image, being the one reflected from the silvered surface behind, and then follow a series of images caused by the reflections of the light from side to side becoming gradually fainter and fainter until they are invisible.

Another matter of some importance was then referred to. It was stated, that where there was refraction there was reflection, and where there was no refraction there was no reflection. If any solid or liquid bodies were taken, it was no matter how different they were in substance or in weight, if the solid only bent the rays of light to the same degree as the liquid, it acted upon it just as the liquid itself, and became invisible when immersed in it, owing to the absence of refraction and reflection at the two bounding surfaces. If the eyeball of an ox be plunged into water it vanishes; it appears like the water, although it is a totally different substance. The whiteness of foam and of snow—each consisting really of perfectly transparent bodies—was shown to be due to the repeated reflections of light from particle to particle, occurring so often as to render the mixture perfectly opaque. To illustrate this property of transparent bodies a piece of bibulous paper was taken. This was explained to consist of a multitude of partially transparent fibres, but because they are mixed up with air so much light is reflected at each surface that the paper appears white and opaque. If, however, a substance be introduced into the pores of the paper, which has a somewhat similar refractive power on the light to the fibres themselves, the great reflection and loss of light will be avoided, and the transparency of the paper will be powerfully augmented. Olive oil is such a substance, and the great increase in the transparency of the paper upon touching it with a drop of this liquid was beautifully shown by projecting an image of the paper on the screen by means of the electric light. It was then explained that the terms *dense* and *rare*, applied to a refracting medium, did not refer in any way to the weight of the body. A substance may be *optically denser* than another, though it be the lighter of the two. Thus: spirit of turpentine floats on water, and is therefore lighter, or, in ordinary language, less dense than water; but a ray of light in passing from turpentine to water is bent *from* the perpendicular, and in passing from water to turpentine it is bent *towards* the perpendicular. In optics, therefore, the densest body is that which refracts most.

The important subject of the total reflection of light was then treated of. Supposing a ray of light, passing from a denser medium to a rarer, struck the common surface of both so obliquely, that on quitting the denser medium it was refracted so as just to graze the surface, the angle between that ray and the perpendicular would be called the limiting angle, and for this reason—because no ray that strikes the surface at a larger angle than the limiting angle can get out of the denser medium. All such rays, on striking the surface, are *totally reflected*, according to the law explained in the first lecture. The limiting angle then marks the limits of possible transmission from a denser to a rarer medium. This was explained to be the only case in which the reflection of light was total. It was then shown that a jet of water might be filled with light which could not escape in consequence of the law of total reflection. An electric lamp was placed behind an iron vessel connected with the water pipes of the building, so that water could enter it and issue forth in the form of a jet from a hole in the front, near the top of the vessel. At the back, opposite the hole from which the vein of water issued, was a plate of glass, so that the lecturer was enabled to send a beam of light from the electric lamp through the glass, and straight through the vessel, issuing out of the hole in front in the form of a cone of light. The vessel was then filled with water until it kept running out of the front hole in the form of a jet: upon then turning on the light the beams of light which formerly passed through the hole in the form of a divergent cone, struck obliquely against the interior surface of the vein of water. The consequence was, that they could not get out, and were therefore actually washed down as if the light were a tangible substance, and reflected from side to side; but so obliquely, that they could not quit the liquid. In this way the whole of the jet of water was illuminated from top to bottom by the carrying down of the light which formerly passed straight through. When the Lecturer interposed coloured glasses in front of the lamp, the effect was most gorgeous, the vein of water shone with the most vivid colours, appearing alternately a bright blue, golden yellow, deep purple, and intense fiery crimson. The experiment is one of the most beautiful in the whole range of optics, and elicited universal admiration.

The instrument known as the magic lantern was then described. It was shown to consist simply of two parts, one to illuminate the object, and the other to make a magnified image of that object on the screen. It was was illustrated by placing a glass transparency in front of the electric lamp, and then arranging a single lens in front of this so as to project an image of the picture on the screen. The compound solar microscope was shown to be in effect the same thing as a magic lantern only much more refined. It consists of a little system of lenses, by means of which a very high magnifying power can be brought to bear upon any object placed between two slides and powerfully illuminated by other lenses close to the lamp. By means of an apparatus of this kind the singularly beautiful phenomena of the formation of crystals from a saturated solution of sal-ammoniac was shown on the screen. At first a plain white disc was seen; then the film appeared to move in one corner, and the " atoms marched in time," running together as if they were alive, weaving a crystalline web of such delicate beauty that nothing man ever formed could approach it.

The human eye, that most wonderful optical instrument of all, was then described. This was shown to consist first of all of a substance just in front of the eye like a watch glass, called the cornea; it holds a little fluid called the aqueous humour, and behind that there is a little lump of jelly-like matter called the crystalline lens. Behind is the general mass of the eye ball, filled with what is called the vitreous humour. A large artificial eye was then built up of a glass globe filled with water, having a black paper iris with an an opening in it, for the pupil, in front of this a lens, and at the back a tissue paper retina. Objects were held in front of this large eye, and upon being illuminated by the electric light, they were seen by the audience to be distinctly projected on the tissue paper retina at the back, but in an inverted position. This was explained to be the case with the human eye, the image on the retina of all objects which are looked at being in an inverted position. For distinct vision, it was shown to be necessary that the rays from every point of an object should come to a focus *upon* the retina. Some eyes, however, refract too much and bring the rays to a focus too soon; to remedy this defect a *divergent* lens was shown to be necessary to be placed before the eye; this was explained to be *short* sight. Other eyes, on the contrary, do not refract enough, and to help them, a *convergent* lens is placed before the eye; this is long sight. Different spectacles were then taken and exhibited in the beams of the electric light. The action which they exercised on the rays was clearly visible.

In conclusion a few words were said upon the action of light upon the eye. The effect does not subside the moment the light ceases, but endures about a quarter of a second after the light has ceased to shine. A succession of sparks, therefore, which follow each other at intervals of a quarter of a second would appear as a continuous line, and if the end of a burning stick were taken and moved round in a circle in about the fifth of a second, the circle would appear as a continuous line of light. Instead of a burning stick a beam of light was reflected, by means of a looking glass, to the ceiling, when upon rotating the mirror, the fine luminous index travelled round and gave the appearance of a continuous ring of light, because every revolution was accomplished within the time that the image took to subside.

## ON A NEW PROCESS OF PHOTOGRAPHY WITHOUT SILVER.

BY DR. T. L. PHIPSON, F.C.S.

MEMBER OF THE CHEMICAL SOCIETY OF PARIS, &c., &c.

THIS process, which is founded upon the use of oxalate of iron, was discovered by me about a year ago. I gave a slight sketch of it in the *Moniteur de la Photographie* of Paris, for October 1st 1861, and I did not intend to say anything more about it until I had made further experiments, with a view of testing its value in comparison with the use of salts of silver. But a few weeks ago, to my surprise, I perceived that Mr. Reynolds had brought it before the Dublin Chemical Society as a novelty, and moreover as a discovery of his own. But this author has had recourse to nitrate of silver to finish his proof, whereas in my process, no silver is used at all. It is well known that light has a peculiar action (a reductive action) upon many organic salts of iron, more especially upon the *oxalate of peroxide of iron*, which it reduces to the state of *oxalate of protoxide*. The first of these salts forms beautiful emerald green, prismatic crystals, extremely soluble in water, and decomposable by light; the latter salt is yellow, insoluble in water, and not influenced by light.

The first thing to be done is to prepare a concentrated solution of oxalate of peroxide of iron. For this purpose I take a solution of chloride of iron, and having precipitated the peroxide of iron by ammonia, I collect it upon a filter and wash it with boiling water, after which this acid is dissolved in a warm concentrated solution of oxalic acid. A beautiful emerald green solution is thus obtained, which must be concentrated a little by evaporation, and then set aside in a dark place for use.

If this solution be exposed to the sunlight, microscopic yellow crystals of oxalate of protoxide of iron are deposited, more or less rapidly, until the solution contains no more iron, and has become perfectly colourless. Upon this remarkable decomposition is founded the process of which I speak. The paper destined to receive the photographic image is floated for about ten minutes upon the green solution of oxalate of peroxide in a flat dish or capsule, to which a certain quantity of oxalate of ammonia has been added; the whole of course being kept away from the daylight, and at the expiration of that time, the paper is taken out of the solution and hung up by one of its corners to dry.

Let us suppose, for example, that a positive proof is required; the paper thus prepared is placed behind the negative and exposed to the light for ten or twenty minutes, according to the weather. It is then well washed with distilled water or with rain water (spring water will not answer, on account of the lime it contains which decomposes the image by forming oxalate of lime). All the non-decomposed oxalate of peroxide of iron is thus washed from the proof, and a feeble yellow image of oxalate of protoxide, scarcely visible, is left upon the paper.

The best means I have hitherto discovered of developing the image and obtaining proofs equal in tone, colour, and vigour, to those obtained with salts of silver is as follows:—

The faint yellow proof is plunged for a little while into a solution of permanganate of potash, to which a few drops of ammonia have been added. In this bath the image soon becomes brown and distinctly visible; it is then withdrawn, washed, and plunged into a solution of pyrogallic acid, where it is allowed to remain for half-an-hour, after which it is taken out, washed, and dried.

The image thus developed is a very dark brown, and can be distinguished with difficulty, by inexperienced eyes, from proofs obtained with silver, the tones are peculiarly soft and permanent in the proofs I have made.

This process is, therefore, extremely simple, and as the use of silver is quite excluded, I imagine it will prove economical. A few experiments I have made without a camera seem to indicate that oxalate of iron may be used in the camera for producing negatives, which must be afterwards developed, as above, with permanganate of potash and pyrogallic acid. But I should much like to hear the results this process, or some modification of it, would furnish in the hands of a practised photographer.

## THE PHOTOGRAPHIC PLANE TABLE OF M. AUGUSTUS CHEVALLIER.*

BY LIEUT. PATE.

THESE statements are all the results of operations made by ourselves for the purpose of testing the apparatus. Upon being invited, M. Chevallier did not hesitate to come to Arras to put his instrument to the proof. Neither the officers who took part in the experiments nor myself are expert photographers, so that our sweeps of the horizon are not so sharp as might be obtained with more experience and with better materials; but this question of sharpness of image in the pictures obtained by a continuous rotary motion so successfully solved by MM. Martens, Garella, Baldus, and many others, is a decided progress accomplished in photography and cannot form an objection in this place.

We have operated:—1st. With fixed sectors of 5° each. 2nd. By a continuous motion. The two methods have not only given identical results, but the plan of the front of the citadel of Arras, executed during these operations has furnished a result completely in harmony with the very exact plans deposited with the regimental school of engineers.

We can, therefore, attest the great excellence of this instrument, which Colonel Valdés, in his report to General Zara del Valle, describes in the following terms:—

"The ingenious photographic process devised by M. Chevallier is entirely free from error, very rapid in execution, and requires, in the triangulator, no other special knowledge than that of photography."

Beside its applications to ordinary topography, this instrument is susceptible of a great many others, which are

* Concluded from p. 64.

not without interest. With the photographic plane-table, we can, as pointed out by M. Gay Lussac, reproduce scenes passing simultaneously at different parts of the horizon: for example, we can obtain, without the possibility of error, as pointed out by M. Benoit, in his report, the positions of an army on a field of battle during the principal phases of an engagement. Then, again, in a besieged place, what facilities it affords for surveying from some elevated site, a church tower, for example, the movements of the enemy, and transmitting them to the army of relief to guide its operations.

It does not enter into our plan to speak of the commercial applications of this instrument, of the anamorphic properties of the sweeps of the horizon, of the restoration of the parallels of the verticals by mirrors, either cylindrical or conical, nor of the curious geometrical results which are given by this kind of anamorphosis.

We must be equally silent on its application to the taking the panorama on the external surface of a fixed cylinder or a prism, the reverse of the operation described above.

We can only refer a moment to another application of the photographic plane table, the happiest, which promises in the future the most astonishing results, viz., its utility in the geodosy of an unknown country. And M. Faye himself, when he so warmly praised the geodesic operations of M. d'Abbadie, in Ethiopia, doubtless pleaded the cause of M. Chevallier's ingenious instrument without intending it.

For what took M. d'Abbadie so much difficulty and courage to perform during many long years, the photographic plane-table gives with the greatest facility, so that the traveller takes care to number his proofs successively of the sweeps of the horizon, then he can, after two or three years or more, of travel through an unknown country, construct very exact maps at his leisure; in a word, the new workman presented to us by M. Chevallier is always ready for work, and only asks to make the tour of the world.

The utility of photography in a military point of view has recently been approved by a decree, which proposes that no other instrument should be employed beside the camera obscura; now we have an instrument which, without sacrificing any of the properties of the camera at the same time gives us very correct measurements, it is quite natural therefore, that the photographic plane-table should attract the attention of scientific men, and that it should be proposed as the type of military photographic instruments, and that therein M. Chevallier should find a first recompense for his labours and sacrifices.

The principle of the instrument remains unchanged, although since its first appearance it has undergone many important improvements, has been simplified in its mechanism. and rendered lighter and more portable. We hope on a future occasion to give a detailed description of the instrument, with diagrams, and a plan of the front of the citadel of Arras, made from materials furnished by the plane-table the proofs furnished by fixed sectors, together with special instructions for using the instrument, and on the application of the proofs for producing successively topographic plans, orographic maps and geographic charts.

## Critical Notices.

THE JAPANESE: THEIR MANNERS AND CUSTOMS; with an account of the general characterics of the Country, its manufactures and natural productions. By Thomas Clark Westfield. London; Photographic News Office, Paternoster Row.

The substance of this work was originally delivered as a lecture at the Marylebone Scientific and Literary Institution. It contains a careful resumé of the best information which various explorers have contributed respecting a country and a people, regarding whom so little has been, until recently, known, notwithstanding the great interest attaching to them. The literary portion of the book is characterized by clearness and modesty. The subject has been carefully studied, and is stated with lucidity and brevity. Its especlaim to the attention of photographers is, that besides being written by a photographer, it is illustrated by a series of very choice photographs, consisting of stereoscopic views of the country and people. These have been selected with considerable judgment from the series of Japanese slides published by Negretti and Zambra. As photographs, they are very good: much better than we have frequently seen produced in a tropical climate, being soft, delicate, and full of detail as well as brilliant. The subjects cannot fail to be very interesting, including, as they do, a variety of characteristic scenery and native portraits. A group of "Japanese Ladies," in winter costume, especially please us; one of the faces possesses a placid sweetness, which, despite the Tartar type of features, the costume, &c., we should call beautiful.

The work is very handsomely got up in small quarto: it is well printed and handsomely bound; and the photographs are on tinted mounts with ample margin. Altogether, the volume will adorn worthily the drawing-room table.

THE PRACTICAL ELOCUTIONIST: an extensive Collection of Recitations, selected and arranged expressly for School use; with a few plain Rules for Inflection, Modulation, Gesture, and Action, and Rhetorical Punctuation. The principal positions illustrated from Photographic Studies taken expressly for this Work. By C. H. Pinches, Ph. D., M. A., &c. London: Kent & Co.

The especial claim which this work appears to have on our attention arises from the fact that the illustrations are from photographic studies taken expressly for the purpose. These illustrations, which have been engraved on wood from the original photographs, are very valuable, and will convey to the youthful student a more apt idea of the value and effect of graceful and appropriate position and action than many chapters of mere description. There is something very satisfactory in the photographic truth of drawing in these diagrams, in contradistinction to much of the stiff and conventional which so often characterizes, or used to characterize, similar illustrations.

Having examined the part of the volume which at first glance claims our attention as associated with photography, we find on further examination, that the work is as complete and valuable in every department as it is in illustration. Notwithstanding that we cherish an affectionate remembrance of the "Murray's Reader," the "Enfield Speaker," and the still older "Scott's Elocution" of our school-days, we are constrained to admit that the book before us is a vast improvement on these works, both as regards the simplicity and clearness of the instructions and rules appertaining to elocution as an art, and the choice selection of pieces in prose and poetry for practice. The book will be a treasure to an intelligent schoolboy, and is a valuable work of reference for the library.

STEREOSCOPIC VIEWS OF PARIS. London Stereoscopic Company, Cheapside.

The London Stereoscopic Company have just issued a further series of Mr. England's admirable stereographs of Paris, instantaneous and otherwise. Of the instantaneous street scenes, it is only necsssary to say that they surpass, if possible, in definition and detail, his former pictures. Some of the subjects are somewhat crucial tests of instantaneity; here, for instance, in No. 91 is a regiment of infantry, five abreast, with fixed bayonets, marching towards the camera; every detail in every part is rendered without the slightest confusion. Here also in No. 101, "Halles Centrales," is a busy market-scene, containing a surging crowd of many hundreds of bustling moving people, all perfectly detailed. Many of the subjects are very perfect as pictures, altogether apart from their interest as instantaneous views. Of these we may mention No. 106, a view in the Rue Royale, with natural clouds, which is a most charming composition, and a fine photograph. In this series, Mr. England has produced some very fine interiors. In speaking of them we accord them very high praise when we state that we think some of them are equal to Wilson's interiors. Several views of the interior of the church of St. Etienne du Mont, which we believe presents some considerable difficulties as regards the question of lighting, are exceedingly fine. The magnificently carved pulpit, which, though nearly black and dimly lighted, is here secured with the most perfect definition, detail, and gradation. There are also some fine pictures of scenes in the Bois de Bologne, which are very perfectly executed.

## ON THE MANUFACTURE OF COLLODION.

BY THOMAS SEBASTIAN DAVIS.*

There are few investigations in connection with modern photography that possess greater theoretical, chemical, and practical interest than those associated with the manufacture of collodion. The interest and importance of the subject are not exclusively derived from scientific considerations, but are intimately associated with the greater or less facilities that the compound is capable of affording for the production of artistic effects. It is true that the pictorial merits of a photograph can only partially constitute the standard for a just estimation of the exact value of a collodion or process; yet it is equally undeniable that the conceptions of a cultivated taste may be fairly expected to realize a nearer approximation to its sentiments, when aided by the more appropriate agents. Regarded in this aspect, the manufacture of collodion, and the characteristic results dependent thereupon, constitute a theme of recurrent interest, and one which, from time to time, should be brought under our notice in order to adapt its qualifications to the current requirements of the artistic photographer.

The preparation of collodion embraces the consideration and realization of two especial qualifications; the one the production of a medium that will possess the necessary physical properties of yielding a homogeneous and even film after evaporation from a smooth surface, and the other the power of giving an image possessing the nearest approximation to a true representation of the varied gradations of light and shade as seen in nature. The former requirement directs our primary attention to the constitution of the plain collodion, and the latter to the nature of the salts best adapted for receiving the actinic impression. I purpose, in the present paper, detailing the methods by which the above conditions may be most satisfactorily attained according to the result of my own varied experiments in connection therewith. It may be well here to remark that the special formula which I am about to advocate is the one which I have especially found advantageous to adopt in working the wet collodion process with iron developers, and the washed collodion albumen dry plate processes generally. It is one by which a collodion may be prepared in every respect adapted for yielding the best results with pyrogallic acid development; but under such circumstances the necessary impression of the latent image is received with less rapidity than upon films prepared with one or two commercial collodions particularly distinguished in this respect. It may be judged, therefore, from the latter observation, that I neither advocate or recommend the practical or artistic photographer to make his or their own collodion; but this I would emphatically urge, that no modified form of development, or any description of a dry plate method of preparation should be esteemed of scientific value unless it be capable of being successfully practised in combination with a collodion of known chemical composition.

To turn, in the first instance, to the consideration of the manufacture of the pyroxyline, we may notice that its introduction into photography primarily resulted from the discovery of M. Schonbein, that the elements of nitric acid are capable of combining with certain vegetable fibres, and that the compounds resulting therefore possess new and remarkable properties. The development of the fact led to the knowledge of the practical value of gun-cotton, and consequently to the specification of a patent taken out in our country in the year 1846 by a Mr. John Taylor, of the Adelphi, for the manufacture of explosive compounds. In this specification we have a detailed description of the means by which gun-cotton of the most explosive character may be successfully prepared. I shall venture to make one or two extracts therefrom, inasmuch, as they will contain some practical hints equally applicable to the manufacture of photographic pyroxyline. "The vegetable matter," it states, "which is found best suited for the purpose is cotton, in the state in which it comes to this country, but cleared from any extraneous matter, it being desirable to operate only on the clean fibre of the cotton, which should be dry. The acids which I employ are nitric acid of from 1·45 to 1·50 specific gravity, and sulphuric acid of 1·85 specific gravity. As far as my experience goes the best mode of using them is to mix them in the proportion of one measure of the nitric acid with three measures of the sulphuric acid, in a convenient vessel of glazed earthenware or other material not acted on by acids. By this mixture great heat will be produced. The mixture will be allowed to cool until it reaches a temperature of from sixty to fifty degrees of Fahrenheit. It should be introduced as open as practicable. And in order to ensure the cotton being fully impregnated with the acids, and every part equally and fully subjected to the action thereof, the cotton when in the acids is to be moved or stirred by means of a rod or glass, or other matter not acted on by the acids. The acids are then to be poured or drawn off. * * * The cotton is afterwards to be washed, opened out and dried, which may be conveniently done by spreading it thinly on surfaces in a room heated by steam or otherwise to about 150° Fah., and when dried it is fit for use. I would remark that nitric acid alone produces on cotton an effect similar to that produced on cotton by the mixture of acids above mentioned; but in carrying out the invention with nitric acid alone the cotton should be removed and washed immediately after it has become soaked with the acid, but I believe that so good a result cannot be obtained by the use of nitric acid alone, and the product is more costly." It will be gathered from the above extract that the principle of the manufacture of gun-cotton is not dependent upon the relative proportions of the mixture of the acids, although the preference is given by the patentee to the three to one ratio, as more recently advocated by Mr. Hardwich. The explosive cotton made in acids of the above strengths is unsuited for the manufacture of collodion, inasmuch as the product is insoluble in a mixture of alcohol and ether. If, however, we only dilute the acids to a suitable extent, or, what is analogous thereto, take acids of a less specific gravity, and act upon the cotton therewith, we shall obtain a pyroxyline soluble in an ethereal mixture of alcohol, and distinguishable from the former when saturated with water by a semi-transparent appearance, and a tendency to partial disintegration. Provided we carry the dilution of the acids to too great an extent the texture of the cotton will be entirely destroyed; if to the extreme degree it will be completely dissolved as soon as immersed in the acid mixture. The disintegrating, or solvent power of the dilute acids increases with an elevation of their temperature, so that it happens that an acid mixture, in which the fibre of the cotton would be scarcely altered at a low temperature, might entirely dissolve the whole at a higher one. As it is found that a more fluid collodion can be manufactured from a pyroxyline made at elevated temperatures, it follows that the strength of the acids must be correspondingly less diluted when used at higher temperatures, in order to produce a given action upon the same vegetal fibre. The essential element for consideration, therefore, in the manufacture of pyroxyline adapted to meet the requirements of the photographer, is the proportionate dilution of the acids, that will give the best results when brought into union with the normal cotton at some fixed temperature, ranging between 130° and 150° Fahr. The above rule will equally apply to the case whether the nitric acid be used in its free condition or be liberated from nitrate of potash by the chemical action of the sulphuric acid thereupon. As far as my own experience has led me to a preference between the use of free nitric acid, or the employment of nitrate of potash, I must confess that I consider a slight advantage in respect to uniformity and suitability is gained by the combination of the two. Without, however, dwelling upon this point I must now proceed to the statement of the means by which I manufacture a pyroxyline equally adapted for the production of collodion to be used for the wet and dry plate processes.

*(To be continued.)*

* Read at the South London Photographic Society on the evening of Thursday, February 13th.

## A RAPID PROCESS ON DRY COLLODION WITHOUT PRESERVATIVE.

Dear Sir,—Having been rather successful in experimenting on dry collodion plates, I beg to state how I have operated, for the use of those who, like myself, would be glad to give up their syrups and obtain good negatives with as much certainty and the same rapidity as when wet collodion is used. My silver bath contains 40 grains to the ounce of water, and is slightly acid. The collodion I use is of a powdery character and contains a bromide. I use old collodion to clean my plates.

I coat and sensitize the plates as usual. When coming out of the bath, they are allowed to drain a short time into the bath, washed over with filtered rain water, and finally with pump water, until all trace of greasiness and nitrate of silver is removed.

They are left to dry spontaneously, out of the dust, and when quite dry kept in a plate box. I give the same exposure as for a wet plate, and develop in the following way:—

I have a second vertical bath filled with clean rain water in which I dip my plates to be developed; they are left there for a few minutes, then well drained and removed to the silver bath; a dip or two in this bath will restore to the plates the excess of nitrate of silver removed by the washing. In this state the plates are developed in the same way as a wet plate.

I use an iron developer, which is the following:—

| | |
|---|---|
| Protosulphate of Iron ... ... ... | 15 grains |
| Sulphate of Copper ... ... ... | 10 ,, |
| Glacial Acetic Acid ... ... ... | 15 minims |
| Citric Acid ... ... ... ... | 1 grain |
| Water ... ... ... ... ... | 1 ounce |

The picture I intensify with a saturated neutral solution of bichloride of mercury, and then hyposulphite of soda, in which some nitrate of silver is dissolved, and fix with a fresh solution of hypo.

The result is a fine negative picture, in all respects equal, if not superior, to one obtained of wet collodion. I never have fogging and have not lost a single film.—I am, dear sir, yours respectfully, Capt. de Langue.

N.B. In my hands a dry collodion plate, to which the excess of nitrate of silver is not restored, but added to the developer, requires no more than twice as long exposure as my plates when dipped in the silver bath before development.

## REPORT OF THE COUNCIL OF THE PHOTOGRAPHIC SOCIETY.

In submitting the Ninth Report of the progress and prospects of the Photographic Society, the Council have good reason to look back with satisfaction to the past year's proceedings, and to anticipate an unusual success in the future.

The balance sheet, herewith presented, exhibits a far more satisfactory condition of the finances than has been shown for some years.

In 1858 the deficiency on closing the year's accounts amounted £56. In 1859 it was £88; and in 1860, the large sum of £384. The balance sheet for the past year exhibits a marked improvement, in so far that the receipts of the year are slightly in excess of the expenditure. This result is the more gratifying, as it has been chiefly brought about by means which prove that the art and science of photography is becoming more appreciated by the public, as its capability, its beauty, and advantages become better known and more clearly understood.

In the year 1858 the public exhibition of photographic works, held under the auspices of the Society, left a deficiency of upwards of £100. In 1859 the loss sustained was only trifling, but the exhibition of 1860 showed a serious deficiency of £125.

Now it was highly important that these annual displays should be continued, so the arrangements of the past year's exhibition, and its management, received particular care in order that every possible saving might be effected, and the high character of the exhibition still maintained. The Council have much pleasure in now reporting that a profit of £36 was the result, due to the increasing appreciation by the public of the beautiful works collected together.

The publication of the Journal also shows a small balance on the year's account. Although issued for the convenience and information of members of the Society, it has been accepted as a chief literary authority on photographic subjects, and this position it still maintains, notwithstanding the numerous photographic periodicals which have come into existence since its first establishment.

During the past year a most important matter unexpectedly claimed the attention and compelled the interference of the Council in order to vindicate the position of the members of the Society. It strongly proved how necessary it is that a central representative body, such as the London Photographic Society may rightly claim to be, should watch over and vigilantly guard the interests of the professor, and of the scientific position universally accorded to photography.

In the intended Exhibition about to be opened at Kensington, it was proposed that the results of photography, and the apparatus by which these results were produced, should not be classed with the fine arts, but be included among mechanical contrivances, fitting in between horological instruments and ship's tackle. Against this proposition the Council entered an indignant protest, and their expostulation received the almost unanimous assent of photographers both in this country and on the Continent.

By some confusion of ideas, it appears to have been considered by those who first proposed the objectionable arrangement, that pictures taken by light were merely mechanical results, in so far that they were produced by the agency of the camera, and that, therefore, they should not be classed with pictures and other works of art. It seems to have been overlooked that such a definition must have banished these latter also into the limbo of mechanical products, as they are produced by means of the eye of the artist, and the human eye is simply the most perfect camera known, lens, diaphragm, focussing apparatus, sensitive plate and pictures, which, as Locke writes, "when drawn in our mind are laid in fading colours;" and even high art cannot pretend to accomplish anything without an eye. On any other grounds, as to display of true artistic power, and appreciation of what constitutes a real picture, the proposition of the authorities was still more untenable; and the Council have much pleasure in stating that the impropriety of the proposed arrangement was at length admitted, and that a plan by which photographic works are accorded a position more suitable to their importance has been adopted. And the Council cannot refrain from here mentioning how deeply the Society is indebted to the President for his personal exertions and his invaluable advice and assistance in conducting this important matter to a satisfactory issue. On the settlement of the above difference, the Council willingly agreed to afford every possible assistance in the arrangement of the department, and at the request of the Royal Commissioners, two Members of the Committee, the Earl of Caithness and Mr. Kater, together with Dr. Diamond, were appointed to advise them in their decisions as to the photographic department. The Council have, however, still to express their regret that the position assigned to this department in the building at Kensington is far from satisfactory. Every endeavour has been made to get this disadvantage remedied, but it would appear that no other space is at the disposal of the Commissioners, as they have expressed their wish to do all honour to photography, and promised under the new arrangement to associate it as nearly as possible with the fine art department. The whole space appointed to English exhibitors for the display of photographic pictures is under 3,000 square feet, and that for apparatus and chemicals about 500 feet more.

The applications for space were so numerous that a very much larger extent could be easily filled; indeed, one person alone requested an allotment to six times the whole available amount.

It was hoped and anticipated throughout this country that photographic results of all nations would be exhibited together—and the advantages afforded by such facilities for direct comparison are obvious. The objections to such an arrangement, it is stated, came from the heads of the foreign department: how far this was due to their wish to avoid the objectionable arrangement of their artistic contributions originally contemplated cannot now be known. It may be fairly assumed that photography will form one of the most interesting parts of the new Exhibition, especially as the one great object is to take stock of the progress made since the first gathering together of the results of human skill and industry in 1851.

In alluding to these wonderful structures, there is one honoured name which spontaneously arises in the mind whenever and wherever they are mentioned. It has often been said that the lamented death of the Prince is at this time especially felt as a national affliction, on account of the great work now in progress, which is so identified with his name. Yet, throughout the whole time that the Prince Consort so nobly filled that high position, of which we now recognize the greatness, by sadly noticing how vast is the blank which his loss has left, his efforts were unceasing to advance and assist everything that was good and worthy, so that had that

> "Sweet nature gilded by the gracious gleam
> Of letters, dear to Science, dear to Art,"

been spared to us as yet a little longer, it must still have seemed, whenever the fatal summons came, that then his loss would least of all be borne.

During the past year there have been recorded no great discoveries in photography as a science, and comparatively few improvements in it as an art; but its progress has not been less marked than during former years; for it has now entered on and made great advance in that most important phase in the development of every art, viz., its *application to useful purposes.*

But a few years ago photographs were a scientific curiosity; now it rivals the electric telegraph, or the railway in the multiple interests it subserves. The lawyer receives the photograph of a signature as evidence; the doctor exhibits the result of his skill by photographs of the case before and after treatment; the engineer judges of the progress of his works from daily scraps of paper which the post bring him from the recording camera, and Government so confides in the value of results obtained by photographic aid, that attainment of the art is encouraged, and its practice profitably employed in all departments where exactness in representation and reproduction is required. So great, indeed, is its utility now become, that every improvement in the process, however trifling in itself, acquires importance by its wide application.

To the Royal Society there is yearly apportioned a Government grant of money to be expended in furthering scientific investigations for the benefit of the country.

The Council of the Photographic Society, pointing only to the practical results hitherto attained under unfavourable circumstances, would venture to suggest that assistance should be granted by Government towards improvements in the processes of photography. It would serve to determine many difficulties, and tend to increase the advantages now derived from the various employments of the art in differeut departments of the Government.

A yearly grant, if only a tithe of the money saved by substituting photographs for the mechanical drawings formerly made in all ordnance, naval, and other departments, would stimulate advancement in the art, and assuredly more than repay the expenditure.

The avidity for small full-length photographs has, during the last year, so remarkably increased, that this development of public taste appears almost worthy of historic note. And these little pictures, equally perfect and pleasing, vindicate the correctness of the popular predilection in their favour. They recall, not merely the features, but the attitude and habit of the sitter, and are indeed "the abridgement of all that is pleasant in man."

As now produced, they admirably illustrate how conducive to the pleasures of the many photography may be made, whilst equally valuable to the highest intellectual investigations, or of recording the results of mechanical skill.

During the past year twenty-four new members have been elected, and it is anticipated that a still greater addition will accrue from among those who have hitherto belonged to the societies that have ceased to exist.

The numbers of these have gradually diminished as the advantages of one central and representative body have been recognized throughout the country.

The Council trust that this cofidence, so generally expressed in the Photographic Society of London, as representing the interests of the art and progress of this science, may be always maintained.

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## PHOTOGRAPHIC DIORAMA.

[The following article from the *North British Daily Mail* will afford our readers some further information on the interesting application to the principle of the diorama to the exhibition of transparent photographs. So far as we can learn, the joint labours of Dr. Taylor and Mr. McNab have been very successful in this matter.—Ed.]

In the present day, the wonders of magic are far more than realised by the plain realities of science. The electric telegraph and photography are perhaps the most marvellous discoveries of an age in which marvels have all but ceased to be wondered at. The art, or rather science, of sun painting has put within the reach of every one scenes and realities that are locally far removed from the observer. That a familiar landscape, or the likeness of some well-known and esteemed friend, can be presented by the photographic and stereoscopic processes by the shadows of the objects being indelibly fixed on durable material, are triumphs of scientific discovery. What further progress these arts may yet make is hidden from our present ken, but that marvellous results may yet be attained is not only probable but most likely. When a landscape is presented on the stereoscope, the defects chiefly noticeable are absence of life, motion, and changing colour. It never can be possible to fix moving objects and show them acting and moving, but discoveries may be arrived at by which the effect, to some extent at least, may be obtained. We were recently shown the result of a discovery made by Dr. Taylor, of the Andersonian University, by which most perfect aerial effects were produced on photographic landscapes. Dr. Taylor is well known for many ingenious experiments with light, and for many ingenious practical applications of scientific discovery. In the matter to which we now refer, it is unnecessary that we should at present describe the mode by which the wonderful effects are produced. Suffice it to be said that the apparatus is simply a box fitted with lenses and other appliances. The pictures we saw operated upon were mostly landscapes taken in the East Indies by Mr. Andrew Williamson, of the firm of Williamson Brothers and Co., Calcutta, the scenes themselves being selected with great skill and taste—also, a few magnificent Highland views, photographed by the Doctor himself in the noble demesne of the Duke of Argyle, at Inverary. The plates are of a large size, and are taken on glass, to which it would seem that this invention is best adapted. The object is to produce the various atmospheric effects which are constantly occurring in the natural landscape, such as the passing of clouds, sunset, sunrise, moonlight, &c., and the success which has been obtained by this ingenious invention is truly as wonderful as the effects are pleasing. For example, we are looking through the glass at an Indian river scene. The glow of a tropical sun is gloaming in the sky and in the waters, the foliage and verdure on the river banks dazzle the eye with the brilliantly reflected light. But as you look a change creeps over the atmosphere; the clouds which seemed to hang in the sultry sky apparently move and assume a dusky hue, the waters looks sombre, and the landscape begins to wear a deeper green, and gradually the light dies away and leaves you to enjoy the cool and quiet of an evening on the banks of the Ganges or the Hoogley. The operator has merely again to say *presto*, and slowly the clouds begin to be lightened up, the sun sends up his red and gold from below the horizon, and as you gaze you have once more a noon-day splendour shining over all. Some very fine Hindoo groups were also operated upon with the most pleasing effect, but perhaps that which struck our admiration most were some avenue scenes from Inverary. The effect is about as superior to painting as are the works of a Claude or a Turner to the sketch of a mere schoolboy, although, in its own walk, there can be no substitute for painting. The invention under notice, of course, requires an apparatus and considerable space to work it, and thus rather takes the place of an exhibition than of a common picture. We are not aware that Dr. Taylor has any wish to do more than make his discovery known, as it deserves to be. All that we need say of the *modus operandi* is that it is extremely simple, and consists of a revolving cylinder, the edge or rim of which is strongly coloured with those hues that are required to produce the dioramic effects. A number of gas jets are so placed as strongly to illuminate the cylinder and reflect its hues upon the photographic plates. The effects produced are really surprising. With such photographic plates and such an apparatus, a person may never leave his own chamber, and yet in reality become acquainted with the peculiarities and beauties of foreign climes, in all their varying hues and shades.

We should add that while the merit of this discovery or invention is due to Dr. Taylor, he has been ably assisted in bringing it to its present state of perfection by Mr. McNab, the well-known photographist, at whose residence we had the pleasure of inspecting the apparatus under the superintendence of the Doctor himself. The plates are the property of Mr. McNab; they have been photographed by him with admirable clearness and force from the original negatives, the size of the plates rendering the process somewhat difficult. The size, however, gives the great advantage over the stereoscopic pictures that nine or ten persons can view them at the same moment; and, indeed, it is in contemplation to get plates so large that a whole roomful of spectators could enjoy the spectacle, which would then become one of the most attractive and beautiful exhibitions.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 12th February*, 1862.

M. Derivau has constructed a miniature still for the travelling photographer, which is extremely interesting for the ingenuity displayed in its construction, so that it shall occupy as small a space as possible. The kettle holds over five pints of water, and the whole apparatus, including the furnace, weighs less than 10 pounds, and measures about 18 cubic inches. This economy of space, so important a consideration in photographic baggage, is obtained by calculating the various parts of the still, so that when they are dismounted, they can easily fit into each other. Thus the *worm* fits into the furnace, this latter into the kettle, and the whole into the dome or capital.

In anticipation of the partial eclipse of the sun which took place on the 31st of December last, many of our Parisian photographers made important preparations to obtain views of various phases of this celestial phenomenon. Unfortunately it was a waste of labour, for the sky was overspread with thick clouds during the whole of the day. At Belfont, however, the sky was clear, and M. Vernier was fortunate in being able to obtain some good negatives, and has addressed the following note, respecting the phenomenon, to the Academy of Sciences.

"My proofs, which were taken during a clear sky, are remarkable in this particular, that the last two, numbered 5 and 6, exhibit no trace of the aureola. The image of the sun is traced sharp and clear on a black sky, while the first four proofs are surrounded with an aureola similar to that of the 18th of July, 1860, but still, less visible. This peculiarity cannot be explained by the intensity of the solar light, after the exposure of the negative. In fact, all the proofs were obtained in the fraction of a second; but in proportion as the sun declined towards the horizon, it lost its splendour, or, if I may so express it, its photogenic power. It results from this fact, that if I had prolonged the time of exposure of the negative some thousandth part of a second in the latter proofs, I should have obtained the aureola as well as upon the first.

"From the preceding experience, I conclude that the aureola which surrounds or envelopes the sun belongs exclusively to the terrestial atmosphere; for, notwithstanding the serenity of the sky, which appeared to me favourable for my experiments, the atmosphere at this season of the year is always loaded with moisture which reflects, or produces, a certain splendour, or a radiation of light, more or less extended, around the luminous body which traverses it."

Our Photographic Society has published the following *Notice to Exhibitors* at the Universal Exhibition of 1862:—

"Sir,—I have the honour to remind you, in the name of the Committee, that upon the decision of the Imperial Commission, the admissions to the Exhibition at London will be rendered final, for the section of photography, only after the examination of the photographs intended for this Exhibition.

"You already know that the pictures should have been sent unframed, to the *Palais de l'Industrie* by the 10th inst. at the latest. Each proof must bear the name of the artist, and all by the same person must be sent in a portfolio, which, besides better protecting them, will render confusion less likely to occur.

"I believe it is necessary to urge the inconvenience that would arise from incurring the expense of framing beforehand, since the space, necessarily restrained, accorded to photography, does not allow the Imperial Commission to fix, before the examination of the proofs by the jury, the amount of space which can be awarded to each exhibitor finally admitted.

"I must also remind you, sir, in the name of the Committee, that upon the proposal of the Jury named by the Imperial Commission, the French Photographic Society has accepted the office of General Agent for all the exhibitors of the section of photography who desire to avail themselves of it, whether members or non-members of the Society.

"I think it scarcely necessary, sir, to point out to you the economy and other advantages that must result from this association, which, moreover, not only leaves perfectly intact the right of each exhibitor to the prizes awarded, but will also preserve the individuality of every one connected with it.

"The Imperial Commission will take upon itself the expense of forwarding and returning the pictures to London, but not the expense of fixing them up, and the Royal Commission of London gives the space without any fittings whatever. Now this fixing up the pictures will be much less expensive if undertaken in common. The French Society of Photography cannot possibly be influenced by any speculative motive, but will strictly divide the general expenses among the exhibitors, according to the space occupied by them. The expense of frames and other special items will, of course, be personal.

"The French Society of Photography leaves every one at liberty to act by himself, except, however, in what concerns the stalls, panels, tables, &c., which the Imperial Commission renders obligatory on the whole body of exhibitors, by whomsoever represented, as is absolutely necessary.

"If you accept the proposal of the French Photographic Society, I beg, sir, in the name of the committee, that you will sign the enclosed, put it into an envelope, and return it by post, addressed to the Secretary, Agent of the French Photographic Society, Rue Drouot, No. 11."

The decision of the law courts against copyright in photographs is so contrary to the opinions generally entertained, that it may be interesting to give it in full:—

"Considering that photography is the art of fixing the images of external objects by means of the camera obscura, and various chemical processes, and that it is a purely mechanical operation, requiring skill, no doubt, and much skill, yet it in no respect resembles the work of a draughtsman or painter, who *creates* from the resources of his imagination his subjects and compositions, or represents, with his own feeling, subjects from nature; that in recognizing the service photography has rendered to the fine arts, yet it cannot be ranked with them in the same category; for, in fact, photography neither creates nor invents; it is limited to the obtaining negatives (*clichés*), and afterwards obtaining positives from them, which servilely reproduces the objects placed before the lens; that these works, produced by the aid of mechanical means, cannot, in any case, be assimilated with works of the mind, or confer on the industry that fabricates them a property similar to that of the artist who creates and invents; that jurisprudence has already applied these principles to the operation of modelling, which, like photography, demands only dexterity and practice in their execution; that Daguerre, in selling his secret to the State, gave his invention, as well as all its modifications, improvements, and results, for the public benefit, and it would be contrary to rule, in such a case, to give a privilege, not only to the inventor himself, but to all those who profit, or have profited by his discovery. Seeing, that from these considerations, the reproduction of subjects obtained by photography does not constitute the offence of counterfeit or piracy, provided for and punished by articles 425 and following, of the Penal Code, an action for damages cannot be sustained.

"For these reasons the prisoners are acquitted, the seizure of their photographic copies is void, and the prosecutors are condemned in costs."

This decision may seem hard, and henceforth we must not, I suppose, say much about *artistic photography*.

By a new method of weaving discovered by M. Voisin, he is able to produce shawls in every respect equal to the famous Cashmere, and at about one-eighth of their cost. It would be difficult to explain in what this discovery consists, without going into details of the manufacture of shawls; but, in brief, it may be described as a new method of interlacing the threads, resulting in a very durable product, economy of material, and the employment of any number of colours. This discovery must not be looked upon in the light of an experiment, for no less than 1,650 shawls have been made on the new plan, and worth 350,000 francs, equal in quality and appearance to Cashmere, valued at 1,250.000 francs. We may expect to see in the forthcoming exhibition, not only specimens of these shawls, but of other new fabrics produced by the machine of M. Voisin.

## DRY COLLODION WITHOUT PRESERVATIVE.

Dear Sir,—I am induced once more to address you on the subject of Dry Plates without Preservative, in consequence of the appearance of Mr. Hislop's letter in the News of last week, wherein he says—"you have inadvertently fallen into an error, in stating that I invariably use albumen as a foundation." At which, I must confess, I am somewhat surprised, as I, in common with yourself, and no doubt many of your readers, understood that it was Mr. Hislop's invariable practice to coat his plates first with albumen, and thereby placing the preservative under instead of over the collodion.

By referring to your report of the North London Society's meeting, page 572, vol. v., Mr. Hislop's paper was there read by Mr. Martin, who, in answer to a question from the chairman, said, "That the film had a tendency to leave the glass, and that Mr. Hislop, therefore, always coated the plate with a very dilute solution of albumen, prior to applying the collodion." Mr. Hislop also gives in his paper the formula for the albumen solution, to be used as a foundation for the collodion, and at page 604 of the News, Mr. Hislop, in making some observations at the North London Society's meeting upon the discussion that had previously taken place at the reading of his paper, exhibited his bath solution, to prove that the albumen had no deteriorating effect upon the bath, in which he says, "Some hundreds of plates had been excited, and fully nineteen-twentieths of these had been excited, since it was his *custom* to coat with albumen."

Also, exhibiting pictures from two negatives, he says, "One was upon albumenized glass, *in his usual way*; the other upon unprepared glass."

This is the only instance that I can discover wherein Mr. Hislop makes mention of collodion upon the unprepared glass, and that appears to have been an experimental plate, for the purpose of showing the society the non-chemical effect of the albumen, rather than as a proof that the collodion was in itself sufficient to produce the picture.

I have to acknowledge the thanks which Mr. Hislop in his letter of last week, tenders to myself, in common with others of your correspondents, for our corroborative testimony. Yet I must confess I imagined I was in my process going one step farther towards simplicity of manipulation than Mr. Hislop had then done, which induced me to forward to yourself, sir, the specimens you did me the honour to mention so favourably in your article a few weeks since, and which I flattered myself would be sufficient to show that with a suitable collodion, a preservative either under or over the film was entirely unnecessary.—I remain, dear sir, your's respectfully, J. F. Ward.

*Stratford on Avon.*

## THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Sir,—Surely those who undertake the duty of publishing opinions for the guidance of others, cannot be too scrupulous and careful. The writer of the article in last week's News,* upon the "Exhibition of the Photographic Society of Scotland," has in his "*hasty notice*," the result of a "*partially made inspection*," not treated me with justice. I do not ask him for praise, but simply for a certain measure of accuracy in his report. He is no doubt entitled "not to like my last season's pictures so well as my Endsleigh series," or, on their merits, to say anything else he pleases. Opinions vary, and it is gratifying to me to find that your own opinion, as expressed in your foot note to the article in question, is in direct opposition to his. This, however, is not my point, though I cannot help saying that the "Scotch Peasant's Cottage" he finds so much fault with, and which I believe *is* a "ready made picture," has received the most unqualified praise, and is ranked as a subject the very reverse of "being incapable of photographic treatment." What I complain of is the inaccuracy of his description of my pictures. Speaking of the subject mentioned above, he says, "It is a flat and almost windowless Scotch cottage, fronting a dirty road, and garnished by only a peat stack or *something worse*." He then says that "several of my efforts have this year been wasted on subjects of this kind, incapable of photographic treatment; and congratulates me upon escaping from these, or from comparatively formal ploughed fields and flat distances." My answer is, that with the definition I aim at, and believe have a right to take credit for, photography is sufficiently capable of delineating texture and form to place beyond question that the "windowless cottage" did not face a dirty road, and that it is not garnished by a peat stack or something worse; the latter remark being an imputation upon my taste I need not, I am sure, notice. Further, so far from "wasting my efforts" upon several such subjects, it is the only one of the kind I have done; and in spite of the writer's condemnation I will add, that I did it not only because I was struck with its picturesque effect, but I conceived it would make a very suitable companion picture to an "English Mansion" I had photographed. As to my "formal ploughed fields," they, along with the dirty road and "something else," are simply in the imagination of the writer, who so described them, not in any one of my photographs.

Your readers will decide whether it is just and fair to publish a "hasty notice" written after an "inspection only partially made." Should the word partially be read in another sense? Vernon Heath.

# Photographic Notes and Queries.

### Iodide of Silver in Collodion.

Sir,—I find the addition of a few drops of solution of iodide of silver will greatly increase the rapidity of the collodion, which seems to get more sensitive the longer it is kept. I prepare the solution of iodide of silver by rubbing down in a mortar a few grains of nitrate of silver, and adding a saturated solution of iodide of potassium drop by drop, till all the precipitate is dissolved.—I remain, sir, yours respectfully, A. L. H.

[The early formulæ for the preparation of collodion generally contained iodide of silver, and many photographers believed that greater sensitiveness was obtained by its aid. If we remember rightly, the original formulæ published by Dr. Diamond, in "Notes and Queries," contained iodide of silver. A gradual conviction appeared to gain ground that it was unnecessary, and it fell into disuse. Possibly, in connection with the other formulæ and manipulation now in use, it may be found advantageous.—Ed.]

* From the Society's *Journal*.

## Talk in the Studio.

The Sculptor and the Photographer. — The Italian correspondent of the *Daily Telegraph*, speaking of the works in progress of Mr. Hiram Powers (better known as Greek Slavo Powers), says:—"This sculptor is singularly fortunate in having a son who is one of the best photographers in Florence. He has made a study of what was once an amusement, and, as is often the case, has surpassed the older hands. His portraits are likenesses as well as pictures. The photographs of his father's works are very beautiful; but what strikes me most are his pictures taken from life, for there his sitters do not look as if they were in the stocks, or gazing vaguely at the heavens—of course void of any '*non-di-meno-gira*' ideas—but simply gentle and genteel 'sitters.'"

Mr. Vernon Heath.—It will interest many of our readers to learn that this gentlemen, known so long in the photographic world as a skilfull artist and as the principal in the firm of Murray and Heath, is about to retire from that firm and devote himself entirely to photography professionally. The freedom from business cares will doubtless afford opportunity for still greater triumphs of manipulatory and artistic skill than those with which all interested in photography are familiar in Mr. Heath's productions. In a letter which is before us, we are informed that Mr. Charles Heisch, Professor of Chemistry at Middlesex Hospital, and well known to photographers by his researches in photographic chemistry, and more especially as one of the earliest and most consistent advocates of the use of bromides in collodion, assumes Mr. Heath's interest in the business in Piccadilly. We hail the accession of such a man into the manufacturing and commercial ranks of photography, as tending to maintain the high position which these departments have acquired in this country, and affording to photographers full reliance on the scientific skill which superintends the manufacture of preparations upon which all their efforts depend.

Apparatus for India.—We omitted to state in our report of the Photographic Society's meeting last week, that Messrs. Murray and Heath exhibited a new double swing back camera, specially adapted for India. By a single mechanical arrangement the swing of the back is effected without any increased size being given to the camera, which is as small as an ordinary portable bellows instrument. The adjustment for focus is effected by means of a screw, which can be thrown in or out of gear by simply touching a spring; and the bellows are made of a material specially suited to resist the effects of a hot climate and the attacks of insects, &c.

## To Correspondents.

⁂ To Advertisers.—The unusual press upon our advertising columns this week compels us to omit many advertisements.

Slate.—We fear that slate is scarcely suitable for a silver bath; but having made one, your best plan will be to coat the inside with some protective varnish. A shellac varnish may be used; or better still, a mixture of rosin, bees-wax, and finely powdered slate, in about equal proportions. This applied hot will give you a fine hard surface when cold.

A Subscriber from the Commencement must have seen that we have repeatedly given formula for the manufacture of collodion. We have not space to give full instructious in this column on such a subject. We may briefly say: take

| | |
|---|---|
| Pyroxyline made at a moderately high temperature | 10 grains |
| Alcohol, 820 sp. gr. ... ... ... ... ... | 1 ounce |
| Ether, 720 sp. gr. ... ... ... ... ... | 1 ounce |
| Iodide of sodium ... ... ... ... ... | 6 grains |
| Ditto cadmium ... ... ... ... ... | 4 grains |
| Bromide ditto ... ... ... ... ... | 1 grain. |

You will find an article giving full details in the Photographic News Almanac.

An Amateur.—It entirely depends on the purposes for which you require the lens. The No. 2B and No. 3 ordinary of the maker you name are altogether different lenses; the first is a very quick-acting lens, covering about 5 by 4, or half plate, and is especially good for card portraits; the other is not so quick acting, and although called a half plate, will cover, we believe, a whole plate. Both are excellent lenses; but your choice will depend on the especial purpose for which you require to use a lens. 2. The keeping of albumenized paper after sensitizing, depends much on circumstances. Some samples rapidly discolour; whilst others in a dry dark place keep a few days without risk It is always better to print, tone, and fix, as soon after sensitizing as possible.

Teesdale.—It is quite manifest that a view lens of 9 inches focus could not be intended for views 9×7. If the lens were sold to you to cover a 9×7 plate, and *guaranteed*, we should imagine that the dealer of whom you had the lens will exchange it. We cannot advise you to attempt to remove the lens from the tube and replace it by another of longer focus yourself, as if you are not familiar with the work, it is probable you could not do it efficiently, and it is very important that the lens should be fixed quite parallel with the sensitive plate. First of all, endeavour to get the dealer to change the lens; and failing in that, sell the one you have got, and buy another. Or else, get the camera body shortened a little, and take smaller pictures for the present with the lens you have.

W. G.—The especial characteristics generally desirable in a collodion for dry plates are, that it should give a powdery adherent film, and possess a bromide. The powdery film may be obtained in two ways: either by making the pyroxyline with weak acid at a high temperature, or by adding an alkali to the collodion after it is made. The addition of a few grains of carbonate of soda to each ounce of collodion, and after agitation filtering, will generally make the film adherent and powdery; but the collodion does not always keep well after it is thus treated. The collodion of which the formula is given in the Photographic News Almanac may be used for dry plates with advantage.

W. H. Bolton.—Shellac is readily soluble in a *hot* solution of borax and water. Have you used sufficient heat? Or try the adoption of a little more borax.

J. B. Y.—On page 248 of our third volume (No. 72), you will find full instructions for making and using a specific gravity bottle, by which the specific gravity of all kinds of solutions may be ascertained.

Tom Gardner.—The silver solution running in greasy lines when the plate is removed from the bath, will occur from a variety of causes. In your case, it is probably from the use of a collodion which gives a horny repellant film. When that is the case, the addition of one or two drops of distilled water to the ounce of collodion will often prove a remedy. Also, move the plate repeatedly in and out of the bath during the time of exciting. 2. The only way in which you can keep size ready for use is to keep it in a very cool cellar. 3. If the water placed on your white lead becomes white and turbid, it shows that there is some adulteration, as carbonate of lead is insoluble in water.

C. F. Booker.—The probable cause of the peculiar cracking of the film you describe, is that some traces of the hypo or cyanide had remained in the film, not having been perfectly washed out after fixing. This has gradually absorbed moisture under the coating of varnish, and then from changes of atmosphere caused the cracks. For those films which are cracked there is no remedy. To prevent others already varnished from going, keep them in as dry a place as possible, and be careful to wash well and dry well in future. Sometimes, however, these cracks will occur after every known precaution has been taken.

Toby's Ghost.—All dry plates must be wet all over before applying the developer. 2. Your question "how to distil the essence from anything not a liquid" is not quite clear. If you refer to essential oil of flowers, &c., they should be bruised well, macerated in a small quantity of water, and then placed in the still, and submitted to as low a temperature as will serve the purpose. If, however, you are not familiar with such operations, you had better see a chemist manipulate before attempting it yourself. 3. In order to avoid injuring the film of wet plates in placing them in a box, use a box with V shaped grooves.

X. Meson.—It is desirable to wash the print carefully for a few minutes between toning and fixing. As a rule, the time required for fixing is about fifteen minutes; but the time will vary with the kind of paper, a soft absorbent paper being quickly fixed, and a hard repellant paper requiring a longer time.

Alphabet.—The price you name is a very low price for a portrait lens. You may by chance get a good one for the money; but not with certainty. You cannot get, as a rule, a standing figure well defined on a quarter plate with a common quarter-plate lens. To ascertain if the visual and actinic foci are coincident, place a pile of books upon a table, each one an inch or two further back than the other; then focus for one in the centre, and if on taking a picture that one is sharp, the visual and actinic foci are coincident; if that one be out of focus in the picture, and some other books in, the two foci vary just in the proportion indicated by the position of the books. In such case your dark slide would require adjusting to the amount of difference. 2. When a collodion dries slightly opaque or opalescent when merely poured on glass it is unfit for producing positives. The only remedy is to change the sample of collodion. 3. The production of instantaneous pictures depends on good light, and good lens, silver bath, collodion, and developer, all being in harmonious relation and in careful manipulation.

Jacobus.—The dealer whose name you mention as No. 1 is a retailer of second-hand apparatus and a respectable man; but it is of course impossible to guarantee second hand goods without trying them. Of the two lenses, regarding which you ask our opinion, we have no means of judging which will suit you best. A rack and pinion is not necessary if you have a ready means of adjusting the camera body. For general landscape purposes we prefer the ordinary view lens of the maker you name to his orthographic.

Cornish Chough.—Your pyroxyline has been made with acids slightly too weak, and has consequently a slight tendency to crape, and also to dry rather opaque. With care in manipulation, it may, however, be made to work very well. The sole cause of your difficulty in the negative sent is under exposure. The plate required at least double the exposure; with full exposure you will get both foreground and distance properly detailed. A little more bromide to the collodion will be an improvement.

W. W.—We do not know any specific house of whom you may get "Judæan asphaltum," but you will probably succeed better in getting it through a respectable drysalter than a chemist. Probably it may be known as "Egyptian asphaltum." Should you still fail we will make some enquiry in London.

Wm. Clark requires a good process of transferring an engraving from paper to glass. He at present varnishes the glass and brings the print into contact with it; then places the whole in water containing a little sulphuric and nitric acid. He is not quite satisfied with the result. Can any of our readers give additional information. We fancy the process he uses is a good one, but probably requires practice to ensure success.

A. B.—It is possible that by proper effort you may succeed. We will see if we can aid you.

Negative Varnish.—In the recipe for negative varnish given in Mr. Warner's letter in our last, for "turning" the plate read "warming" the plate.

E. T., J. H., J. Jones, Economy, E. E. L., and several other correspondents, together with several articles in type, are compelled to stand over until next week.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 181.—*February* 21, 1862.

## VARNISHING AND WAXING PRINTS.

We have received several enquiries recently as to some efficient means of varnishing photographic prints; the objects for which such a process is proposed being two-fold: to give more brilliancy, depth, and transparency to the picture; and protect it from the destructive action of varied atmospheric conditions. From the earliest production of paper proofs, photographers have had a hankering after some means of giving increased depth and transparency to their shadows; or, rather, of giving full effect to all that really existed in the picture. The mode in which photographic prints are obtained has always had a tendency to produce the picture slightly within the texture of the paper, rather than entirely on its surface, and hence a slight loss of detail and transparency in the shadows. The application of a varnish tends to rendeem this defect by making the image "bear out" more perfectly. The use of albumenized paper, which, by keeping the image on the surface, has tended to give more brilliancy and sharpness, came into vogue chiefly on this account, and is, we apprehend, at least for the present, likely to continue in use. To our own taste the use of albumenized paper, although under existing circumstances a necessary evil, is bad enough; but the additional use of varnishes is worse. The use of glazed surfaces for photographic pictures is, we believe, purely a conventional taste, which has arisen rather out of the exigencies of the art, than from any beauty such surfaces possess. We cannot doubt for one moment that, if prints equal in depth and vigour, purity, brilliancy, and detail could be produced on plain paper, albumenized prints would be at once scouted as vulgar and inartistic, and varnished prints not less so.

In the present state of our printing facilities, however, it is clear that all the detail and brilliancy that is in the negative cannot at all times be secured in plain paper, nor even on all samples of albumenized paper. Many photographers will, therefore, prefer the delicacy and sharpness, depth and vigour, to be obtained from a glazed surface, to the chaste and pure, albeit sometimes feeble and dull, simplicity of plain paper. For the benefit of those of our readers interested in the matter, therefore, we have a few suggestions to make on the choice of material, and the mode of using it.

A variety of varnishes and other substances have been recommended and used, to give a highly-glazed surface to photographs. Perhaps the most perfect surface is that obtained by the French method of applying a coating of gelatine. A piece of plate-glass with a very perfect surface is carefully cleaned, then sponged with fresh ox-gall. Before it is quite dry it is coated with a hot solution of fine gelatine, about twenty grains to the ounce. When it is well set and free from tackiness, but not so entirely dessicated but what it would retain the impression of the finger, the picture is laid upon it, face down, and pressed all over; carefully avoiding the enclosure of air bubbles. When firmly in contact, it is left for some hours to harden. When quite hard the edge may be lifted with a penknife, and if the operation has been properly conducted, the picture will leave the glass with a gelatine surface of the most perfect character. This gives a brilliant effect to the photograph; but it is sadly suggestive of the covers of those pretty French boxes which contain *bon bons*. If handled with damp fingers, moreover, the gelatine becomes tacky and dull. To obviate this it has been proposed to first coat the plate with a tough collodion, and pour the gelatine on that, so that the completed picture will have a surface of collodion.

A step beyond the gelatine surface is that obtained by the principle of French polishing. The picture is first coated with gelatine, applied with a large brush. When this is perfectly set, a solution of white shellac in spirits of wine is applied with a piece of cotton wool rolled up in a piece of linen cloth. The method of applying this is, as we have said, analogous to French polishing, a light circular motion being used. It requires some manipular skill, and produces, when well done, a very fine, hard, and brilliant surface; but quite as meretricious and vulgar-looking as the gelatine.

Varnishes of all kinds may be used, from the old-fashioned solution of Canada balsam in turpentine, to Sœhnée varnish. If the print be on plain, or very slightly albumenized paper, it will require sizing or coating with gelatine, to prevent the varnish being absorbed in patches and bearing out with an uneven surface. If the paper be highly albumenized, preparation or sizing is not necessary. On pictures of any size the varnish should be applied with a brush, but in small ones it may be flooded as on glass plates. We have experimented with several kinds of varnish, and found little difficulty with any. The common crystal varnish answers well; as do several spirit varnishes. It is important in order to produce an even, fine surface, that a full-bodied varnish be used—a thin one being apt to sink into the paper, and dry irregular and dull. We have found that advertised as "penetrating varnish"—which on paper prints does not penetrate—work the best. Whatever spirit varnish be used, should be applied near a fire to avoid risk of chilling.

By far the best application, however, giving depth, transparency, and detail to the shadows, without adding offensive gloss, is a coating of wax. This may be applied to plain paper or albumenized paper, and whilst it brings out all that lay hidden in the shadows, it can be used so as to leave no perceptible gloss on the lights of the picture. Just so much may be applied, in fact, as appears to enter sufficiently into the surface of the paper to give it transparency without laying on it to give it gloss.

Regarding the second purpose which these coatings have been intended to serve, we shall not say much. If a photograph have received full justice in the processes of printing, fixing, and washing, we believe it should not fade, without any protective varnish. If it contain within itself the elements of its own destruction, a varnish may delay, but cannot prevent its doom. Some of the substances proposed may even accelerate its destruction. A coating of gelatine may decompose under the influence of moisture, and in its own decomposition hasten that of the print. The same is true of a thin varnish of gum arabic, which has been proposed. Most gums and resins have, moreover, in themselves a tendency to become yellow, and may thus aid in destroying the beauty of the print it was intended to protect.

Regarding wax, it is also slightly liable to discolour, but the very slight amount it is necessary to apply makes this consideration of little moment. The mode in which it is applied and the solvent in combination with it, is of some importance. A correspondent in a contemporary has recently been recommending the application of wax to prints on slightly albumenized paper, as removing the necessity for the use of highly albumenized paper, which he has found difficult to tone satisfactorily. He there recommends the use of turpentine as a solvent of the wax. This is decidedly wrong. The purest white wax should be used, and a solvent which entirely evaporates without leaving any residue. Turpentine leaves a residue, which will not only rapidly turn yellow, but which some chemists have thought might exercise a detrimental effect on the permanency of the print. Mr. Hardwich, speaking on this subject in a paper on the fading of positive prints, some years ago, remarked: "Turpentine, commonly used as the solvent [of wax], is liable to contain a principle possessing oxidyzing properties, as may be shown by agitating commercial oil of turpentine with dilute solution of sulphate of indigo, the blue colour of which it often quickly bleaches." There are, however, various solvents which are innocuous, and evaporate without leaving any residue. Pure benzole, chloroform, or essential oils. The essence of spike, lavender, or rosemary, the cheapest of the essential oils, we have used with complete satisfaction.

There is one class of pictures to which the application of wax will be of the greatest value: we refer to the developed prints produced by the solar camera. The chief defect in these prints arises from their being sunk too much into the texture of the paper, a consequent want of brilliancy resulting. Many continental photographers varnish their enlarged prints, and in pictures of this magnitude the effect is not so offensive as in smaller prints; but we apprehend that wax, whilst answering the same end, would be still more free from objection.

Some time ago we called the attention of our readers to the advantages of Clausel's encaustic paste for this purpose. Our attention had been called to the preparation by Mr. Rejlander, who generally uses it upon his prints. It is prepared by Bailey and Son, of Wolverhampton; and, if we remember rightly, the recipe was imparted to Mr. Rejlander by the late Prince Consort. It consists of white wax, *oglio cotta*, (which is, we believe, an Italian preparation of poppy oil inspissated by heat) and an essential oil. This is easy to use and effective when used. Messrs. Newman, of Soho Square, we believe, manufacture an enamel or encaustic paste of a similar kind.

The best mode of applying the preparation of wax is to rub a thin coating all over the surface with a piece of clean cloth or the fingers; and then with a piece of woollen fabric, which is quite clean, polish well, crossing and recrossing the strokes, until a fine rich surface is obtained, giving richness and depth, but without the offensive glaze of varnish. Touching out of any slight defects should be done first, and after waxing the inequalities of surface will be imperceptible.

## IODIDE AND BROMIDE OF SILVER:

### Researches into their Photogenic Properties according to the Circumstances under which they are obtained.

BY M. E. REYNAUD.

Most of the photographic processes known at the present day, are based upon the property possessed by certain salts of silver being sensitive to the action of light.

Among these salts, chemists have recognized that those most applicable to photography, on account of their greater sensitiveness, are the iodide, the bromide, and the chloride of silver. Photographers have naturally directed their researches upon these salts, and consequently to those salts which they form by double decomposition in the photographic film. We are therefore led to study the various properties of the iodide, bromide, and chloride of silver, according as these salts are obtained by the decomposition of one or the other of the soluble iodides, bromides, or chlorides, and also directly by iodine, bromine, or chlorine.

For the present, I shall limit myself to the study of the salts employed in the wet collodion process, commencing with *iodide of silver*; this salt being the basis of sensitized photographic collodion.

We know that iodide of silver is obtained by the double decomposition of an iodide and of the nitrate of silver forming the sensitizing solution. We have therefore to examine the different qualities of the iodide of silver, according as it is formed under one or the other of the following conditions:—

1st.—According as the collodion contains a solution of iodide of potassium, or of iodide of ammonium, or of cadmium, &c., or of some of these iodides together; or also of an excess of iodine.

2nd.—According whether the sensitizing silver solution be neutral, acid, or alkaline.

Let us suppose for a moment the silver solution to be slightly acid, as is the case usually in practice; and commence our study with the examination of the photogenic properties of *iodide of potassium.*

It is a well-known fact that the iodide of silver resulting from the decomposition of iodide of potassium, receives the luminous impression very slowly. A collodion which contains only this iodide is in fact one of the slowest; but it possesses some special qualities which it is worth while to examine.

First, let us mention its property of giving very dense blacks in the negatives, a quality which renders it so valuable in copying old engravings, the yellow paper of which acts but very feebly upon the sensitive film; and also, generally, for everything requiring great contrasts in the negative, always excluding the representation of animated objects on account of the slowness of photogenic action before spoken of.

Another quality of collodion iodized with iodide of potassium is an extreme delicacy of detail, which is due to the slowness with which the silver reduced on the glass plate during the development of the image, attaches itself to the impressed portions. This second property gives it the preference in obtaining very small negatives, such as are afterwards amplified in the solar camera.

I propose to return to this subject, and examine in detail the molecular state of the silver reduced upon the negatives, according to the products and processes employed. These researches will offer much interest for the solution of the problem of amplifying images.

*Iodide of cadmium*, with regard to rapidity, possesses qualities opposite to those of the preceding iodide; for the iodide of silver formed by it is one of the quickest in receiving the luminous impression; but, on the other hand, it possesses the serious defect of giving fogged pictures: this defect is corrected by the addition of bromide of cadmium; but a surer means of avoiding fogging without altering the sensibility, consists in adding to the collodion a few drops of chloride of iodine, or a very slight proportion (say about 1 or 2 per 100) of chloride of zinc. The use of a very acid silver solution will produce the same result. Without the addition of the bromide, this extremely rapid collodion will have the defect of being nearly insensitive to the green, yellow, and red rays.

I shall now speak of *iodide of ammonium.* This iodide possesses mixed qualities, which admits of its making a very good collodion, employed either alone, or preferably, with a small addition of bromide of ammonium.

Although this collodion is not so sensitive as that with iodide of cadmium, it is preferable to the latter on account of the artistic perfection of the images it yields.*

Let us, however, notice one of its defects, which consists in the great facility with which it forms spots in the sensitive film upon being immersed in the sensitizing silver solution. Certain researches upon this subject have proved to me that this effect is caused by the great facility with which the iodide of ammonium is decomposed into iodide of silver at the time of sensitizing; the liquid veins of the silver bath in motion impress themselves on the film, and it is particularly that part of the film resting on the edge of the bath that is spotted thus, which arises from the veins of the

* I must mention in this place a remarkable coincidence existing between the sensitiveness of the three salts studied above, and their solubility in alcohol. We perceive, in fact, that iodide of potassium, the least sensitive among them, is also the least soluble in this liquid, while the iodide of cadmium, which possesses very great sensitiveness, dissolves in it with remarkable facility.

solution, striking on the glass plate, being broken up on reaching the side of the bath. The result is an inequality of action upon the iodide; the inequalities are reproduced upon the film by reason of the promptitude with which the latter is decomposed under the influence of the nitrate of silver. From this we may readily conceive that this effect may be diminished by the employment of a vertical bath, especially by allowing the plate to descend gradually and gently into the solution: this is verified by experience.

The same kind of spots are produced also when the collodion contains a notable quantity of free iodine.

Lastly, the same accident occurs when the collodion contains too large a proportion of iodides, especially if the sensitizing silver solution is new and strong. Moreover, these various phenomena depend upon the relative quantities of pyroxyline, ether, and alcohol, contained in the collodion.

The three iodides we have examined are nearly all that are employed in the preparation of wet collodion. Sometimes, however, iodide of iron and iodide of zinc are introduced.*

*Iodide of iron* appears to me of no advantage in collodion. Much has been said in praise of its rapidity; as for myself, I have never observed anything remarkable in it in this respect; at least when this salt is produced, as recommended by M. Eugene Sahler, in the collodion itself, my various experiments lead me to suppose that the same result would take place with other iodides in the same condition.

I shall say only a few words upon *iodide of zinc*. Its properties are nearly the same as those of iodide of cadmium. It does not appear to me advantageous when employed alone; but I have obtained a very good collodion in employing it concurrently with other iodides.

Before speaking of the different bromides, it remains to examine the action of *iodine*, when free in the collodion. A well-established fact is the preservative action of iodine against fogged negatives. A pale collodion, that is, one containing no free iodine, sensitized in a neutral silver solution, almost always gives fogged negatives. To make the fogging disappear, the silver solution must be acidified, or what indirectly produces the same result, free iodine must be added to the collodion.

To this end, we may also make use of chloride of iodine, which, at the moment of sensitizing, is transformed into chloride and iodide of silver, and set a certain quantity of nitric acid in the film at liberty.

(*To be continued.*)

* I shall not in this place enter upon the examination of the iodides with organic bases, nor of the iodides of the metals of the first section, recently introduced.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Hydrosulphuric Acid.*—Frequent mention has been made in these articles of hydrosulphuric acid, or sulphuretted hydrogen, as it is just as frequently called, and in most works on photography it is referred to. It is essential, therefore, that the photographer who desires to acquire a knowledge of the chemistry of photography, should be acquainted with the history and properties of this body.

Hydrosulphuric acid is prepared by acting on a metallic sulphide with an acid, in a gas generating apparatus. As this apparatus is of very general use, we think it advisable to give a brief account of the readiest method of constructing one. A large, wide-mouthed bottle, containing about a pint, is fitted with a good cork. Through this is pierced two holes, to admit of moderately stout glass tubing, technically known as "quill tubing." One piece is long enough to reach to the bottom of the bottle, and to project about eight inches above the cork, being surmounted at its upper end by a funnel blown on to it (such "funnel tubes" can be purchased for a few pence at an operative chemist's); through the other hole in the cork a piece of glass tube about six inches long is fitted; this tube is bent at right angles; one arm just passes through the cork, and the other projects horizontally outwards. Another bottle is now selected of a smaller capacity to the former, and fitted in like manner with a cork having two holes in it. Through one hole a glass tube passes, one end of which reaches halfway down the interior of the bottle, and the other end, being bent, at about three inches from its extremity, at right angles, rises up to and just meets the bent tube of the larger bottle. In the second hole of the cork of the smaller bottle another right angled tube is fitted, one end of which just passes through the cork, and the other end of which projects outwards horizontally. Finally, a fifth piece of glass tube is bent at right angles about two inches from one extremity, and the other end cut off to such a length that when the bent end is on a level with the bent tube of the second bottle, the straight end is within an inch of the table. The tubes connecting the two bottles are then joined together by fine vulcanised india-rubber tube; the loose tube is in a similar way connected with the smaller bottle, and the apparatus is complete. The first large bottle is called the generating bottle, and the other the washing bottle. The latter is to be filled with water until it rises to about half an inch above the extremity of the tube, which we have explained is to project half-way into it, and the large bottle is to have about a dozen lumps (about the size of marbles) of fused sulphide of iron placed in it, which are then to be covered with water. The apparatus is then to be tested for leakage in the following manner:—moisten the surface of the corks, the necks of the bottles where the corks fit, and the india-rubber tubes, with plenty of water, then apply the lips to the loose tube hanging down, and blow air in gently; the liquid will be forced up each long tube in the bottles, and, upon stopping the end of the loose tube with the tongue, should remain at the same level quite stationary. If, however, the apparatus leaks, the column of liquid in the tubes will rapidly descend, and the condensed air will escape at the leaky places with a hissing noise, where also it may sometimes be seen bubbling through the water used to wet the corks, &c. If the leakage occurs round the neck of the bottle it may frequently be prevented by giving the cork a tighter squeeze into the neck. If the leakage be at the india-rubber joints, the best plan is to wet them and then bind them round with fine copper wire; but if it be at the holes in the corks, or through flaws in their substance, the remedy will not be so simple. A paste must be made of linseed and almond meal, and, having well wetted the corks, they must be well smeared over with this until all leakage has been found to have ceased upon being tested for; the linseed coating may be smoothed over with the fingers, having wetted them with a little water. As soon as the apparatus is tight it is ready for use. A good stoppered bottle is nearly filled with distilled water, which has been recently boiled and allowed to cool (to deprive it of air), and then placed near the washing bottle, so that the loose glass tube dips into the distilled water and goes nearly to the bottom. Dilute sulphuric acid (one part of oil of vitriol to four of water) is now to be poured into the generating bottle through the funnel tube when the hydrosulphuric acid gas will be immediately seen to rise from the sulphide of iron through the liquid in the form of minute bubbles. The reaction is expressed in the following equation

$$FeS+HO.SO_3=FeO.SO_3+HS.$$

FeS being the sulphide of iron and HS being the hydrosulphuric acid, a compound of equal atoms of hydrogen and sulphur; the other product of the reaction being sulphate of iron $FeO.SO_3$. The gas accumulating in the upper part of the bottle drives the air before it, and bubbles first through the washing bottle, where it is deprived of its impurities, mechanically carried over, and then through the bottle of distilled water, where it is absorbed. It is necessary either to perform this operation in the open air, or under a chimney where there is a good draught, in consequence of the deleterious nature of the gas, and also of its action on metals and the different chemicals, especially silver salts, met with in the photographic laboratory. In fact, so injurious is the presence of this gas to the ordinary photographic processes, that the photographer who has not another room in which to perform such operations as these, except the one in which he prepares his sensitive plates and paper, should on no account attempt to prepare sulphuretted hydrogen, but either purchase its aqueous solution ready made (and even this will require great care in using), or dispense with it altogether.

Hydrosulphuric acid is a colourless gas, of an intensely disagreeable odour of rotten eggs, very poisonous in its undiluted state, and injurious even when dilute, producing fainting and asphyxia, and acting like a narcotic poison. It burns, like hydrogen, with a blue flame, forming water and sulphurous acid, with deposition of sulphur. It is soluble in water when passed through it, and as this aqueous solution is the one most frequently of use to the photographic chemist, we have given above the method of forming it. The bottle should from time to time be removed from the evolution tube, and having inserted the stopper, be well shaken; if, upon removing the stopper, the contents seem to suck inwards, it is a sign that the water is not yet saturated, and it must be submitted to the stream of gas once more, the generation being kept up in the large bottle by adding dilute sulphuric acid from time to time; if however the stopper, upon being removed, appears to be blown out, it is a sign that the water is saturated with gas, when the bottle must be carefully stoppered and placed aside for use. It is advisable, if the stopper be well ground in, to allow the bottle to stand upside down in a corner, its weight resting on the stopper; this prevents the possibility of any air being absorbed by the aqueous solution. In this case the stopper, before being put in, should be well lubricated by being warmed and then rubbed over with solid paraffin.

The amount of sulphuretted hydrogen gas which water will absorb is from two and a half to three times its volume. The solution forms a colourless liquid, having the odour of the gas, which, when exposed to the air, or heated, is entirely evolved. Upon standing, the solution absorbs oxygen from the air, which unites with the hydrogen of the sulphuretted hydrogen, forming water, with precipitation of sulphur, which gives the liquid a milky appearance:—

$$HS+O=HO+S.$$

The chemical reactions of hydrosulphuric acid, and the uses to which it may be applied in the photographic laboratory, must be deferred to our next article.

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

### Lecture iv.—Jan. 2, 1862.

With regard to the duration of the impression upon the retina, Professor Tyndall commenced by illustrating a very simple and beautiful form of experiment. The illustration was effected by means of the electric light, an image of the effect produced being projected on the screen; but the same thing, the lecturer explained, could be tried by each of his audience in the following manner:—Take a knitting needle, stick a little silvered bead on the top of it by means of marine glue or sealing wax, and having fastened the other end firm in a vice, strike it so as to cause it to vibrate. When the sunlight, or even the light of a lamp or candle is allowed to fall upon the bead upon striking it, the needle vibrates, and the bead goes on describing the most beautiful figures. Generally there is formed a figure of 8, which denotes the vibrations of which the rod is capable; at other times, the spot of light forms the most beautiful circles and ovals, with crimped or serrated edges, and every moment changing into some new form. Several popular toys depend upon this principle of the persistence of vision, amongst others being the chromatrope.

The subject of *irradiation* was then mentioned. This effect is produced when the eye looks at a luminous object; it appears larger than it really is, and the more intense the light, the larger does the object appear. Thus the full moon appears larger when looked at with the naked eye than when looked at through a dark glass. The bright new moon appears also to belong to a larger sphere than the dusky globe which it partially encircles. The lecturer illustrated this by exhibiting two rings of exactly the same size; one being black on a white ground, and the other white on on a black ground. Upon illuminating this with the electric light, the white ring appeared considerably the larger of the two, and even in the ordinary light of the room there appeared a slight difference in size. Another illustration of the same subject was afforded by a fine platinum wire ignited white hot by the battery; it appeared considerably thicker in that state than when it was cold, or when it was looked at through a coloured glass.

The special subject of the day's lecture was then commenced. A slice of white light was first of all projected on to the screen, and then a little glass prism was interposed in its path. The beam was bent very much on one side, and the white light was reduced to its coloured components. This is the grand discovery of the great Newton. The white light of the sun was then explained to be made up of an infinite number of rays of different refrangibilities. Each particular refrangibility corresponds to a particular colour; hence the number of colours involved in solar light is infinite; but for convenience sake, we divide these colours into seven, which are called primary colours. These are Red, Orange, Yellow, Green, Blue, Indigo, and Violet. Of these colours the red is the least refrangible, and the violet the most refrangible; the other colours being intermediate between these two. The spectrum of the electric light was then formed, and it was shown that by placing a lens in front of the prism, the colours could be so blended together again as to reproduce white light. The illustration was carried still further by taking the coloured rays forming the spectrum, and actually building them up again into the form of the very coal points from which they originally issued. Newton's experiment of the blending together of the seven primary colours into white light was then performed by projecting the image of a glass circle, painted with transparent colours, upon the screen. It was caused to rotate rapidly, when the different colours vanished, forming white light.

The spectrum which had hitherto been employed to illustrate these facts was from a glass prism; and attention was drawn to the width which the colours were drawn apart when this material was used. Some substances, it was stated, had the power of drawing the colours more widely apart than others; glass, for example, does this more effectually than water, and bisulphide of carbon more effectually than glass. This drawing asunder of the colours by a prism was called *dispersion:* thus the greater the distance between the red and violet ends of the spectrum, the greater is the dispersion. A hollow glass prism filled with bisulphide of carbon was then employed instead of the glass one to disperse the light, when the colours were seen to be pulled more asunder, and a more richly coloured spectrum was produced. Another bisulphide of carbon prism was then interposed in the course of the rays after they had undergone dispersion by the first prism, when the spectrum was greatly increased in length, stretching entirely across the screen. This was employed to explain the production of colours in nature. A bunch of red artificial flowers with green leaves, was introduced into the red extremity of the spectrum. Instantly the red flowers glowed with increased brilliancy, whilst the green leaves were perfectly black. Upon passing them along, as the bunch approached the green rays, the flowers grew black, and the leaves shone out with their natural colour, and when they left the green, and arrived at the blue rays, the whole bunch appeared jet black. The explanation of this is, that the colouring matter of the red leaves has the power of completely quenching, absorbing, drinking in, and destroying the blue, green, and yellow, whilst the only light which it is capable of reflecting back is the red. The same fact was afterwards illustrated with coloured sealing wax. Mr. Anderson, the assistant, (possessing a tolerably ruddy complexion,) was then requested to pass along the rays of the spectrum from the red upwards. At first his face shone with the bloom of youth; as he passed towards the yellow, one side of his face assumed a very cadaverous aspect, which became perfectly frightful when he entered the blue rays. Upon returning, one side of his whiskers became quite radiant, whilst the other side of his face was corpse-like; until, upon fairly entering the red ray, he shone in the full splendour of boyhood. In fact, the colours of bodies are entirely due to the light which falls upon them. If the white light of the sun were simple instead of compound, we should only have light and shade in the world, but there would be no colour.

The beautiful spectra produced by the combustion of various metals, was afterwards exhibited. A metal heated to whiteness gives a *continuous spectrum* as long as it remains in the solid or liquid condition; but when the metal has been reduced to vapour, and when that vapour is rendered luminous by intense heat, the spectrum of the vapour is usually composed of brilliant bands. Every metal has its own distinct system of bands. These were beautifully exhibited in the case of cadmium, copper, and zinc, by placing the respective metals on the lower carbon pole of the electric lamp, and refracting the light so evolved by means of the usual arrangement of prisms, lens, and slit. The bands produced by copper and zinc having first been exhibited, those of their alloy, brass, were shown, by which it was seen that the bands of each metal are produced in the spectrum of the alloy. Thus, knowing the bands which each separate metal produces, we can determine from the spectrum of an alloy the metals of which it is composed. The bands of metals were also shown to be produced when the salts of the metal are raised to a sufficiently intense temperature.

The light evolved by the ignition of the vapour of the metal sodium was then exhibited. This is intensely yellow, and gives a spectrum consisting of one single yellow band. This was first shown to be the case, and it was then explained that a luminous vapour absorbs those rays, which it can itself emit. Thus the light of incandescent sodium vapour is intensely yellow; but when a beam from the electric lamp is sent through this vapour, the yellow rays of the electric light are intercepted. This was shown by first projecting on the screen the continuous electric spectrum, and then interposing the vapour from a piece of burning sodium in the path of the rays. A broad black band was instantly ploughed out of the spectrum in that part where the yellow soda line formerly fell.

The recent theory of the composition of the sun was finally briefly examined. The sun, according to this, is supposed to be composed of a solid or liquid central portion, which of itself would give a continuous spectrum; but this nucleus is surrounded by a flaming atmosphere, through which the rays from the nucleus have to pass. This solar atmosphere, or *photosphere* as it is often called, intercepts those rays of the nucleus which it can itself emit, and hence the solar spectrum is always furrowed by dark lines (*Fraüenhofer's lines*). From these lines we can determine the metals which produce them; and in this way it has been found that many of the terrestial metals are present in the sun.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

Cameras.—*Continued.*

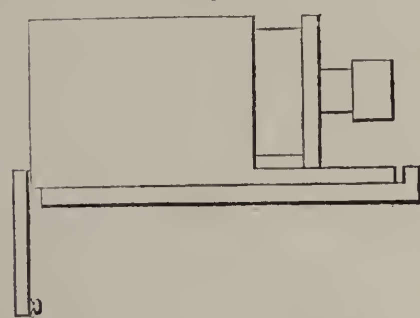
*The Focussing Screen.*—It has always appeared to me a mistake to make the focussing screen a separate piece by itself, instead of attaching it permanently to the camera. It not only has to be put into the instrument and taken out again every time that the focus is examined, but when taken out it has to be laid aside, generally in a hurry, and it runs a great chance of being broken. This applies to all descriptions of cameras, though the remedy cannot in every case be effected in the same manner.

In cameras for the studio it may without any inconvenience be hinged at the bottom, and, opening outwards, it will lie, when not in use, upon the top of the camera stand if this latter is larger than the camera, (fig. 5), or it will hang down parallel with the back if the camera projects beyond the stand, (fig. 6). In either case it will be out of the way of the plate holder, and the arrangement offers no practical objection, while it cannot be denied that it is much more convenient than the usual detached focussing screens.

Fig. 5.

When constructed in this manner, the frame of the screen

Fig. 6.



will not enter the grooves which receive the plate holder, but will lie flush up against them. It is kept up in its working position by means of a spring button on the back of the camera.

There many other ways in which the focussing screen can be constructed to form a permanent part of the camera, but I have described this one in preference, as it is the most generally applicable, and the simplest.

The ground-glass which is now supplied for the best focussing screens is of a very superior description to that which we had to use at first. The grain is fine and even, and the image appears upon it smooth and distinct in the details. Still I am inclined to think that we should find an advantage in using a polished glass, flashed with an extremely thin layer of opaque white glass instead of the granulated surface: for this would be as good or better than the ground-glass for ordinary purposes, and a high magnifying power might be used to focus subjects offering much minute detail, or the negatives of which were intended to be subsequently enlarged with the solar camera.

I am not aware that there is any obstacle to procuring glass flashed in this way; if not, I am inclined to think its use should be recommended, as just now small portraits requiring minute care in focussing are in vogue; and the time is not far off when enlarged pictures from small original negatives will be raised to their proper place in public estimation, and it is essential for these latter, which are to be looked at magnified, that the operator be able to assist the eye with a magnifier while arranging the focus.

(*To be continued.*)

* Continued from page 74.

## ON THE MANUFACTURE OF COLLODION.

BY THOMAS SEBASTIAN DAVIS.*

To make the pyroxyline, take 3¾ ounces (avoirdupois) of ordinarily dried and pounded nitrate of potash and mix it in an earthenware jar with 10½ fluid drachms of water. Pour upon this 4½ fluid drachms of nitric acid, sp. gr. 1·42 and 8¼ fluid ounces of the strongest commercial sulphuric acid, sp. gr. about 1·845, and intimately mix the whole with a glass rod. As soon as the mixture is at the temperature of 150° to 145° Fah. introduce 100 grains of finely divided cotton, in small quantities at a time, taking speecial care that each quantity is saturated with the acids before the introduction of the next, and allow the whole to remain at rest, standing upon a non-conducting surface, for about ten minutes. After the lapse of this interval, press the cotton with the glass rod against the bottom of the vessel, and pour off as closely as possible, the fluid mixture. The pyroxyline should then be quickly washed in three or four changes of water, and subsequently in several additional ones, with the precaution of pressing as much of the moisture as possible from the cotton between each change; by so doing, the cotton will be quickly and thoroughly freed from the slightest trace of acidity. As a precautionary measure, one or two of the latter washing waters may be rendered slightly alkaline by the addition of a few drops of ammonia: that used for the final cleansing should be neutral and distilled. The cotton may now be allowed partially to dry spontaneously, but the last traces of moisture should be driven off by the aid of a hot-water bath. As the quantity of water in the above formula constitutes the element of success, or otherwise, in the manufacture of the pyroxyline, it may be as well to refer to the extreme ranges and the resulting effects. If we add 12 fluid drachms of water instead of the 10½ recommended, the result would be that the greater portion of the cotton would be dissolved in the acids, and the remainder, if washed and dried, would be found to dissolve but sparingly in ether and alcohol, and yield a powdery, incoherent, and unsuitable film. If, upon the other hand, we were to reduce the quantity of water to 8 fluid ounces we should find that the cotton would be scarcely altered in its appearance when washed and dried, have but little solubility in an etherial mixture, and yield a film possessing a "crapy" texture. It thus follows that all the more characteristic pyroxylines may be produced by a comparatively trifling alteration in the strength of the acids. When, however, the water is added to the extent given in the instructions, the detached particles of cotton will give a milkiness to the first washing waters, it will present, when wet, a semi-transparent appearance when held up to the light, and after subsequent desiccation will dissolve easily and scarcely without leaving a residue, either in glacial acetic acid or an etherial mixture of alcohol. From this pyroxyline the plain collodion is to be made as follows:—

| | | | |
|---|---|---|---|
| Ether, methylated, sp. gr. | ·720 to ·730 | ... | 4½ fluid ounces |
| Alcohol ... | ,, ·837 | ... | 1½ fluid drachms |
| Pyroxyline ... | ... ... | ... | 6½ grains. |

The methylated ether referred to above can be commercially obtained of either the above strengths; the alcohol is the ordinary rectified spirit of 56·60 over proof of the distiller.

The sensitizing solution to be added to the plain collodion is a question of importance second only to the manufacture of the pyroxyline. I deem it exceedingly desirable that care should be taken that the addition of the sensitizing solution to the plain collodion should not be attended with the slightest precipitation; rather that the slight milkiness which the plain collodion may retain even after long standing should immediately disappear upon the addition. In order to ensure this effect, I recommend that a weaker alcohol should invariably be used in the manufacture of the plain collodion, than that which is employed as the solvent for the salts. I am aware that the greater facility with which the salts employed are dissolved by the weaker spirit has led to a practice at variance to the one advocated; but under such circumstances a precipitate generally occurs. The composition of the iodizing solution is to be as follows:—

| | |
|---|---|
| Iodide of potassium ... | ... 6 grains |
| Iodide of cadmium ... | ... 18 grains |
| Bromide of potassium ... | ... 2 grains (in excess) |
| Chloride of ammonium | ... 2 grains (in excess) |
| Alcohol, sp. gr. ·805 ... | .. 1 fluid ounce. |

I give the preference upon chemical and photographic reasons, to the combination of iodide of potassium and iodide of cadmium over the combinations of other iodizing salts, and the stability and solubility of the latter combines conveniently with the instability and sparing solubility of the former. The alkaline iodide is, moreover, eminently qualified to give a great and excessive vigour of intensity, whereas, the metallic salt by itself imparts an image of the opposite character. A combination of the two in the above proportions yields probably the best image that can be realized by the use of iodides alone. The preference may be given to the potassium iodide over the ammonium, inasmuch as the former is less liable to decomposition, and the consequent liberation of free iodine, than the latter. The iodide of sodium is almost identical in its action and properties with iodide of potassium; but as the latter can be obtained with greater facility in a state of purity, convenience suggests its employment. The effect of adding chlorides and bromides to the combination of the above salts is to lessen the exaggerated contrasts which are likely to attend the use of a plain iodized collodion, to give greater immunity from stains and fogging, and what is of considerable moment, permit a longer exposure, where necessary, for the delineation of objects situated in shade, without the prevention of the vigorous rendering of the higher lights. The beneficial effects of the chloride of ammonium will be but trifling as far as regards the use of the collodion for the wet process. It will give however greater sensibility, increased brightness of negative, and general correctness of tone to plates, from which the whole of the free nitrate of silver has been washed away for the purpose of applying a preservative. With respect to the introduction of the potassium bromide in preference to the bromide of ammonium, it may be remarked that although it be less freely soluble in alcohol, yet for negative pictures, in combination with mixed alkaline and metallic iodides, it is sufficiently so to produce the desired effect. By its use we prevent the possibility of double decomposition, which under certain circumstances may otherwise take place. The salts, as described, should be dissolved without heat in about three-fourths of the alcohol, and after having been frequently shaken therein for two or three days, and carefully filtered, the remainder of the spirit may be then added. The iodizing solution is to be mixed with the plain collodion in the proportion of one volume of the latter to three of the former, and it will be found that the resulting compound will meet every possible requirement of the artistic photographer, with the exception of very rapid sensibility. In furtherance of the object of obtaining increased sensibility, I have tried many published and original experiments, but without meeting with any marked success, unaccompanied with some serious inconvenience. The generality of these experiments have been directed to the introduction of such salts into the sensitizing solution as form by double decomposition with nitrate of silver, insoluble compounds more or less effected by actinic power. The salts which can be successfully introduced for the purpose are obviously limited to those which are partially soluble in a mixture of alcohol and ether, and afford insoluble compounds when the electro-negative element enters into combination with the metallic base. In accordance with the above conditions I have selected for my experiments the acetates, malates, citrates, succinates, benzoates, arseniates, arsenites, cinchonates, &c. The only instances in which I have obtained any indications of increased sensibility have been in those in which the salts introduced have possessed an alkaline reaction. Amongst these I may especially mention the arsenite of potassium. As silver salts of a character so formed are prone to reduction under the influence of the ordinary developing agents, their employment is to a greater or less extent attended with a general fogging of picture. In following out some experiments in connection with sensibility, I introduced the terchloride of gold into the sensitizing solution in the place of the less soluble chloride of ammonium. The exaltation of sensibility caused by this addition was both marked and decided, but the known facility of reduction to which this salt is subject, apart from the influence of light, under the action of pyrogallic and protosulphate of iron solutions, defeated the possibility of its successful application. So great is the aptitude of this salt to reduction, that the introduction of a single plate covered with a film containing a mere trace thereof is sufficient to render a large quantity of the nitrate of silver bath solution inapplicable for further photographic purposes. It was therefore with some surprise that I subsequently found that Mr. Barnes, in his excellent and able manual upon the use of collodion upon a thin substratum of albumen as a dry plate process, had not only tried,

* Concluded from p. 79.

but suggested, the use of chloride of gold as an accelerator many months before the date of my experiments. As a general result of my researches in this direction, I am inclined to endorse the opinion heretofore expressed, that at the present moment we must use, even if we are not to rest satisfied with collodions of ordinary sensibility, and that we have not as yet discovered any "accelerator" of unexceptional utility. We may, however, perfect the manufacture of such collodions by a critical study of those minutiæ to which I have endeavoured to direct attention in the present paper.

## PHOTOGRAPHIC PIRACY.

A case of some interest to photographers was tried before the Lord Chief Baron and a special jury, in the Court of Exchequer on Tuesday, the 18th inst. The case as reported in the *Times* stands as follows:—

MAYALL *v.* HIGBY.

Mr. Vaughan Williams and Mr. Blaine were counsel for the plaintiff; Mr. M. Smith, Q.C., and Mr. Aspland for the defendant.

This was an action by Mr. Mayall, the well-known photographer of Regent Street, to recover the original photographic portraits of several distinguished persons, and also damages for the alleged illegal use which the defendant had made of them in copying and selling diminished impressions in the form of *cartes de visite*.

Mr. Mayall was called, and gave the following evidence:—In 1857 Mr. Tallis, the publisher of the *Illustrated News of the World*, called upon me and asked me to lend him a number of my portraits of eminent men, for the purpose of engraving and publishing weekly in his paper. I agreed to lend them on condition only that he would return them as soon as engraved. It was subsequently arranged that I was to have an advertisement inserted in his paper gratis. I handed over to him, from time to time, about 200 photographs for engraving; among them were Lord Brougham, Prince Dhuleep Singh, Mr. Serjeant Shee, the Prince Consort, Lord Campbell, the Rev. J. Bellew, and other distinguished persons. They were all engraved and published in the *Illustrated News of the World* weekly. Some of them were returned after being engraved. I also lent him photographs which, to the best of my belief, have not been engraved. Among them were the Earl of Dartmouth, the Duke of Rutland, Mr. Bernal Osborne, Mr. Tom Taylor, the Rev. Baptist Noel, Prince Joinville, Lord Rosse, and others. The photographs were taken by me by arrangement. Lord Brougham and others came to me for their portraits. I stated to them that the negatives were my property, and I asked their permission to publish them; they gave me their consent. In many cases permission was refused. On all the photographs produced permission was given. I took the portraits at my own expense, and gave a copy to the parties who sat for them.

The portrait of Lord Brougham in an oratorical attitude was produced and handed to the jury.

Witness continued,—Mr. Tallis became a bankrupt in 1860, but his paper continued as before. After his bankruptcy I found that reduced copies of my photographs were being sold. I had not myself published or authorized to be published any copies of them. I found that Mr. Bennett, of Bishopgate Street, was selling them, and I called upon him and ascertained that he was publishing them for Mr. Higby, the defendant. Mr. Higby afterwards called upon me, and offered to sell me the photographs and the negatives he had made from them for £250. I stated I would give him no definite answer till I had consulted my legal adviser. On his calling again I refused to hold another conversation with him.

In cross-examination.—I have sold a few copies of the original of Lord Brougham and a few others to their private friends at £2 2s., with an express understanding that they were not to be copied. I sold no copies of Prince Dhuleep Singh except to himself. No offer that I can recollect was made for Sir John Pakington. (Laughter.) Alderman Carden was returned by Mr. Tallis. As soon as I found that the portraits were being sold I wrote to the assignees of Mr. Tallis, saying they were my property.

The evidence of Mr. Mayall was confirmed by his secretary, and witnesses were called to prove the value of the photographs and of the reduced copies of them sold by the defendant.

On behalf of the defendant, Mr. Smith stated that he should prove that Mr. Higby had bought the portraits from the assignees in bankruptcy of Mr. Tallis under the impression that they had a good title to them, and that he had paid considerable sums for them, and was acting in a perfectly *bonâ fide* manner.

The Chief Baron said that after the evidence that had been given there was no pretence for saying that any property in the photographs passed to the assignees; that the defendant, though acting *bonâ fide*, had no right to them, and must look to the assignees for his remedy.

It was ultimately arranged that a verdict should be entered upon the count in *detenue* for the plaintiff for 40s., upon the understanding that the photographs should be given up to the plaintiff; and, after direction from the Judge, the jury returned a verdict for the plaintiff of £25 upon the count charging the defendant with illegally using the photographs by making and selling reduced copies of the same, the question being reserved for the Court whether any such action would lie in the absence of any law of copyright relating to photographs.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting of this Society was held at the City of London College (formerly Sussex Hall), Leadenhall Street, on the evening of Thursday, the 13th instant. The Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a former meeting were read and confirmed, and the following new members were elected:—Messrs. H. P. Robinson, of Leamington, J. J. Cole, C. W. Wood, Harman, Hoskins, and Shooter.

Mr. T. Clark Westfield presented to the Society a copy of his work on Japan, illustrated with photographs, which was noticed in our last

Messrs. Smyth and Blanchard presented to the Society two very fine photographic copies of paintings by Mr. Noel Paton.

Mr. G. Wharton Simpson proposed, after the routine business, that the first act they did in the new premises, which promised to be eligible and convenient in every respect, should be to pass a vote of thanks to their worthy President and the Committee of St. Peter's School Rooms, Walworth Road, for their liberality in so long placing the rooms at the disposal of the Society, The vote was carried at once by acclamation.

Mr. Howard proposed the effects of the Society left in the school-room, consisting of benches and some planks, &c., for the purpose of making long tables, be offered to the Committee of the School Room.

Mr. Simpson seconded the resolution, which was carried, as was also a motion by Mr. S. Davis, thanking Mr. J. Rennel for a liberal offer of an excellent room gratuitously; but which not being sufficiently central had not been accepted.

The Secretary, referring to photography in the International Exhibition, said:—It would undoubtedly be a matter of great and very serious regret if, of all the arts and sciences it is the great business of this year of 1862 to show the world in their most advanced stage of development and promise, photography alone should be represented by a poor, a meagre, or insufficient display. I hear with pleasure that the Committee appointed by Her Majesty's Commissioners for the management of this department of the glorious International Exhibition are most earnestly doing their work, and that they spare neither personal labour nor thought in working out their very important tasks; but the space devoted to photography in the Kensington Exhibition is so very circumscribed, and so unfortunately subdivided, that it seems extremely desirable that an exhibition of photography additional to it, and calculated to convey a more thorough and comprehensive view of the art in its various pictorial and scientific departments, should be organised, and opened at as early a period as possible after the present date. Influenced by such considerations, your committee have for some months past contemplated and discussed the possibility of opening an independent photographic exhibition, which, without opposing, should be additional to the photographic portion of that at South Kensington. Having matured a plan, and put themselves in written communication with the Secretary of the Crystal Palace Company at Sydenham, Mr. G. Wharton Simpson, Mr. Sebastian Davis, and myself, at the request of the Committee, waited upon this gentleman to make some definite arrangements, enter into particulars of detail, &c., and I am enabled to announce that we were met with ready courtesy regarding all our proposals, and that negociations are pending which will, I hope, issue satisfactorily both for this Society and all persons interested in the progress of photography throughout the world. The necessity for an auxiliary exhibition needs no urging: among photographers, we have reason to believe that it is universally felt, and the simple fact that photographs have been prepared for exhibition in all parts of Europe by those who have either received no allotments of space, or have been grievously disappointed in the small portions set apart for them, lead us to hope that a collection may be gathered together, which, for quantity, quality, variety and interest, will probably surpass any exhibition organised under less rare and peculiarly favourable conditions. The opportunity is not likely to be again proferred for many years to come, and your Committee trust that the personal exertions of every individual member will aid them in doing justice both to it and the art we represent. We are anxious to embody all the more recent improvements and discoveries in the art, to illustrate fully the capabilities of different processes, and to show, in various ways, and as completely as possible, all the various applications of photography, to exhibit select specimens of choice or novel apparatus, and, in short, to carry out all suggestions which will tend to raise the art as art in public estimation, and at the same time give the collection a full share of scientific interest, and great educational value.

Mr. Sebastian Davis then read a paper "On the Manufacture of Collodion" (see p. 79).

At the conclusion of the paper Mr. Davis produced various samples of pyroxyline, illustrating the effects of strong acids at a low temperature, and of weak acids at a high temperature. A sample, also, made after the formula recommended by Mr. Davis was shown, and a portion of it added to a mixture of alcohol and ether. It dissolved almost immediately without appreciable residue.

The Chairman, in proposing a vote of thanks to Mr. Davis, referred to the great value of such papers, involving, as they did the careful prosecution and accurate recording of important chemical experiments.

Mr. Simpson, referring to the remarks in Mr. Davis's paper, suggesting the possible accelerating qualities of various organic and other compounds of silver, said, if he remembered rightly, the arsenite of quinine had been used in some of the earliest experiments with collodion. Dr. Diamond had shown him a very early collodion positive, in which there were very distinct traces of five separate tints obtained. The collodion by which it was obtained contained the salt just named.

Mr. C. J. Hughes remarked that, notwithstanding the increased commercial facilities of procuring good working collodion, without the trouble of each photographer preparing it for himself, the subject was as important as ever; and, notwithstanding all the research which had been made, we did not possess that amount of certain and definite information on the subject which we felt we ought to have. The matter appeared simple enough, perhaps, but no one could grasp the whole subject, but those who had had very large experience in every phase of making and using collodion. There were many causes which contributed to render certainty on this subject very difficult to obtain: the intangible chemical composition of some of the elements involved; the trembling state of balance upon which the best conditions depended, and the relation and influence which other things, such as the bath and developer, had in affecting results, all contributed to render the subject a difficult one. Those only who had by experiment realized these difficulties, could properly appreciate the value of a paper like that of Mr. Davis. The subject was wide enough for many evenings' discussions. First, there was the cotton wool and the various substances which had been proposed as substitutes, such as linen, flax, paper, and even silk. Mr. Hardwich had given these substances much attention, and the result of his experiments was, that cotton was out of all proportion the best. True, there were some persons who still preferred paper; but the preference was generally based rather upon experience than any theoretical superiority. Next came the question of acids. We knew that nitric acid alone would produce the desired result; but it was much more manageable and satisfactory to use the mixed acids and water. The use of nitrate of potash used to be very common, but it had now fallen much into disuse, on account of the difficulty of getting rid of the sulphate of potash formed. He had been a little surprised to hear that it entered into Mr. Davis's formula, and should be glad to know the especial ground upon which he used it. Of course, in speaking of nitrate and sulphuric acids, we only meant solutions of the anhydrous acids, and it was convenient in practice to use them of such a strength as admitted the addition of water, which, by generating heat, gave them a suitable temperature. Next came the proportions of acids. Mr. Hardwich had tabulated the results of almost every proportion, from three of nitric acid to one of sulphuric, to three of sulphuric to one of nitric. The maximum of nitric acid gave a film in which there was very little contrast; whilst with excess of sulphuric the pyroxyline gave a film yielding a vigorous intense image. Experience alone could decide upon the desirable medium. The question of temperature came next, that entirely depended upon the quality of pyroxyline desired, and upon the strength of acids used. With strong acids a high temperature was necessary; whereas, if much water were added to the acids, a much lower temperature would produce a similar result. The time of immersion would also be affected by similar causes. He remembered that Mr. Hadow, some years ago, spoke of leaving the cotton in the acids all night; that would, of course, be at a temperature of about 60° Fah. At the temperatures now generally used, about ten minutes seemed to be regarded as sufficient. Mr. Hughes proceeded to refer to the use of nitrous acid and its general abandonment, and to the importance of thorough washing, and the advantages of an alkali wash in neutralizing any remaining acids. The strengths and proportions of the solvents were next passed in review, and the importance of considering them in relation to the quality of the pyroxyline and the size of plates intended to be used. Coming to the question of iodides and bromides, and the undoubted advantage of the latter in conjunction with iron development, he remarked on the singularly large proportion of bromide used in America compared with what could be used with advantage in this country. Regarding the use of chlorides in collodion he had recently been going through a series of experiments in this direction. He had come to the conclusion that the smaller the proportion the better the result, and the entire omission was best of all.

Mr. Simpson said Mr. Hughes had throughout his remarks enunciated a principle of the utmost importance in every branch of photography, namely, the importance of harmonious relation in all the parts of any process. It was almost impossible in photography to speak of the advantage of anything *per se*, as that which was of the utmost value under certain circumstances might be useless under other conditions. Nevertheless it was possible to fix those conditions, and as Mr. Hughes in his able review of the various processes employed in the manufacture of collodion, might perhaps have left an impression on the minds of the uninitiated that its successful manufacture was almost a hopeless task, involving as it did, so many considerations, he thought it might be desirable briefly to state a method in which all the conditions were tolerably well defined, and which, he believed, with ordinary care, would always give satisfactory results. The method of preparing the pyroxyline was an old one, if he remembered rightly, first published in the definite form, in which he should state it, by Mr. Sutton. He took equal parts by measure of sulphuric acid and nitric acid; the latter of a specific gravity of 1420, the former the oil of vitriol of commerce. These were raised to a temperature of about 150° by placing the vessel containing them in another containing hot water. The cotton wool was immersed and kept in about ten minutes, washed well, and dried. Five or six grains of this would dissolve entirely in equal proportions of ether and alcohol, the latter of a specific gravity of ·820. Equal parts of iodides of cadmium and sodium were used in iodizing. He preferred the latter to potassium, as being more soluble. About half-a-grain of bromide of cadmium and two grains of each of the iodides named, gave a collodion very sensitive and very stable, and yielding most excellent results with iron development. For the tyro he knew of no formula so simple; whilst for most purposes he knew none giving finer negatives.

Mr. Hannaford found the formula Mr. Simpson had just described a most efficient one; and by adding different quantities of water to the acids, he obtained pyroxyline of any quality he required, for wet or dry processes. By adding a little water to the acids named, and raising the temperature to about 160°, he obtained a pyroxyline giving great intensity, and by adding sufficient bromide, he could regulate the result. As to the use of a chloride, he thought that might be useful in a collodion for dry purposes, as it was now generally understood that the presence of one or more salts of silver, in addition to the iodide, was of great service in securing sensitiveness in dry plates. Referring to the advantages which many photographers found from mixing different kinds of collodion, he stated that he utilized his waste acids by making a fresh lot of pyroxyline with them, which he mixed with the other, and so obtained some of the advantages of a mixed collodion.

Mr. Wall spoke in high terms of the excellence of the collodion made by Mr. Hannaford.

Mr. Henderson referred to the advantages to be derived from the use of iodide of silver in collodion.

Mr. Davis stated that it was originally used by Dr. Diamond. Mr. Hadow had, however, stated, as the definite results of some experiments, that the iodide of silver formed by double decomposition in the collodion film, was more sensitive, and the addition of iodide of silver fell into disuse.

After some conversation,

Mr Simpson said, in reference to the quantity of bromide which might be used with advantage in this country, he knew that Mr. Hughes, whilst convinced of the advantage of a small amount of bromide, had arrived at conviction, from experiment, that nothing was to be gained by using it largely. He (Mr. Simpson) had used all proportions up to two grains to the ounce with marked increase in sensitiveness, but a slight loss of intensity.

Mr. V. Blanchard had been experimenting recently, and had obtained pictures of equally good quality from one grain of bromide and five of iodide, and from five of bromide and one of iodide. The base was cadmium.

Mr. Harman said he had no difficulty in getting good results with three grains of bromide and three of iodide.

After some further conversation

Mr. Davis stated, in reply to Mr. Hughes, that his object in using some nitrate of potash was to secure a portion of pure nitric acid by its decomposition, and he thought that in its nascent state it was more capable of entering into combination with the cotton.

On the motion of Mr. Blanchard, seconded by Mr. Fry, the discussion was adjourned to the next meeting.

It was announced that at the next meeting Mr. Noel Fitch would read a paper on "The Experiences of an Amateur in Portraiture."

The proceedings were then terminated.

Amateur Photographic Association.

A meeting of the Committee of the Amateur Photographic Association was held on Monday, the 10th inst., at 26, Haymarket, the Right Hon. the Viscount Ranelagh in the chair.

The minutes of the last meeting having been read and confirmed, the Secretary read a letter from the Earl of Caithness, expressing his regret that he could not be in town to attend the meeting.

The Secretary laid before the meeting sample copies from the negatives sent in to the association, the number of which up to the date of the meeting was 1,756, which, together with foreign and colonial ones on their way to this country, will probably amount to about 2,000, and which, even after the process of weeding by the referees, will, it is fully anticipated, show a total of not less than *fifteen hundred good negatives.*

A question respecting the further reception of negatives having been raised, it was decided that the catalogue should not yet be sent to press, but be kept open until the 1st of March, as members residing abroad and in the colonies had scarcely had sufficient time to forward their plates. It also having been suggested that a gold and silver medal is hardly the most useful or acceptable form in which a prize can be given, it was resolved that in each case (at the option of the recipient) a silver tankard, or other piece of plate of equal value, should be substituted.

On considering the propriety and advantage of holding an exhibition and *soirée*, the Chairman kindly offered at any time to place a suitable room at the disposal of the society.

It was decided in reference to the selection and distribution of the prints, that each member shall be requested to select three times as many prints as he may be entitled to for his subscription, arranging the selected numbers in a preferential order in his list, placing those most desired at the commencement, and so on. It is confidently hoped that by this arrangement, although members may not in all cases have *every* print most desired they need, under no circumstances, have awarded to them pictures which they do not value.

The time at which the award of the prizes should take place was next discussed, and it was resolved that it should not, if possible, be deferred later than the 15th of March.

The idea of establishing a "Photographic Art Union," in connection with the Association, was introduced by the Secretary. The subject was considered to be one of considerable interest, but there being many important questions involved, it was deferred for further discussion till next meeting, and the proceedings then terminated.

Photographic Society of Scotland.

The ordinary meeting was held on the 13th inst., H. Ross, Esq., in the chair.

An address of condolence to Her Majesty, on the death of the late Prince Consort, was adopted unanimously.

The decision of the Prize Committee as to award of medals for the best pictures in the exhibition was announced as follows:—The medal for the best portrait has been awarded to Mr. D. O. Hill, R.S.A., for his picture, No. 295, "Dr. John Brown and his cousin Dr. John Taylor Brown;" the medal for the best landscape, to Mr. James Mudd, of Manchester, for his picture, No. 54, "The Tay above Dunkeld; and the medal for the best frame of six cartes de visite, to Mr. H. P. Robinson, of Leamington, for his set, No. 174.

Specimens of zincography, by Sir Henry James, were sent to the meeting by Sir David Brewster. Mr. Taylor also exhibited a few specimens of photolithography, by Mr. Ramage, of Edinburgh, and one by Mr. Osborne, of the Ordnance Survey, Australia. A discussion ensued on the subject of photographic engraving.

Professor Archer exhibited a number of specimens of M. Joubert's process of enamelling photographs on glass.

Sir David Brewster sent for exhibition a few specimens of M. Camarsac's new process of photographic enamelling, which he had received from M. Claudet for that purpose.

A communication was read from Herr Otto Köhnke, Mehlbye, Schleswig, on a new mode of obtaining photographs without the use of chloride of silver or hyposulphite of soda: and specimens of the process were exhibited.*

## Correspondence.

### MEALINESS IN TONING.

Sir,—The articles on "Mealiness in Toning" have interested me very much, although I cannot say I have been so much troubled with this drawback to pleasant and easy printing as some appear to have been; but as the first step towards perfect cure should be to thoroughly comprehend the nature of the disease, I think some further attention should be given to this point. I am not satisfied with the theories at present given. In preparing my own gold bath I have, I believe, generally used an excess of alkali, and perhaps this is one reason why I have been less troubled with this defect. I do not think the question lies so much in the formation of insoluble salts in the paper, but more in the *particular kind of salt*, and in this view of the case, I believe the conversion of the unreduced silver into *any other than the chloride salt* will prevent mealiness. My reason for this idea is, that I believe when the chloride of gold comes in contact with those parts of the print where the action of light has been less energetically felt, and where by consequence, there remains a large amount of unreduced silver, converted by washing into chloride, a new action is set up *between the two metals, setting free the chlorine*, which acting rapidly on those parts where it would in such cases exist in largest quantities, produces those mottled tints, known by the name of mealing. Now I believe the presence of organic matter checks this action more or less according to circumstances, but in the case of the conversion into an organic salt, as in the proposed use of acetate of soda; if this suggested molecular or electric action between the two metals still takes place, there remains no chlorine† in the paper to affect the tint of the proof, but instead the tint is

* See Photographic News, Jan. 31st, p. 57.

† It will be understood that the chlorine in the gold solution is already neutralized.

produced by combination of gold and organic matter, and the toning takes place more equally. I don't know if I have explained my ideas on the subject so that you can understand my meaning, but if I am not quite right in my view I think I have indicated the direction in which the difficulty lies. I think it will also be found that my suggestion explains most of the phenomena attending the efforts to overcome this very serious difficulty.—I am sir, yours respectfully, E. E. L.

The same correspondent writes further as follows :—

I endeavoured in my last note to explain that I understood this defect to arise from a rapid and unequal liberation of chlorine. caused by the action of the silver of the proof in contact with the gold of the toning bath, for it should, I think, be kept in mind that the metals still retain and can be again reduced to their metallic form.

What I wish particularly to correct in my former note is the notion that I there gave that I thought free chlorine unnecessary and injurious in the process of toning. This is not my idea, as I believe it to be the real active agent in the process, and that toning takes place in proportion to the amount of free chlorine present, and also the greater or less rapidity with which it is liberated ; it will, therefore, be understood that it could only be objectionable when existing unequally on the surface of the paper, and producing unequal reduction of the gold. That chlorine is essentially an agent in toning may, I think, be shown in many known facts, as, for instance, the great difficulty in toning proofs that have been previously fixed.

There are, however, some retarding agencies also to be taken into consideration besides the absence, more or less, of chlorine. The most active of these retarding agencies will, I think, be found in organic substances. Judging by my own experience, every organic salt of silver, when present in any quantity, exerts some retarding influence, and to this cause also may, perhaps, be traced the beneficial influence of the acetate of soda, checking the too rapid liberation of chlorine, and allowing more equal distribution of the precipitated gold.

The reason why mealiness does not occur on plain paper proofs, I take to be owing to the absence of organic matter on the surface, as it is well known that the silver salts are more rapidly reduced on this kind of paper, and therefore, when under the influence of the gold bath, the amount of reduced silver being large in proportion to free chloride present, we do not see those rapid and extreme changes of tint so common with albumen paper.

In the *sel d'or* process also, it was formerly recommended to add hydrochloric acid to the bath, and this, however injurious to the permanency, certainly aided rapid toning. I would also call attention to the different action of the newly prepared gold bath, and the same bath when left some time before using. This I take to be owing to the fact, that some of the chlorine being liberated from the gold to form chloride of sodium by the decomposition of soda, effects this new combination very slowly, and it is during this time, and whilst the chlorine is in a nascent state, that it acts most energetically in reducing the gold. It will, therefore, be seen, that according to my view, chloride is essential ; but that being exceedingly energetic, it rapidly frees itself in the presence of the new action taking place between the two metals, and if there be not a *large* amount of *reduced* silver present, the act of substitution soon ceases, and the gold is deposited, not *on the proof*, but *in the dish*, and the hypo afterwards removing the unreduced silver, the slight amount of reduction becomes visible in the pale grey colour of the part not effectually acted on.

In conclusion, my view is, that as free nitrate is necessary to aid reduction of the chloride of silver, so also some free chloride is necessary to aid in the reduction of the gold of the toning bath ; but that the gold is deposited on the reduced silver in proportion to the amount of reduction, and that where the amount of reduction is not in excess of the amount of chloride, irregular toning takes place, and the gold bath is exhausted without aiding the operation.

What I have attempted to describe will also explain, I think, why washing the proof in water containing chlorides is conducive to the production of mealiness, and also that water containing organic matter may check the action of toning. I have already trespassed so far on your patience that I will avoid adding more, otherwise I could mention many known facts in support of the view I have here given of this part of the process.—Yours respectfully,

E. E. L.

P.S.—There is one other matter in connection with mealiness in toning worth observing. I allude to the fact, that this defect is *not* inherent in the process of *alkaline* toning, else it would have occurred when this process first became so common. If, therefore, the cause be unequal reduction of the silver of the proof, whence arises this unequal reduction ? It is, I believe, admitted, that some negatives produce this more than others. Now, my suggestion is, that iron development has brought this upon us. The majority of iron developed plates require redevelopment. I think everyone has felt how very easy it is to produce stains and patches in this latter process. I have often heard operators remark that a stain visible only by reflected light was of no importance. I cannot subscribe to this opinion ; whatever may be the cause of this stain, it differs in colour from the surrounding parts, and if say darker, being composed of the same matter as the light parts, and which matter is used as a retarding agent, it follows that this dark stain may obstruct in a greater degree the reduction of the surface beneath, or if the stain be lighter, may admit an unequal reduction in the opposite direction ; let those who use redeveloped negatives make careful observations on their printing qualities, and I think we shall then learn the origin of mealiness in toning. I have a strong notion that all gold toning processes are perfectly analogous, and with your permission I may another time endeavour to show that the gold of the old hypo toning bath acts just in the same manner on the proof as it does on the alkaline bath, and that the difference is more apparent than real.

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Sir,—I have of late read much in the Photographic News on the subject of mealiness in toning. Although I always tone by the alkaline chloride of gold process and use albumenized paper I have never met with the above annoyance. For the benefit of others less fortunate, if you think it worth while to give insertion in your Journal to these remarks, I will detail the process I employ. It was communicated to me, in its main features, in the course of last summer by Mr. Bashford, a professional photographer, at Jersey, to whom, therefore, as far as the process itself is concerned, I surrender whatever merit it may possess.

I print a little, but not much, beyond the intensity I wish the finished picture to retain. On removal from the pressure-frame the proof is washed in two or three waters for several hours. When I have the choice, I give preference to soft water for this part of the process, but do not find that hard water exerts any injurious action. My toning bath is prepared as follows :—I take of chloride of gold one grain dissolved in six ounces of water, and this is rendered alkaline by four drachms of a solution of phosphate of soda of the strength of ten grains to the ounce of water. This is sufficient to tone at least eight pictures of the size of nine inches by seven. In cold weather it expedites the operation to raise the temperature to something like blood heat.

The proofs are retained in the toning bath until the shadows by transmitted light appear of a dark chocolate brown ; they are then washed in several changes of water and fixed in a hypo bath of the strength of six ounces to the pint of water, in which they remain from fifteen to twenty minutes, undergoing but little change by transmitted light, though by reflected light the cold violet tint gives place to a warm dark brown. I should add that I use

Marion's "extra albumenized" paper, and that I excite by floating for five minutes on an eighty grain silver bath.

I send you a print from a calotype negative of a street in Dinan, as a fair sample of the results of the above process I am not chemist enough to say whether the absence of mealiness is due to the use of phosphate, instead of carbonate of soda, or whether it should, in more justice, be attributed to the manner in which the albumenized paper is prepared, that I leave for others to determine; but according to your opinion of the merits of the result it rests with you to recommend it or not to your numerous readers.—I am, sir, &c., W. F. Watson.

*Dinan, France, February*, 1862.

[The print received is entirely free from mealiness.—Ed.]

## PORTRAITS IN THE OPEN AIR.

Sir,—With all deference to the opinion of such an authority on photography as the Abbé Despratz, I think he has made a slight mistake in one or two statements, as contained in last week's News. The first is that "a good portrait can never be taken in the open air;" of course I am not in a position to judge what the Abbé might call a good picture. I can only say that my practice has been a good deal in that way, and I never remember being troubled with the "spotty" effect mentioned. I never find any difficulty in getting pictures of fair quality. I enclose a portrait taken nearly two years ago, in which there is plenty of half-tone, and two groups. The negative of the single figure has been scratched somehow, but it will serve to show that at any rate half-tone may be found in pictures taken out of doors. It was taken on a bright day; the sun being at the time obscured by a cloud, and the exposure was, as near as I can remember, two seconds. This brings me to the second point in dispute, viz., the difference of exposure required in the open air in comparison with a glass room. My conclusion is, that under the same circumstances, it would be four or five times as great, that is, about ten seconds! I always find on a bright day, in the shade, that two seconds, and in summer one second, is ample; in fact, I took a picture as nearly instantaneous as could be, by removing and replacing the cap, on a cold dull day last month. It may be well for amateurs and experimental photographers to wait for certain effect of cloud, &c.; but for one like myself who depends upon it for a living, it would hardly pay. I must e'en make the best of my day when out, whether the sun be too bright or the reverse: and if I cannot produce pictures up to the standard referred to, I must be content. I must apologize for occupying so much of your space in this matter, and beg to subscribe myself, yours respectfully, T. Jones.

*Broad Street, Ludlow, Feb.* 12, 1862.

PS.—The one group is scarcely printed enough, and the one figure on the side has spoiled it by moving; that was exposed with a side light ten or twelve seconds.

[We conceive the Abbé is in error. Great skill and judgment are required in open-air portraiture; but it *is* possible, we know, to produce excellent portraits without a glass room. Indeed your specimens prove it.—Ed.]

## THE ALKALINE RAPID PROCESS.

Sir,—As far as my limited opportunities have yet enabled me to test the merits of Mr. Bartholomew's very valuable suggestion, of the use of *soda* in dry plate photography, I can speak most satisfactorily of its results. With a sensitiveness in the camera, almost equal to that of wet collodion, the pictures have a density, detail, and cleanliness, especially in the skies, more uniformly certain, than from any other dry process I have ever tried, although I very much prefer the gelatine one of Dr. H. Norris. I attribute the entire success of this method to the *alkaline*, in opposition to the usual *acid*, reaction of the sensitizing agent, nitrate of silver, for as acids *retard*, may not therefore alkalies excite, or at all events, *not* retard? The presence of organic matter always exists in every photographic process of the present day, whether negative or positive, for without it, no decomposition of nitrate of silver by light alone is effected, the pyroxyline in one case, and the paper and albumen in the other, being always present. No common amount of simple washing will entirely remove all the nitrate of silver from the sensitized collodion film, but for the good keeping qualities of dry plates, it is necessary to reduce the quantity of it to a minimum. Is the fogging evil of wet collodion films, in an alkaline sensitizing bath, owing to their extreme sensitiveness, and if so, might it not be turned to good account in instantaneous photography? Might not an *alkaline* sensitizing bath be always used for dry plates, so that no after use of soda would be necessary, but simply washing them well before gelatinizing and drying, &c.? Is this the secret of Dr. H. Norris's very sensitive dry plates? I have found the best method of applying the soda solution to be *after* the first washing, and *before* the second or last, so as to remove it entirely before pouring on the warm gelatine solution; for if any combination takes place between the soda and the gelatine, certain slight markings, of a cellular or reticular form, fatal to good negatives, are the result. I am very truly yours, &c., E. T.

*Coldstream, N. B., February* 12, 1862.

## THE DRY PROCESS WITHOUT PRESERVATIVE.

Sir,—I do not quite understand the object of Mr. Ward's communication in your last, but if it be to impugn my good faith I must refer him to the article in question, which, from its very title, is descriptive of a dry process "*without* preservative." I there state that "no preservative substances whatever are required; good pictures can be got without them." If the film be excited in the ordinary way, well washed and dried, it will be found as sensitive as the best of any other dry process." I simply stated that I had found it necessary to keep the film on the plate by some means, either by varnishing the edge of the plate, or covering the surface with gelatine or albumen. I preferred albumen chiefly because of its easy preparation, and also because I had been in the habit of using it as a substratum in the wet process.

Having been told that my pictures were all due to the albumen, and further that the albumen would spoil the bath, I produced a picture without the albumen, and showed a sample of the bath, giving also the results of my experience of its use, as I have just stated, namely, as a substratum for wet collodion for a long period of time. The "hundreds" of plates were not stated by me to have been prepared for drying, but they were used while wet.

If you will refer to No. 153 of the *British Journal of Photography*, you will find a letter of mine in relation to the resin process of Mr. Glover, in which I indicate the result at which I was then arriving. My words were, "I strongly suspect that no preservative is required at all." This letter dated October 15th, 1861.

I would simply observe, once for all, that the paper read by Mr. Martin was hurriedly prepared at his request, but if I had imagined that it would have raised so much controversy it is very probable that I might have taken more pains with it.

I find that there are persons who, oddly enough, seem to ignore the facts altogether, as though "vested interests" were disturbed by not using "preservative" substances, but I have to thank you for bringing the subject prominently forward, and if amateurs are enabled to obtain pictures with more care and certainty my object will have been gained without contending who was first in the field, which must really be a matter of perfect indifference to your readers.

I have had several collodions sent me for trial, but I have not yet found one to my mind. The article wanted is a collodion which will not leave the plate during the fixing of the pictures, and will give vigorous results with a moderate exposure. If any of your correspondents can help me in this respect, I shall feel greatly obliged.—I am, yours obediently,

W. Hislop.

[If our readers refer to the last paragraph of Mr. Hislop's paper, read at the North London meeting in November (p. 579, Vol. V, Photographic News), they will find he distinctly states that he claims nothing new. He simply emphasized an old idea which had never received due recognition, and in so doing has initiated or rather revived experiment in the right direction. We believe a suitable collodion is the only thing required. Wo havo not had timo to try Mr. Ward's formula. Will Mr. Hislop do so? Some of our correspondents havo sent us samples of collodion for tho purpose, which we hope shortly to try.—Ed.]

## Photographic Notes and Queries.

### Photographic Exchange Club.

Dear Sir,—If we consider that tho object of tho Exchange Club is not only tho collection of a stock of pictures, but should bo accompanied by an acquisition of knowledge with respect to the working qualities of different processes, and lenses, &c., we must see that the latter part of tho object is not lost sight of, for precious, indeed, is such information that most of our pictures convey.

I think, if wo were to adopt tho uso of such labels as those enclosed, we should, in tho long run, bo not the less satisfied:—

TO BE REVERSED.

| | |
|---|---|
| Subject ... ... ... | The Old House at Homo |
| Process ... ... ... | Fothergill |
| Lens ... .. .. | Ross's 4½ in. focus |
| Stop ... ... ... | ¼ in. |
| Timo ... ... ... | 2½ minutes |
| Light ... ... ... | Bright, without sun. |

NOT TO BE REVERSED.

| | |
|---|---|
| Subject ... ... ... | Valo Crucis Abbey N. Wales |
| Process ... ... ... | Collodio albumen |
| Lens ... ... ... | Aplanatic 4½ in focus |
| Stop ... ... ... | $\frac{5}{16}$ in. |
| Timo ... ... ... | 7 min. |
| Light ... ... ... | Wet, without sun. |

Their use would obviate another evil attending the writing on the back of prints; we should not have the words—*right, left*, staring us in tho faco when we put it in the stereoscope, such being tho caso with some that I havo mounted, the words being as distinct on tho face of the picture as on the back.

I have got a greater number of these labels printed than I shall probably ever want, and if any fellow-member would like to use them, and does not find it convenient to get them printed, by enclosing six stamps to me he may receive 100 by return of post.

*Higher Hurst, Ashton-on-Lyne.* John Hollingworth.

### A Modified Fothergill Process.

Sir,—As I havo seen articles frequently in your Journal on new dry processes and modifications of others, which I supposo may all have their advantages, perhaps you will allow me to say a few words on a method of preparing dry plates, which is a little different to any I have seen described in your paper, and would much like some of your readers to try it.

Being principally engaged in the operating room, but having occasionally done out-door work, and often with dry plates, the method I have adopted in preparing them for about three years past is simple. They are very sensitive, and give good results, and will, I anticipate, have good keeping qualities; but I have never tried them more than a few days.

I first ascertain that my chemicals are in good working order, with fresh plates and pyrogallic development, sensitize a plate as usual, put it into a flat dish containing 40 ounces of water, (this is for a plate 12×10), let it remain until tho water flows freely over the surface; take it out, drain for about a minuto, then pour over it the following solution, which must be kept on from one to two minutes.

| | |
|---|---|
| Albumen ... ... ... ... | 1 ounce |
| Water ... ... ... ... ... | 4 or 5 ounces, |

*Glacial acetic acid*, 20 drops to each ounce of the above, and to bo well shaken in a bottle. This must be free from suspending particles; I prefer it being filtered, or a stock can bo put away to settle, as it will keep any length of timo; at all events, I have used it six months old. The plato may now bo washed, a great amount of washing not being required, as they can bo fully developed without being washed at all, and thereby not being so apt to stain, but still I prefer them being washed.

I havo tried ammonia in the albumen, but never even liked tho idea of putting it to a sensitive plato; I have also tried citric acid, but prefer the acetic.—Yours, &c., T. H—.

*Durham, Feb.* 12, 1862.

P.S.—The albumen will not keep if less acid than I stated is added.

## To Correspondents.

The First Exhibition of the South London Photographic Society.—Specific arrangements for holding a supplemental Exhibition of Photographs at tho Crystal Palaco have now been mado by tho Committee of the South London Photographic Society. Wo hope to bo ablo to publish the conditions in our next.

P. C. Riversdale.—Your suggestion has repeatedly been anticipated in various ways, but without practical success. The mere formation of iodide of silver in the film is not sufficient, excess of nitrate is also desirable. M. Poitevin proposed, about two years ago, to add nitrate of silver, about 5 grains to the ounce of collodion. This was to be immersed in, or coated with. a solution of iodide of potassium. The film of iodide of silver in this state is insensitive to light. To excite the plate for use, a solution of nitrate of silver was to be poured over it. In the various processes suggested during the last year or two by H. Bellini, Captain Dixon, and A. Gaudin, nitrate of silver was added to the iodized collodion.

C. O. E.—If you had acted on our suggestion you would have escaped the difficulty. India-rubber is very tardily soluble in benzole, especially in some samples. We recommended dissolving the india-rubber in chloroform, and, if necessary, diluting with benzole. We can now only recommend you to follow that course. Bi-sulphide of carbon is a ready solvent, but is not a pleasant smelling article to use.

Enquirer.—The lenses quoted in the catalogue you mention are of French manufacture, and we have no doubt but that at the price referred to will be good of its kind. Those of the best English makers are, however, generally much superior in defining power and rapidity, and to those who can afford them, are worth the difference in price. The method of precipitating silver from a nitrate solution with copper may be used if you prefer it; but the use of a chloride is simpler.

C. F. Booker.—The cracking of the collodion film and of varnish film was very fully discussed at a meeting of the Photographic Society a little more than twelve months ago. You will find the matter fully treated at pages 391 and 397 of our fourth volume. A variety of causes were suggested, but a common opinion prevailed that it resulted from traces of the fixing salt remaining in the film Mr. Booker's difficulty consists in the collodion film cracking under the varnish. Can any of our readers suggest further information as to the cause or remedy.

Chirurgicus.—The Kinnear camera is one of the most portable and efficient for landscape work we know. If well made it may be very light without being actually fragile, and will answer perfectly for dry plates. The means of obtaining the same advantage by inclining the lens, as are obtained by a swing back, require, of course, very great care and judgment in use.

Enquirer, No. 2.—The silver obtained by washing prints prior to toning them, should be precipitated in the form of a chloride by the addition of common salt. The chloride thus thrown down should be well washed and dried. It may then be reduced to the metallic state by placing in a crucible with double its weight of a mixture of the carbonates of potash and soda, and submitting to a bright heat.

Economy.—If there be any silver in your waste developing solutions, it will gradually be reduced into metallic silver, which will be found in a grey powder at the bottom of the bottle.

A Novice.—If your folding landscape camera have a sliding body it will answer for portraits as well; if not, the simplest plan will be to buy another for portraits and keep the one you have for its own purpose.

F. G. L.—See articles on "Iron Development and Brilliant Prints" in last volume, also in Photographic News Almanac. A strong iron developer will give more detail, a weak one more contrast.

Anastarchus.—We should prefer to line the cistern with thin gutta percha, as described in the series of articles "Amateur Mechanic," in our second volume.

J. W.—The flame of a candle protected by a yellow shade is not likely to be injurious to an excited collodion plate. 2. We should consider the lens of the English maker you name incomparably better than the French one for card portraits. 3. With a soft negative the *Rive* paper will give you the best prints; with a very vigorous negative the *Saxe*.

T. G. B.—Sunshine is necessary to the efficient use of the solar camera. Without direct sunshine the condenser is useless.

Emily.—The best mode of avoiding stained fingers in photography is to use great care. India-rubber gloves or finger-stalls may be used; but you remember the old adage about a "cat in gloves" You may use horn pincers in lifting sheets of paper from the silver bath; and some of the numerous plate-holders for developing; and by the aid of these, and careful manipulation, you may avoid "getting your hands into *such* a state."

Tom.—Good Scotch or Russian glue may be used for mounting photographs with advantage; and will occasion the least tendency to cockling.

G. G.—We prefer hyposulphite of soda to cyanide for fixing negatives.

Frank Farleigh.—We do not think any especial advantage is obtained in using a bath of greater strength than 40 grains to the ounce, for negatives. The stronger the bath, the greater the proportion of acid necessary to mako it work without stains or fog.

C. F. L.—Wash the inner frames of your dark slides frequently, and tako care to drain the plates well upon a piece of blotting paper. Any accumulation of silver in the slide is apt to cause stains.

X. Y. Z.—All intensifying processes require that the primary image should have an especial character suited to the method to be adopted. Wherever the negative is intensified after fixation, it is desirable that plenty of detail and softness should characterize the image in the first place. Where intensity is gained rather by a change of colour than by piling on additional silver, the greatest delicacy will be secured. It is for this reason that many operators prefer the use of bichloride of mercury and iodide of potassium.

Several correspondents in our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to tho Office, 32, Paternoster Row, London.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 182.—*February* 28, 1862.

## EXHIBITION IN CONNECTION WITH THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

We have already intimated to our readers that it was in contemplation by the South London Photographic Society to hold an exhibition of photographs during the forthcoming summer. That an exhibition affording fuller scope for illustrating the present state of photographic art than can possibly be effected in the space devoted for the purpose in the International Exhibition at South Kensington, is desirable, is universally admitted and emphatically expressed. That such an exhibition should be under the direction of some photographic society need scarcely be affirmed. The parent society having concluded that the initiation of such an additional exhibition on their part was undesirable, and the officers of the South London Society having received intimation of this determination on the part of the parent society, at once resolved to undertake the duty of organising an independant exhibition.

As a *South* London society it was felt that the Crystal Palace at Sydenham possessed a local fitness for an exhibition under their auspices, whilst at the same time it possessed an extent of facilities, and a universality of attraction, which would render it by far the most desirable place in which to hold an exhibition which, if not a substitute for, might at least, be an important auxiliary to, the display of photographs in the building at South Kensington.

We have now the pleasure of announcing that arrangements are completed with the directors of the Crystal Palace Company, which secure to the society a very large and eligible space in the first gallery of the Crystal Palace, immediately overlooking the central trancept. This space will be placed entirely under the management of a committee of the South London Society, and so arranged and screened as to form a complete and separate department. Immediately adjoining this space another portion of the gallery running northward, will be devoted to the exhibition of apparatus &c., in which everything novel and interesting in connection with the material appliances of the art may be exhibited. As regards photographs, arrangements will be made for attendance of a superintendent, who will undertake sales as in other similar exhibitions. This arrangement will not, we apprehend, extend to apparatus.

It is contemplated to open the exhibition about the middle of May. So far as it is possible in the short time now at their disposal, it is the intention of the committee to arrange and classify the pictures sent for exhibition as perfectly as possible, so as to fitly illustrate at a glance every phase of the art. The authorities of the Crystal Palace have, with the liberal courtesy which characterises their management, empowered the committee to offer season tickets to the palace to exhibitors whose contributions possess sufficient excellence for exhibition. When the value of space in this building under ordinary circumstances is remembered, as well as the increased value arising from the enormous influx of visitors who may be fairly anticipated during the ensuing summer, the liberality of the offer cannot be over-estimated, and will require a very strict exercise of supervision on the part of the South London Committee to prevent its abuse.

Among the features which we may with propriety anticipate here, and which, from the limited space, can occupy but a very unimportant position at South Kensington, will be life-size and other enlarged pictures. From English artists large contributions may be expected; and from Continental photographers, many of whom must necessarily be disappointed in obtaining space to exhibit the fine amplified proofs, of which we have heard from time to time such glowing accounts, we may legitimately hope for an extensive and gratifying display of their work.

At the time we write the preliminary arrangements have just been completed. We hope next week to announce the conditions and regulations in full. In the meantime, we make this brief and hasty notification to allow those of our readers who are interested in the matter, to be making any necessary preparation for such a desirable opportunity of contributing to an exhibition which will not, we trust, fall short, in all features of interest and excellence, of any which has been held on any previous occasion.

## Notes and Jottings.

No. 14.

### Mr. Reynolds's New Process: "Summing up."—Dr. Phipson's Iron Printing Process.

The printing process with peroxalate of iron, which Mr. Reynolds recently brought under the notice of the Dublin Chemical Society, has, in consequence of his having put it forward as "new," caused some little discussion, and, on the part of Mr. Reynolds, a misapprehension that he was supposed to have obtained some of his ideas from previous publications on this subject. Having been the first to show that the process had long been known, thereby opening the enquiry, it may not be out of place for us, at this point of the proceedings, to "sum up" the case, which may in fact be considered as practically settled, and to assure Mr. Reynolds that no one ever supposed or intimated, that from beginning to end, he acted otherwise than in perfect good faith.

It may be remembered that the paper "On a New Process for Photographic Printing" was read to the Dublin Chemical Society in November last, and placed before our readers in the first number of the present volume. Mr. Shadbolt next calls attention to the process in a leader in the *British Journal of Photography* of the 15th ult., considering it a subject of "no trifling importance"—and therein he may be right for anything we shall say to the contrary—at the same time describing the idea as a new and original one. That it was original, so far as Mr. Reynolds is concerned, we never doubted, but that it was not *new*, we clearly showed in the News of the 17th ult., at the same time, however, crediting that gentleman for the demonstration of his method of preserving the half tones of the image, which we had not known previously. Mr. Taylor, on the 1st inst., in the *British*, favours us with some "*notes, harmonious and discordant*," on the subject,—"discordant" as regards Mr. Reynolds's claim, but "harmonious" with our remarks thereon. At the same time Mr. Shadbolt, in a second leader confesses to having been caught "napping" with reference to the "so-styled new process;" putting in, however, a good excuse for having given his friends a chance of "waking up the editor," and raising a laugh at his "friend's" expense, demonstrating how little the giant felt the pigmies' kicks. But Mr. Reynolds evidently had not been so accustomed to "'arf bricks" as our stoical friend the editor, and thus we find a letter from that gentleman in the News of the 31st ult., wherein, in reply to our "Jotting," he still stands out for the newness of his discovery, inasmuch as he employed *ammonio*-nitrate of silver, and not plain nitrate of silver as given in our quotations, by which means he preserved half tone, and, in his opinion, disposed of the question we raised respecting the chlorides in the paper, the alkali in excess dissolving the chloride of silver formed. On the latter point we will only stop to express a doubt as to whether Mr. Reynolds can dispose of the chloride so easily; but as regards half tone we gave him full credit for his demonstration. Mr. Taylor's paper had not, at this time, come under the notice of Mr. Reynolds; had it done so he would have seen that ammonio-nitrate of silver had been previously employed by Dr. Halleur for the purpose. Nevertheless, to Mr. Reynolds belongs the credit of showing *why* that salt should be used. Lastly, at present,—for Mr. Shadbolt "may have something to say on this subject in his next number,"—lastly comes a letter in the *British* from the originator of this discussion, to the effect that "no one can be more convinced than he now is that the process is not new," and, as it is ever a comfort to have companions in misfortune, he seizes hold of Mr. Macdonald, who, in a letter to the same Journal, as "the originator of this process more than a year ago," claims "honour to whom honour is due;" this gentleman he pulls with him to the bar of photographic opinion.

The true state of the question then, appears to be that printing with peroxalate of iron and the subsequent application of silver, was introduced by Sir J. Herschel; but that Mr. Reynolds, without any knowledge of the process having been known previously, gave us the results of his rediscovery in good faith. Mr. Shadbolt, overlooking that among the many suggestions for printing without hyposulphite of soda being required as a fixing agent, this particular method had more than once been named, and perhaps being struck by the lucid manner in which Mr. Reynolds gives his information more forcibly than by previous communications; comments thereon, and gives his friends the chance, as he says, of "waking up the editor." Mr. Reynolds being subsequently convinced that the process is not new, frankly states as much, and gives perfectly unnecessary proof that he made his researches quite independently of what had been published before.

In conclusion, we may state that the probable usefulness of the method stands in exactly the same position as it did. It has never been shown that it could practically be employed in photography, and we trust that Mr. Reynolds will not discontinue his experiments because it happens to have turned out the process is not all his own.

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The discovery of Dr. Phipson given in a recent number of the News cannot be considered the same as the above, as this gentleman states it to be: one is a silver, and the other an iron printing process. As a method of obtaining a positive print in iron it is simply a rediscovery of Mr. Burnett's process which appeared a few years back, simultaneously with one we published. The salt of iron which Mr. Burnett preferred as a sensitizer was the ammonio-oxalate, whilst that employed in our experiments was the ammonio-citrate. Michael Hannaford.

## Scientific Gossip.

Purification of Water-glass for Photographic Purposes—Action of Silicic Acid on Fermentation—Curious Property of Tellurium-Methyl—New Processes for the estimation and detection of Nitric Acid in Solutions.

On many occasions have the peculiar properties of soluble glass been mentioned in these columns, and their adaptation to the wants of the photographer been advocated. As a substitute for collodion, as a varnish, and as a cement, it has repeatedly been the subject of experiments, and it is probable that in one if not all of these characters it would hove found its way into the photographer's laboratory, were it not for the great difficulty of preparing the compound in a pure state. Soluble glass, or *water-glass*, as it is frequently called, is a chemical combination of silica with an excess of an alkali, soda, or potash, usually the former; it dissolves in water with a degree of rapidity proportionate to its richness in alkali. It is prepared by fusing together fine white sand or powdered quartz with soda or one of its readily decomposable salts. For all photographic uses a product should be chosen containing as much silica as possible, so long as it is soluble in water. In no case should there be more than two equivalents of alkali to three equivalents of silica: a glass of this composition will be very slow to dissolve; a more basic salt will have a tendency to deliquesce. Mr. J. M. Ordway has recently devoted some considerable attention to the different kinds of water-glass, and has discovered a very perfect means of purifying the compound from the different saline and earthy contaminations which it is sure to contain when prepared for commercial purposes on the large scale. He finds that by several properly conducted precipitations with alcohol, the impurities may be entirely got rid of. We have therefore in this process a ready means of obtaining a water-glass of the utmost purity, and of almost any required composition. For the preparation of a perfectly pure substance for delicate experiments, it is recommended that a rather dilute solution of a crude silicate be taken, containing not more than ten per cent. of solid matter. To ten parts of the liquid may be added at first one part by weight of strong alcohol, and before filtering the mixture should be allowed to stand several hours, in order to give the reluctant precipitate a chance to get fully aggregated together. Rejecting this first deposit, which contains most of the earthy matters and very little of the alkaline silicate, add to the filtrate twenty parts of alcohol, and the greater part of the water-glass will be thrown down. When the product is rich in silica, it is quite voloминous at first, but gradually contracts and becomes more or less coherent. After a rest of six hours or more, the alcoholic liquid being carefully decanted, the solid silicate may be spread on absorbent paper, and allowed to drain as long as it will remain without adhering to the paper. The mass thus deprived of mother-liquor can then be dissolved in four times its weight of water, and carried through the same round of treatment as before. The result of this second series of operations will in most cases be found almost entirely free from impurities; but if need be a third or even a fourth course of fractionizing may be resorted to. It will be found far easier thus to separate the extraneous substances from a roughly made silicate than to observe the many precautions required in preparing a pure product with pure ingredients; and considering the small quantity of alcohol required, and the means of recovering even this by distillation, the cost appears so moderate that a manufacturer might be warranted in resorting to a single precipitation when a nice water-glass is wanted for use in the arts. In such a case it will do to operate on a tolerably strong solution, say one containing twenty per cent. of solid matter; but it should be observed that weaker liquors allow of a more intimate commingling of the alcohol, and are more likely to retain the foreign salts; therefore for photographic purposes the substance should be prepared from a ten per cent. solution, as above described.

Whilst upon the subject of water-glass, we may mention a very curious and important observation, which has just been made. It has been found that silicic acid precipitated from water-glass produces fermentation in saccharine solutions, particularly after the addition of some tartaric acid, and generates the odour of beer-yeast, afterwards of fruits, and finally of ether; in very dilute solutions the odour of putrid yeast appears. Silicic acid does not lose this property by boiling with water, or by repeated employment for fermenting, and subsequent washing with water. A solution of sugar, containing alcohol and tartaric acid ferments briskly with silicic acid, evolving carbonic acid gas amidst the separation of a yeasty foam. If confirmed, this observation of Leuch's will prove most important to the student of the obscure phenomena of fermentation.

A striking illustration of the powerful action possessed by an almost imperceptibly small portion of matter has lately come under our notice. An experimenter has been occupied for some time upon certain compounds which the element tellurium forms with organic radicles. Amongst others, he prepared some tellurium-methyl. The most remarkable property of the tellurium-methyl compounds is their intolerable and persistent odour. A small quantity of either the body itself or one of its salts allowed to get on to the finger, soon communicates a smell to the whole body, and in a few days is perceptible in the breath. The stench is so lasting that the unfortunate chemist is shut out from society for several months. We mention this because there is a tendency with some experimentalists to introduce the salts of these compound ammonias into photography, and if the fashion be once set, there is no knowing where it would stop. It is not likely that tellurium would be at present introduced into photography, owing to its expense; but this not being due to the rarity of the metal as much as to its want of utilization, may at any moment cease to be a bar to its employment.

It is often of consequence to the photographic chemist to ascertain the exact quantity of nitric acid present in a solution. The ordinary processes for estimating this are tedious in the extreme, and, consequently, recourse is generally had to the volumetric process of analysis proposed by Pelouze. This has lately been modified by Braun in the following way:—Instead of estimating by permanganate of potash the amount of protoxide of iron on which the nitric acid has not acted, he determines the peroxide of iron formed by means of iodide of potassium and hyposulphite of soda. Protochloride of iron is first formed, which is then peroxidised to its fullest extent by the nitric acid whose amount it is wished to ascertain. Iodide of potassium is then added, when the perchloride of iron, as is well known, sets the iodine free, even in the cold, but more completely when the reaction is assisted by a gentle heat. The amount of free iodine present may now be easily estimated by means of a solution of hyposulphite of soda after having added a small quantity of starch paste. The standard solution of hyposulphite of soda may be prepared either by dissolving a known weight of the salt in a similarly known weight of water or by standardizing with a solution of hyposulphite of unknown strength the iodine set at liberty by perchloride of iron prepared from a known weight of metallic iron. An excellent way of detecting the presence of small quantities of nitric acid when the exact amount is not required to be ascertained, has also been given by Schulze. It is founded on the fact that nitric acid in a strongly alkaline solution by the action of finely divided zinc or sodium, or aluminium amalgam becomes transformed into ammonia. When zinc is used only about half the nitrogen is evolved as ammonia, but with sodium amalgam the change is complete. When a solution is to be examined it is to be supersaturated with caustic potash and boiled for some time until the original ammonia is got rid of: the sodium amalgam is then dropped into the residual liquid and the mixture again heated. If the smallest traces of nitric acid are present in the solution it will be rendered evident by the immediate evolution of ammonia, which may be detected by the smell.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Cameras.—*Continued.*

*The Plate Holder.*—The plate-holder, or wet slide, is the most important part of the whole camera. On its condition and nature depends materially the condition of the photographic impression. The plate-holder alone comes in actual contact with the delicate sensitive plate, which is entrusted to it during the exposure, and it returns it to the laboratory pure and uncontaminated by this contact, or infected with the germ of stains, spots, rents, and other abominations, accordingly as itself is free or not from imperfection.

Slides for wet collodion plates are, I believe, all made precisely alike, the model dating from the discovery of the process. There is no reason to desire any alteration in the main features, but I think a little attention may be usefully paid to some points of detail.

I mentioned, when speaking of camera bodies, that when, for the purpose of introducing a diaphragm, the camera was made larger than the picture, it did not follow of necessity that the plate-holder should also be larger in the same proportion. There is advantage to be gained, however, in having it made so, as the prepared plate then, instead of resting upon the corners of the plate-holder itself, may be held in an inner chassis, moveable, and more easily cleaned after every plate. Since the cleanliness and consequent worth of the picture depend much upon the plate not being soiled in the slide, no care should be neglected to guard against the possibility of impurity inside this latter, and whatever facilitates the cleaning of it, or that tends to prevent the deposit of hurtful matter in it, increases in the same measure our chances of obtaining a perfect picture.

In the earliest cameras the corners of the plate-holders and of the chassis were fitted with pieces of glass to support the plate, which practically served as a reservoir for a puddle of nitrate of silver, that, draining off the plate settled in these corners between the glass and the wood of the slide or chassis. This nitrate of silver became at once contaminated with organic matter, and if any of it came again in contact with the iodized surface of the plate it was a certain source of stains. When it is considered that the plate and holder had to be carried in this condition from the laboratory to the glass-room and back, and that the plate had to be taken out and its position reversed before development, all which encouraged the impurities to flow over it, it will be understood how difficult it was with such an arrangement to get a plate free from all stain, and, in fact, how rare, in those days, it was to get a plate without at least a mark at the corners and edges, and how often these misfortunes used to obtrude themselves in more important parts of the picture.

This has been remedied to a great extent by substituting silver wires instead of the pieces of glass for the plate to rest upon. By this alteration the formation of a pool at each of the corners is avoided, but it does not entirely get rid of the chance of organic matter being carried on to the plate. The pools of nitrate of silver that have been noticed were only objectionable because they were formed in contact with the wooden frame, and became contaminated with organic matter, and *in this state* would stain the plate. The present chassis fitted with wires, is also made of wood, and when the plate holder is in a vertical position the plate rests upon this wood, and the point of contact receives the draining of nitrate, which—after imbibing impurities from the wood—when the slide is laid horizontally, or when the plate is removed, or even by capillary action only, may flow over the plate and stain it. It is usual to lessen this danger by hollowing out the sides of the chassis, so that the plate can only touch any side at the two extremities. This leaves eight channels by which impurities may be carried on to the plate at one stage of the process alone, and I think many otherwise inexplicable misfortunes might be traced to this source.

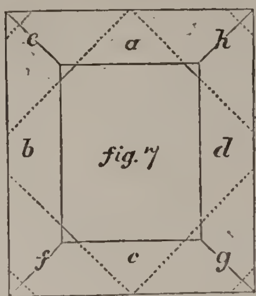
I do not think we can be said to have taken every possible care to produce a perfect picture, so long as we employ wood for any part of our apparatus that is to come into actual contact with a wet collodion plate, or in such very close proximity to it that the silver drainings from the plate can touch the wood, and by any chance get returned to the plate.

It is usual to varnish the inside of the slide, and the

* Continued from page 89.

chassis with spirit varnish, but this is no protection against the action of nitrate of silver. A thoroughly good coating of some resinous combination laid on hot with a brush might be effective for a time; but the proper course is to construct the chassis of some material without action on nitrate of silver. Possibly ebonite may be found the most practical, if its qualities are such as are stated.

I have for some time used chassis of glass, which, while perfectly satisfactory in practice, have the further advantage of being easily made by the photographer himself. Fig. 7




is a representation of one of these chassies. Four pieces of stout glass, (*a*, *b*, *c*, and *d*,) are cut of the required dimensions to form the chassis, the outer dimensions corresponding with the frame of the plate slide, and the inner with the size of the plate. These are laid upon a piece of plate glass, (a sheet of thin paper intervening to prevent sticking), and cemented together at the four corners. Then across each joint is cemented another strip of glass (*e*, *f*, *g*, and *h*), a portion of which overlaps the inside corners of the first pieces, but leaves the inside corners uncovered. This completes the chassis, but it must be left upon the piece of glass until the cement is perfectly set. In use, it rests in the slide upon the outer corners, and the sensitive plate upon the inner corners. This is like the old glass-cornered chassis, only the body of the chassis being in this case of glass, the nitrate of silver remains pure and harmless to the sensitive surface.

After each picture, it is taken out of the slide, held under the tap, and well washed with a brush kept exclusively for that purpose; it is then wiped, and the slide cleaned with a piece of rag, before it is replaced. With these precautions, stains from this source are almost impossible. If photographers who are much troubled with stains in the wet collodion process will make a glass chassis, and will keep it thoroughly clean, they will discover the importance of these observations.

If a diaphragm be used in the body of the camera, it is not necessary for the chassis or inside of the plate holder to be black; but the slide should be coated inwardly with some suitable varnish, to render it as much as possible impervious to nitrate of silver.

A compound of resin and beeswax will be presently described, which is very suited to this purpose.

The sliding shutter mostly in use for portrait cameras is that which opens upwards, and folding forwards, lies, while a picture is being taken, upon the top of the camera. This is a very efficient shutter for in-door work. Care should be taken that it works easily in its groove, and not in jerks or stiffly, so that there may be no danger of lifting the plate holder bodily, and so letting in light upon the partly exposed plate while raising it. A little French polish on the edge of the shutter or in the groove is as often the cause of its sticking as careless workmanship. The remedy for this is a little fine sandpaper applied to the part.

The grooves in which the shutter works should be frequently examined and cleaned from all dust and dirt; as if any is permitted to accumulate there, the friction of raising the shutter is apt to scatter it over the surface of the plate.

Before closing the subject of studio cameras, I must mention that I have purposely abstained from referring to particular instruments of any form, or those exclusively intended for one particular use; altough my observations, being general, mostly apply also to these as well as to the instrument of ordinary construction for general purposes.

(*To be continued.*)

## ON HELIOCHROMY.

BY M. NIEPCE DE SAINT-VICTOR.

Although I still base my researches upon the principle of M. Edmond Becquerel, I believe I have effected an important modification in it, which first admits of my obtaining the most vivid tints upon a light ground; then, after obtaining colours, of fixing them temporarily by a second operation, or rather, of retarding the destructive action of light for a few hours.

The heliochromic colours are obtained upon a film of chloride of silver, formed upon a metallic plate. We can chloridise the silver plate in various ways; at present, I effect this by hypochlorite of potassa. This alkaline bath, although very variable in its composition, generally gives good tints, only the ground of the image remains a little sombre, even after the influence of reheating the plate; moreover, various causes tend to make certain colours predominate.

This chloridizing does not give results identical with those indicated by M. Edmond Becquerel, in his *Mémoire* of the 3rd July, 1854. Nor was it better with regard to sensibility, when I employed it in reproducing the colours of a doll. The bath which I made use of at that date was composed partly of sulphate of copper, and partly of proto- and deuto-chloride of iron, dried, and diluted with one-tenth of water. With this chloridizing, which stood the action of reheating, we can operate, in a quarter of an hour in sunshine, with the camera.

But in my last researches, my aim being rather the fixing the colours than their development, I employed the simplest and most economical means of producing them. It fortunately happened that in my search for the means of fixing the colours, I obtained them more vivid—other things remaining the same.

To obtain the colours on a white ground, it is necessary, before exposing the plate to light, to heat it until the chloride of silver assumes a rosy hue; or rather, replace the action of heat by the action of light under a mixed screen, as pointed out by M. E. Becquerel in his *Mémoire* already referred to. I conceived the idea of extending upon the chloridized plate, before its exposure to light, a film, formed of a saturated solution of chloride of lead, obtained directly from the metal, into which sufficient dextrine is put to form a varnish of a certain consistence. The varnish is left to settle for four-and-twenty hours; when decanted, it will serve for use during several days. Pour this varnish on to the plate, after it has been reheated, and spread it over the entire surface, draining the superfluity off at one corner; then dry it at a spirit-lamp; the plate is now ready to be exposed to the light.

Under the influence of light, the colours are produced in much greater intensity than if the plate were not covered with this varnish, as may be shown by covering only one-half of the plate with varnish. The ground of the portion covered with varnish will be white, because the chloride of lead possesses the property of rendering the chloride of silver white under the influence of light (especially if the chloride of silver has been submitted to the action of heat), and the colours stand out better; besides, and this fact is very extraordinary, the black lines of an engraving are frequently reproduced with very great intensity; the same phenomenon sometimes takes place upon a rose-tinted plate, before exposure to light. After obtaining the colours, the plate is heated over a spirit-lamp, and the temperature raised as gently as possible, without carbonizing the varnish, which sometimes takes place very suddenly upon those parts directly struck by white light, especially if the chloride of lead be too acid or too concentrated. Under the influence of heat we generally find the colours to become more intense, especially if the light has influenced the whole thickness of the film of chloride of silver; in the opposite case, the heat causes the blues of the violet and the blacks to turn red; and this result appears to me very remarkable. It is by this action of heat upon the varnish influenced by light that I obtain the temporary fixing of the heliochromic colours.

If we apply the varnish with the base of chloride of lead after obtaining the colours, they brighten; but they last a much shorter time than when the varnish is applied before the colours are obtained, but still their coming is not delayed.

Generally all the substances applied in the state of varnish upon the film of chloride of silver, either before or after obtaining the colours, blacken the white portions of the images under the action of light, while all the salts of lead, and especially the chloride, whiten them; a too concentrated solution of chloride of lead must also be avoided, else too much white chloride will be produced.

Many substances, as for example, sulphate and nitrate of copper applied with dextrine upon the film of chloride of silver before exposure to light, cause certain colours to predominate and brighten them; but none fix the colours so long as the salts of lead, especially the chloride.

Finally, I hope with this varnish containing chloride of lead, that we may be able almost to entirely suppress the action of re-heating, whenever the plate has been chloridized either by the electric pile or in an acid bath as indicated above; but with the alkaline bath which I employed in my last experiments, it is still necessary to give a semi-heating to the plate before applying the varnish; if the plate be brought entirely to the *rose* hue, the colours are produced more rapidly, the lights are whiter, but the tones are generally less vivid; on the other hand the fixing is more permanent.

In conclusion:—1st. The chloride of lead applied upon the film of chloride of silver before exposure to the light produces in part the effect of re-heating, that is to say, the white light acts in white upon the lights, and admits of all the hues being obtained much brighter than upon a plate brought only to the rose hue by heat. 2nd. The action of heat after that of light produces upon that portion of the chloride of silver covered with varnish a transient fixing of the heliochromic colours. 3rd. White light bleaches chloride of silver in presence of chlorides of lead, instead of making it turn violet, as it would if it were alone. 4th. The destructive action of light is retarded, it acts more slowly, since it requires ten to twelve hours of diffused light to destroy the colours, which usually takes place in a few minutes, besides, there is not always a relative fixity. 5th. Such is the position of heliochromy at the present day, if the problem of fixing is not actually solved, there are at least reasons to hope for a solution.

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

### Lecture v.—Jan. 4, 1862.

The subject of colour blindness formed the subject with which this lecture was commenced. Supposing the audience before him to represent a pretty fair average of London society, the lecturer said that he was perfectly certain that there were then in the room many who did not see all the colours of the spectrum. He knew numbers of people who could not distinguish between a scarlet geranium flower and the green leaves, and it was known that the celebrated Dr. Dalton, of Manchester, could not distinguish between cherries on a tree and the leaves surrounding them. This peculiarity was, strange to say, more prevalent amongst gentleman than ladies. It is in every one's power to render himself temporarily blind to colour in this way:—take a red wafer on white paper; let it be brightly illuminated by the white light of day; look fixedly at it for minute and then push it suddenly aside. The spot which the wafer formerly occupied will be seen to be green, because the eye being partially deadened to red light, the complimentary colour to the red, present with it in the white light of the paper, makes its appearance.

In another way, however, we are all, to a certain degree, blind. There is a spot in each of our eyes where the optic nerve enters the retina, which is quite blind. This may be found out in the following way:—take two wafers, or make two black spots about two and a half inches apart on

a sheet of white paper. Then close one eye, the right, for instance, and look with the left perpendicularly down upon the right hand wafer. The image of the left wafer will now go into the eye and fall upon the blind spot of the retina, and the consequence will be that it will be invisible. In this way the image of the full moon can be completely quenched.

The subject of *chromatic aberration* was then briefly described. Taking the case of a simple lens, if a beam of white light be sent through it will be converged or refracted; but the violet rays of the beam being more refrangible than the red rays, the former would come to a focus earlier than the latter. The positions of the two foci being different, the distance between the focus of the red and the focus of the violet is called the chromatic aberration. This was illustrated by throwing the rays of the electric light on to a large simple lens. Upon interposing a screen in the path of the rays beyond their focal point there was a disc of light with a blue rim, but upon bringing the screen to a point between the focus and the lens, the disc of light was seen to be surrounded with a red rim, because there the blue cone is surrounded by a red one, the red being least refracted.

A brilliant electric spectrum was then projected on to the screen and attention was drawn to the dark space outside the visible spectrum at the red end. No light was visible, although millions of rays were falling on it. These were the heat rays. At the other end of the spectrum also, beyond the violet there are a perfect shower of rays that are invisible to the eye—that might be called too shrill—for as there are notes of sound too shrill to be heard by the human ear, so there are colours too shrill to be seen by the human eye. These were made visible by taking some solution of sulphate of quinine in tartaric acid and moistening a piece of blotting-paper with it. Upon now introducing the blotting-paper into the dark space beyond the violet end of the visible spectrum the part which had been moistened immediately glowed with a pale blue phosphorescent light. It is this property of sulphate of quinine to render these rays visible that enables these highly refrangible rays which are employed by the photographer, to be seen. This was illustrated in another way. The lecturer interposed a sheet of dark blue glass in the path of the rays, this cutting off the rays of an intensely illuminating power but which have not the property of being rendered visible. Upon then placing the moistened blotting-paper in the blue light, it became quite luminous. The same thing was afterwards performed with the rays from a spark from a powerful induction coil, whereby sulphate of quinine, different kinds of glass, and various powders were rendered *fluorescent*, as this phenomenon is called.

The phenomena of the colour of natural bodies were next considered. That of pure water was shown to be a beautiful green in the following way:—A tin tube, fifteen feet long, with glass ends was arranged horizontally and half filled with water. A sheaf of rays from an electric lamp was then sent through the tube and an image of the end of the tube projected on the screen by means of a lens. The upper half of the bundle of rays of light passed through the air in the tube, whilst the lower half of them passed through the water, and the image on the screen showed a strong contrast between the two media; the air being shown by a bright white semi-disc, whilst the water was shown as a beautiful green fluid. This colour is due to *absorption*. Most of the colours commonly seen are due to absortion; that is to say, they are due to the fact that a portion of the spectrum is absorbed within the body, while a second portion is allowed to pass through the body. To illustrate this a spectrum was formed and various coloured fluids were interposed in the path of the rays forming it. Burgundy wine tested in this way was seen to absorb the blue, indigo, violet, and almost all the green whilst it transmitted the red. Permanganate of potash in solution was in this way shown to chisel out with the utmost distinctness the centre portion of the spectrum whilst it allowed the two ends, red and blue, to pass. Various coloured glasses were afterwards tested in the same way.

Other ways of producing colour were then described. The spectrum itself is an example, its colours being those of refraction; so are the colours of the rainbow, which is, in fact, a solar spectrum. The splendid colours of a thin soap bubble are not colours of absorption, but are due to *interference* (to be subsequently explained). The iridescence on the neck of the dove, the hues of a peacock's tail, the colours of the wings of certain insects are not colours of absorption. Neither are the gorgeous colours which were shown to be produced when colourless spirit of turpentine was poured on to pure water. The gold, straw-colour, or blue of tempered steel is not a colour of absorption. Such colours are produced by a thin transparent film of gas, or liquid, or solid. which itself has no colour. They may, indeed, be produced by an exceedingly thin fissure which is perfectly empty. For example the lecturer stated that he had often produced fissures in the interior of a mass of ice, which showed splendid colours, though no air could possibly reach the fissure. Colours were also shown to be produced by reflection from scratched surfaces. They glisten on the fine threads of the field spider. Thin clouds, especially in Alpine regions, are often flooded with the most splendid iridescences, even when the light which falls upon them is white; these colours are to be distinguished from those of the morning and evening clouds which show simply the colour of the light falling on them. Finally a dust of lycopodium, for instance, whose particles are all of the same size, when shaken in the air or on a glass plate, produces colours when a light is viewed through it.

These colours have received various names in conformity with their modes of production. Some are called the colours of thin plates, others the colours of diffraction. They were all explained to depend on the great principle of *interference*.

This, the lecturer said, was a very difficult point to explain, but he would endeavour to render it intelligible in the next lecture. At present he would break the ground by explaining that, although he had hitherto spoken of light as something darting out of a luminous body, as luminous particles which were reflected like billiard balls, this was not what he believed light to be. All the laws referred to in preceding lectures would follow, if light were supposed to be produced by waves or undulations, in the same way as sound. To show that sound was produced by vibrations of air, and that these vibrations actually did pass from a sounding body through the air on all sides, the lecturer performed a very striking experiment. A small gas flame was arranged, having a long glass tube placed vertically over and round it. Upon now uttering a loud musical note with his voice, the lecturer caused the flame to vibrate, giving out the same sound continuously. This proved in the most perfect manner that some of the vibrations of the air passed from the voice to the flame, and caused it to be started into vibration by hearing it. Professor Tyndall stated that he had stood sometimes at a distance of thirty feet off, and had been able to say to the flame, "Sing," and had then been able to say, "Stop," and in each case it had obeyed him.

## DRY COLLODION: MODIFIED FROM SEVERAL PROCESSES.

BY M. JANE.

The plates prepared as under can be kept more than a year without losing their sensitiveness.

The pyroxyline employed is a French one, which dissolved perfectly. The one made with equal parts of mixed acids at 150° Fah., I find perfectly good.

When the plate is perfectly cleaned coat with collodion:—

| | |
|---|---|
| Ether ... ... ... ... | 67 parts |
| Alcohol ... ... ... ... | 33 ,, |
| Pyroxyline ... ... ... ... | 1 ,, |
| Iodide of cadmium ... ... | 1 ,, |
| Bromide of cadmium ... ... | 0·2 ,, |
| Iodide of cadmium ... ... | 0·2 ,, |
| Pure resin (colophony) ... ... | 0·3 ,, |

Put the pyroxyline, ether, and a part of alcohol in a bottle, and dissolve the iodide and bromide in the remainder of the alcohol, filter and mix them together; then add the resin. After 24 hours it is fit to work.

The collodionized plate is sensitized in a bath of:—

| | |
|---|---|
| Water (distilled) ... ... ... | 1000 parts |
| Nitrate of silver (fused) ... ... | 100 ,, |
| Glacial acetic acid ... ... | 100 ,, |
| Iodide of cadmium ... ... | 0·5 ,, |
| Pure iodine (French) ... ... | 5 ,, |

The plate should remain in this bath about a minute till the greasy appearance of the plate has disappeared, then remove it from the natrate bath and immerse it in a bath of distilled water (this bath of water must be changed at each plate). Coat a second plate, and when it is in the nitrate bath, remove the first plate from the first bath of water, and so on till the first plate has reached a sixth bath made as follows:—

| | |
|---|---|
| Water distilled ... ... ... | 1000 parts |
| Pyrogallic acid ... ... ... | 3 ,, |

Filter very carefully.

After the plate has remained in this sixth bath, whilst another plate is coated with collodion, and to put it in the nitrate bath, take the first plate from this pure bath, let it drain and then cover it with:—

| | |
|---|---|
| Water ... ... ... ... | 100 parts |
| Dextrine ... ... ... | 20 or 25 ,, |
| Camphor ... ... ... ... | 5 ,, |

Filter carefully through a sponge.

This solution is made at a temperature of about 27° centigrade, or about 80° Fah.

Cover twice with this dextrine solution and let the plate dry spontaneously, one corner on a piece of blotting-paper, or on two bars of wood.

These plates must be kept in the same manner as plates by other dry processes.

When they are to be developed—which can be done several days after the exposure—immerse the plate in a bath of distilled water for about 20 seconds, then put it on a level stand and cover it with—

| | |
|---|---|
| Distilled water ... ... ... | 100 parts |
| Pyrogallic acid ... ... ... | ¼ ,, |
| Citric acid ... ... ... ... | ¼ ,, |

Return the solution into the developing glass, and add a few drops of a solution of nitrate of silver at four per cent. (a 20 or 25 grain solution); when intensity is obtained, wash and fix in hyposulphite of soda or cyanide of potassium. The plate can be developed with iron by dipping, but the solution should not be poured on the plate. The iron is made as follows:—

| | |
|---|---|
| Distilled water ... ... ... | 500 parts |
| Protosulphate of iron ... ... | 75 ,, |
| Sulphuric acid ... ... ... | 15 drops |
| Glacial acetic acid ... ... ... | 10 parts. |

Intensify with bichloride of mercury and iodide of potassium as described in former pages of the Photographic News. Varnish as usual.

## IODIDE AND BROMIDE OF SILVER:

### Researches into their Photogenic Properties according to the Circumstances under which they are obtained.*

BY M. E. REYNAUD.

From numerous experiments I have arrived at the conclusion that when we make use of a collodion containing several iodides, the properties of the compound are not in relation to the several properties of each of the iodides when used separately. Thus, iodide of potassium, whose slowness when employed alone we well know, appears to me, on the contrary, to gain in sensitiveness when employed with the iodides of cadmium and ammonium.

I shall now indicate some general rules to serve as a guide in the preparation of iodizing photogenic solution. These rules are derived from the observations stated above, and while leaving the operator free to choose which iodide he shall make predominate, they will serve as a basis of operations, and indicate to him the modifications he must make in his formulæ, according to the circumstances in which he is placed.

1st. The quantity of iodine contained in the collodion (and here I understand not only the *free* iodine, but also that which exists in combination in the iodides employed), will be a mean of 1 gramme for every 100 cubic centimètres of normal collodion (1 per 100 grains, drachms, or ounces).†

2nd. In ordinary cases we shall find the advantage of employing together the iodides of potassium, ammonium, and cadmium.

3rd. When we desire to obtain the maximum of sensitiveness, care must be taken that the collodion contains only a small portion of free iodine.

4th. If the photogenic film becomes spotted during sensitising—although its opaline hue may indicate that it does not contain so much iodide—we may attribute this defect to too great an excess of iodine; but if the colour of the collodion is not deeper than orange, we can only attribute this result to an excessive quantity of iodide of ammonium in proportion to the other iodides.

5th. Lastly, if the collodion film becomes fogged, we must add some iodine or chloride of iodine until it assumes the orange hue. I recommend that an alcoholic solution of iodine be employed, so that the hue arrived at may be at once ascertained by merely shaking the mixture.

I shall now make some remarks upon the action exercised upon the above-described phenomena by the state of the silver bath.

A positively *neutral* silver solution always causes fogging, and in order to cause the fog to disappear, a small quantity of acid must be added to the bath.‡ We may employ acetic or nitric acid; but I prefer nitric to acetic on account of the formation, resulting from employing the acetic, of a certain quantity of acetate of silver, which, by prolonged using, is afterwards precipitated by the iodide of silver, with which the solution becomes more and more saturated. The acetate thereupon remains in suspension in the bath in the state of very minute crystals, and their injurious action in causing the collodion film to become riddled with holes is but too well known to most photographers.

By the use of nitric acid this inconvenience is avoided; but it must be used with great moderation on account of its energy. One drop usually suffices for four ounces of neutral silver solution.

* Concluded from p. 87.

† I say the quantity of *iodine*, and not of *iodide*, for upon examining the equivalents of the latter we perceive that a certain quantity of iodide of ammonium, 5 grammes, for example, contains 4 gr. 38 of iodine, while 5 grammes of iodide of cadmium contains only 3 gr. 45 of this metalloid.

‡ The crystallized nitrate of silver of commerce is almost always sufficiently acid to render the addition of any acetic or nitric superfluous.

There is another acid the action of which upon the silver solution does not appear to have been observed; many experiments, however, have proved to me the advantage that may be derived in certain cases by giving it the preference, I refer to *hyponitric acid*. A nitrate solution into which we put nitric acid charged with nitrous compounds, appears to me to possess the property of giving very dense blacks, and lights free from fog; but what struck me as being very remarkable was, that the sensitiveness, far from being diminished, seemed in this case to become augmented. However, I do not positively assert this as a fact, not having repeated the experiment; but I recommend photographers to verify the fact, and to determine exactly what course to pursue in the use of this substance, especially in its application to instantaneous photography.

I shall not enter upon the means employed to neutralize a bath that is too acid, as they are sufficiently well known; I shall content myself with condemning the employment of ammonia for this purpose, the much too intense neutralizing action of this substance almost always gives rise to accidents resulting from the employment of an alkaline bath. Carbonate of soda or carbonate of lime are substances to which, I think, we ought in this case to give the preference.

It now remains for me to speak of the bromides. We know that bromide of silver, compared with the iodide of that metal, is much more sensitive to the least refrangible colours, such as the red, yellow, &c. It is chiefly on account of this property that we are induced to employ the bromide in collodion.

The *bromides of ammonium* and of *cadmium* are those which appear to me to possess this property in the highest degree.

The *bromide of potassium* communicates to the collodion a sharpness aud delicacy of detail similar to that produced by employing the iodide of that metal, and without diminishing its sensitiveness.

The most suitable proportion of bromide in wet collodion appears to me to be 3 to 4 grammes to 12 of iodide in a litre of plain collodion. Too much bromide causes a superficial fogging, which destroys all vigour in the proof.

I now conclude my observations; there still remains much to be said on these subjects, especially upon the influence of iodide of silver upon the nitrate bath which becomes more and more saturated with it by use; and upon the changes induced in collodion by keeping, &c., &c. Upon these I hope to report on another occasion.—*Bulletin de la Soc. Fr. de Photographie.*

## PHOTOGRAPHIC SECRETS.

BY COLEMAN SELLERS.*

The beginner in photography and the unsuccessful operator alike are always on the look-out for, and most earnestly desire to learn, the "great secrets"—the wonderful instantaneous processes of this or that celebrated artist; and when they are told that these unknown processes are the same as what they have learned from the works of Waldack, Hardwich, &c., they cry out at once, "Oh, no! these men only publish what all the world knows already, and keep back the essential principles of their formulæ;" and the proof of this they hold to be their own failures. This very thing is instanced in the complaints of some inquirers in this Journal.

Some few years ago, being requested by a friend to give him some instruction in photography, I furnished him with a list of chemicals and fixtures needed, and as he was an ingenious man, I watched with interest the admirable arrangement of his dark room. At last he was ready for work, and an evening was spent at his house, directing the mixing of his bath, sensitizing his collodion, and preparing all things for an early trial of his skill. I had furnished him also with the balance of the collodion in the bottle which I had used in showing him how to work. The next day but one he came to me with a sad tale to tell. He had followed my directions to the letter (he was a very precise man), and had "exposed" any number of times in all kinds of light, and no image could he develop. "What

* From *Humphrey's Journal.*

shall I do?" he cried in despair. When anyone says very positively that he has followed my directions, and yet has not arrived at the same conclusion as I should have done, is proof enough to me that he has forgotten something. So, before telling him a reason for his failure, I asked him to recite in detail his course of manipulation, which he did in this manner:—

"I first flowed my plate with collodion, then put it into the bath, and then into holder and exposed; removed from holder in dark room, and *washed*."—"Stop!" I exclaimed, "is that my way of working?" "Oh, certainly; see I have your written directions in my pocket-book." He produced the book, and, lo and behold! he had trusted to his recollection of how I worked, and had done his washing before development, instead of afterwards. He is now a good workman, and laughs at his mistake. This is but one of a great many instances that have occurred within my limited experience. Every schoolboy knows how easy it is to make a mistake in a simple sum of addition. How much easier it is to make mistakes in the routine of a chemical formula.

There are two classes of photographers—the practical operator who makes the art his means of procuring a livelihood, and the amateur who makes pictures for amusement. As far as my observation has enabled me to judge, the best workers in both classes are those who are the most willing to give their knowledge to others; they give freely from their abundant store, confident in their own skill, and expect in return that others should treat them with like courtesy. In the case of the practical operator, it is not to be wondered at that he should want to keep secret the principle of his success—the principles which enable him to work better or cheaper than his rivals in trade. We should value the gratuitous contributions to science from those who are thus helping others to equal or surpass them in what is essential to them in money-making, more than the teaching of amaters, who can only expect fame, and who know that they will gain what they desire by writing.

Now, with regard to the secrets of the art, there are no doubt many changes being made in formulæ and convenience of manipulation. When these changes originate with amateurs, a desire to show their discovery to the world soon prompts them to publish it; but when they originate with the trade, the secret rests a long time with the discoverer; it then slowly finds its way to other establishments, and at the same time is modified by each; amateurs, too, learn it, and under the seal of implicit secrecy they may practice it for a long time before it becomes public property.

Such is the case now with regard to printing on albumen paper. Long after my article on printing had been published in *Humphrey's Journal* I continued to silver my paper on a plain 80-grain solution of silver, acid with citric acid. Yet I heard from all quarters that some of the best work in the country was done with an ammonio-nitrate solution for albumen paper; but not one word on the subject has appeared in the Journals, until at last some English operator, who has worked in this country, goes home and tells the editor of one of the English journals* that in America they silver albumen paper on ammonio-nitrate solution, and that they prevent the tendency to dissolve off the albumen by adding ether.

The editor, commenting on it, says that he rather thinks the strength of the solution has more to do with its success than the addition of ether. Months have passed since this was published, and yet no one has said in print that he used the ammonio-nitrate solution. Now, for my part, I have experimented with various processes of this kind for some time past, and with great success, so that I may now say with safety that it is better and more economical than the old way of silvering. But further experiments may show objections; as, for instance, I do not yet feel sure how to strengthen the bath in the best manner, not yet having had occasion to do so; and now I do not intend to say how I use the ammonio-nitrate solution, but will wait for some one, prompted by what I have just written, to give the world his experience on this subject, and thus ventilate one of the *great secrets* in photography. It is one of the most interesting subjects of scientific inquiry, the more so as the bath, though *slightly* alkaline, does not discolour from use; the prints do not turn red in water, and they tone with great vigour in any of the toning solutions in general use.

The chemistry of the ammonio-nitrate solution is interesting, and I hope that some of those who write for this Journal will anticipate me in making it the theme of future articles.

* See Photographic News, vol. v., p. 480.

## CARTES DE VISITE.

BY A. WYNTER, M.D.*

The commercial value of the human face was never tested to such an extent as it is at the present moment in these handy photographs. No man, or woman either, knows but that some accident may elevate them to the position of the hero of the hour, and send up the value of their counteuances to a degree they never dreamed of. For instance, after the great fight with Heenan, Tom Sayers was beset by photographers, anxious for the honour of paying for a sitting; but his reply was, "It's no good, gentlemen, I've been and sold my mug to Mr. Newbold," that sporting publisher having seen betimes the advantage of securing the copyright of his phiz. Thus a new source of income has been opened to first-rate photographers, besides profit arising from taking portraits. A wholesale trade has sprung up with amazing rapidity, and to obtain a good sitter, and his permission to sell his *carte de visite*, is in itself an annuity to a man. For instance, all our public men are what is termed in the trade "sure cards;" there is a constant demand for them, a much greater one, indeed, than can be supplied. It must be remembered that every picture has to be printed from the original negative, and the success of the printing process depends upon the weather; in foggy, dark days no impressions can be taken from the negative. It is true that negatives can be taken from positives, or from *cartes de visite* already in existence; but the result is a deterioration of the portrait, a plan never resorted to by first-class photographers, such as Silvy, or Lock, or Mayall, although dishonest persons are to be found who will commit piracy in this manner for money. The public are little aware of the enormous sale of the *cartes de visite* of celebrated persons. An order will be given by a wholesale house for 10,000 of one individual, thus £400 will be put into the lucky photographer's pocket who happens to possess the negative. As might have been expected, the chief demand is for the members of the Royal Family. Her Majesty's portraits, which Mr. Mayall alone has taken, sell by the 100,000. No greater tribute to the memory of his late Royal Highness the Prince Consort could have been paid than the fact that within one week from his decease no less than 70,000 of his *cartes de visite* were ordered from the house of Marion & Co., of Regent Street. This house is by far the largest dealer in *cartes de visite* in the country; indeed, they do as much as all the other houses put together. The wholesale department of this establishment, devoted to these portraits, is in itself a sight. To this centre flow all the photographs in the country that "will run." Packed in the drawers and on the shelves are the representatives of thousands of Englishwomen and Englishmen waiting to be shuffled out to all the leading shops in the country. What a collection of British faces! If a box or two of them were to be sealed up and buried deep in the ground, to be dug up two or three centuries hence, what a prize they would be to the fortunate finder! Hitherto we have only known our ancestors through the pencils of certain great artists, and the sitters themselves have all belonged to the highest class. Hence we are apt to attribute certain leading expressions of countenance to our progenitors, which are rather owing to the mannerism of the painters than the sitters. Thus all Reynolds's beauties possess a certain look in common; if we believed his brush without any reserve, we should fancy that the English race of the latter part of the last century were the noblest looking beings that ever trod the earth. No portrait of man or woman ever came from his easel with a mean look. The same may be said of those of Gainsborough and Hoppner, and the result is that all our knowledge of the faces of the last century is purely conventional. But it is far different with the *carte de visite*. Here we have the very lines that Nature has engraven on our faces, and it can be said of them that no two are alike. The price, again, enables all the better middle class to have their portraits; and by the system of exchange, forty of their friends (happy delusion) for two guineas!

Let us imagine, then, a box of such pictures discovered of the time of the Commonwealth, for instance, or a few years later. What would we give to have such pictures of old Pepy's, his wife, and Mistress Nip? Yet treasures such as these we shall be able to hand down to our posterity, for there is little doubt that photographs of the present day will remain perfect, if carefully preserved, for generations. Silvi alone has the negatives of sitters in number equal to the inhabitants of a large country

* Condensed from *Once a Week*.

town, and our great thoroughfares are filled with photographers; there are not less than thirty-five in Regent Street alone, and every suburban road swarms with them; can we doubt therefore that photographic portraits have been taken by the million? Out of these the great wholesale houses, such as Marion & Co., have the pick. Every day brings up scores of offers of portraits, which are accepted or not, according to circumstances. In many cases the sale is wholly local, in others nearly wholly metropolitan. Some have a perpetual sale, others, again, run like wildfire for a day, and then fall a dead letter. Some special circumstance or action scatters these portraits wholesale; for instance, the pluck displayed by the Queen of Naples resulted in a sale of 20,000 of her portraits; and Miss Jolly was only a month ago the rage in Ireland. The sudden death of a great man, as we have before said, is immediately made known to the wholesale *carte de visite* houses by an influx of orders by telegraph. There was a report the other day that Lord Palmerston was dead, and his *carte de visite* was immediately in enormous request; and Lord Herbert to this day sells as well as any living celebrity.

Literary men have a constant sale: Dickens, Thackeray, and Trollope, are bought for every album. Scientific men, again, sell well; but theatrical or operatic celebrities have a run for a short time, owing to some successful performance, and then are not sought for more. The series of Mademoiselle Patti has, however, already circulated to the extent of 20,000 copies. It is a curious fact that the *cartes de visite* have for the present entirely superseded all other sized photographic portraits. This is rather singular, inasmuch as we did not adopt it until it had been popular in Paris for three years. Possibly, however, the rage has its foundation in two causes. In the first place, a *carte de visite* portrait is really a more agreeable looking likeness than larger ones; it it taken with the middle of the lens, where it is truest, hence it is never out in drawing; and then, again, it rather hides than exaggerates any little roughness of the face, which is so apparent in large-sized portraits. Secondly, when a man can get forty portraits for a couple of guineas, his vanity is flattered by being able to distribute his surplus copies among his friends. It enables every one to possess a picture gallery of those he cares about, as well as those he does not, for we are convinced some people collect them for the mere vanity of showing, or pretending, they have a large acquaintance. There is still another advantage: *cartes de visite* are taken two at a time, stereoscopically, that is, a little out of the same line, hence solid portraits can be produced by the aid of the stereoscope. When we remember the old style of portrait we were obliged to be contented with, the horrible limning a lover got of his mistress for five guineas; the old monthly nurses they made of our mothers; and the resplendent maiden aunts, with their gold chains, watches, and frightful turbans; and the race of fathers we keep by us in old drawers, gentlemen built up stiffly, and all alike in blue coats, and brass buttons, with huge towels round their necks by way of cravats; when we remember the art at the command of the middle classes not forty years since, we are deeply thankful for the kindness of Sol in taking up the pencil and giving us a glimpse of nature once more. But even the great Apollo himself has his mannerism, and it is easy enough to detect a Silvy, a Lock, a Mayall, a Herbert Watkins, a Maull and Polyblank, or a Claudet *carte de visite* by the manner in which it is posed, or the arrangement of the light upon it. It is a great mistake to suppose that the art of portrait taking has degenerated into a mere mechanical trade; the difference between a good photographic portrait and a bad one is nearly as great as between a good miniature and a bad one. How difficult it is to pose a sitter well, and how this difficulty is increased where the artist has to work with the sun? Of old, in the course of three or four sittings, the natural attitude and best expression of the sitter was pretty sure to come out, but now the difficulty is greatly increased; when a picture has to be taken, we say, in half a minute, what a natural aptitude the photographic artist ought to possess, to seize the best attitude and position at once. To produce a good photograph it requires a thoroughly artistic hand, and that hand must work, also, with the best tools; consequently, the lenses now in use for first-rate work are exceedingly valuable, and the stock of cameras required by the producers of our best *cartes de visite* costs a little fortune.

Then there is, in addition, all the accessories to make up backgrounds—properties, in fact, some of them of the stale routine style; for instance, the pillar and the curtain does duty as of old, and many a good honest cockney is made to stand in marble halls, who was never in a nobler mansion than a suburban villa in his life. But there are not wanting details in better taste. The French have composed their *cartes de visite* in this respect with great skill and art. The most elaborate carved wood-work, the rarest statuettes, the most carefully painted distances, figure in these backgrounds, and are shifted and combined in endless variety, so as to give every portrait some distinctive character of its own. All these things cost money, and the tendency is to throw the best business into the hands of a few skilled capitalists; and in London half-a-dozen men entirely command the patronage of the fashionable part of the community.

Monsieur Silvy appears to have made the *carte de visite* his special study, and has brought to his task all the resources of an artistic mind. No one knows how much depends upon the photographer until he compares a good with a bad sun portrait. That sense of beauty and instinctive art of catching the best momentary *pose* of the body, is a gift which cannot be picked up as a mechanical trade can be. This gift M. Silvy possesses in an eminent degree. And he not only pursues photography as an art, but also as a manufacture; hence the scale and method of his proceedings. A visit of inspection to his studio in Porchester Terrace is full of interest. In walking through the different rooms, you are puzzled to know whether you are in a studio, or a house of business. His photographic rooms are full of choice works of art in endless number; for it is his aim to give as much variety as possible to the accessories in each picture, in order to accomplish which he is continually changing even his large assortment. Sometimes when a Royal portrait has to be taken, the background is carefully composed beforehand, so as to give a local habitation, as it were, to the figure. The well-informed person, without a knowledge even of the originals, may make a shrewd guess at many of the personages in his book of Royal Portraits by the nature of the accessories about them. Thus, all the surroundings of the Duc de Montpensier's daughter are Spanish, whilst his son's African sojourn is indicated by the tropical scenery. The portraits of members of our own Royal Family are surrounded with fitting accessories which stamp their rank. As M. Silvy takes every negative with his own hand, the humblest as well as the most exalted sitter is sure of the best artistic effect that his establishment can produce. This we feel certain is the great secret of M. Silvy's success, as the skill required in taking a good photograph cannot be deputed to a subordinate. But, as we have said, his house is at the same time a counting-house, a laboratory, and a printing establishment. One room is found to be full of clerks keeping the books, for at the West End credit must be given; in another a score of employeés are printing from the negatives. A large building has been erected for this purpose in the back garden. In a third room are all the chemicals for preparing the plates; and again in another we see a heap of crucibles glittering with silver. All the clippings of the photographs are here reduced by fire, and the silver upon them is thus recovered. One large apartment is appropriated to baths in which the *cartes de visite* are immersed, and a feminine clatter of tongues directs us to the room in which the portraits are finally corded and packed up. Every portrait taken is posted in a book, and numbered consecutively. This portrait index contains upwards of 7,000 *cartes de visite*, and a reference to any one of them gives the clue to the whereabouts of the negative. Packed as these negatives are closely in boxes of fifties, they fill a pretty large room. It is M. Silvy's custom to print fifty of each portrait, forty going to the possessor, and ten remaining in stock, as a supply for friends. Sometimes individuals will have a couple of hundred impressions, the number varying, of course, according to the extent of the circle. The tact and aptitude of M. Silvy for portrait taking may be estimated when we inform our readers that he has taken from forty to fifty a day with his own hand. The printing is, of course, purely mechanical, and is performed by subordinates, who have set afloat in the world 700,000 portraits from this studio alone.

In comparing the Parisian and London *cartes de visite*, it is important to observe the wide difference which exists between the class of portraits that sell. In Paris, actors and singers, and dancers are in demand, to the exclusion of all other kinds of portraits. A majority of these portraits, indeed, are aimed at sensual appetites. Statesmen, members of the legislature, and scientific men, do not sell at all. In England, we know how different it is: we want to know our public men—our great lawyers, painters, literary men, travellers, and priests: in

France, there seems to be no respect or reference for such people —at least people do not care to invest a couple of francs on their *cartes de visite*, and consequently they are not produced. The universality of the *carte de visite* portrait has had the effect of making the public thoroughly acquainted with all its remarkable men. We know their personality long before we see them. Even the *cartes de visite* of comparatively unknown persons so completely picture their appearance, that when we meet the originals we seem to have some acquaintance with them. "I know that face, somehow," is the instinctive cogitation, and then we recall the portrait we have a day or two past seen in the windows. As we all know, the value of the photographic portrait has long been understood by the police, and known thieves have the honour of a picture gallery of their own in Scotland Yard, to which we shall refer in some future paper; but the photograph is also useful for rogues as yet uncaptured and uncondemned. Thus, when Redpath absconded, it was immediately suspected that a negative of him must be lodged at some of our photographers. The inquiry was made, and one of them was found in Mr. Mayall's possession. An order was given for a supply to the detective force, and through its instrumentality the delinquent, though much disguised, was arrested on board a steamer sailing from some port in the north of Europe.

## Proceedings of Societies.

### North London Photographic Association.

The usual monthly meeting of this Association was held in Myddelton Hall on the evening of Wednesday, February 19th, G. Shadbolt, Esq., occupied the chair.

The minutes of a former meeting having been read and confirmed

The Chairman exhibited some stereoscopic portraits of Mr. Coleman Sellers, whose contributions to American photographic journals many English photographers are familiar with.

Mr. G. Wharton Simpson exhibited some exquisite card portraits by Mr. Hawke, of Stonehouse, as illustrative of the value of the preliminary bath of acetate of soda in preventing mealiness in toning. Also some fine prints by Mr. Ward, of Stratford-on-Avon, from negatives on simply washed collodion plates, without preservative or preliminary coating of any kind. (See Photographic News, No. 175, p. 14, Vol. VI.)

Mr. Shadbolt, in the absence of a paper for the evening, having temporarily vacated the chair, read a translation of an article from one of the French journals, by M. Niepce de St. Victor, on "Heliochromy." (Another translation of the same article will be found on p. 100.)

A desultory conversation on the subject of photographing in colours followed, in which various accidental cases of producing a few colours was referred to.

Mr. Shadbolt remarked that he could readily understand various imperfect tints being produced in a collodion positive by the different degrees in which the film permitted a dark ground or backing to be seen. One very remarkable point in M. St. Victor's experiments was the reproduction of black by black on a white ground. The plate being white to begin with, and black being supposed to be inactive, ought to have produced no effect; yet here it was reproduced by black.

Mr. Simpson remarked that Mr. Malone, in his paper on "Ruby Silver," had incidentally mentioned that he had secured a similar result to that described by M. St. Victor.

Some conversation on the practical value of these experiments followed.

Mr. Hughes observed that to him it appeared their chief value consisted in keeping alive the interest and faith in the photographic production of natural colours as a possibility. They showed that the production of colours *was* within the bounds of possibility, and that was a great point gained. What had been done might be done again, and each time some slight advance might be made. We should not, therefore, pooh-pooh such efforts as unpractical, but give every encouragement to those gentlemen who with steady faith pursued this desirable, although far off, result.

Mr. Simpson remarked, in reference to these pictures being single positives on silver plates, that it must not be forgotten that the Daguerreotype on silver plates was the pioneer process of photography, and that possibly these plates on which chloride of silver was formed might possibly be, in like manner, the precursors of a practical process of heliochromy.

A conversation on lenses then arose, in which

Mr. Ross expressed his conviction that for general landscape purposes no lens surpassed the ordinary single view lens. The image yielded had greater vivacity and brilliancy.

Mr. Dawson said Mr. Wilson had abandoned compound lenses for lanscape purposes and returned to the use of a single lens, and was using the old quarter-plate lens for card portraits.

Mr. Hill said that a letter he had recently received from Mr. Wilson was to the contrary effect. It said that he preferred the compound where it was necessary to secure a wide angle.

Mr. Ross said that much misapprehension seemed to prevail amongst photographers as to the extent of angle embraced in pictures. They seemed to overlook the fact that when the picture was measured on the horizontal line, the amount of angle included would vary with the shape of the pictures. It was desirable that the diameter of the circle of definition should be given in speaking of the angle included by any lens. It was an error to suppose that any lens was superior for every purpose, each one had its speciality; the single for landscapes, the orthographic for architecture, and the triple where perfectly straight lines were required.

Mr. Hughes asked if the pincushion-shaped distortion were inherent in the orthographic lens, or only seen in the margins when the lens was strained.

Mr. Ross said it really existed in the image always to just the same extent as the curvature in the single lens in the opposite direction.

The Chairman observed that when the lens was used for the sizes which the lenses were catalogued to cover, the distortion was imperceptible.

A conversation ensued on the various appliances used in the early days of photography, as substitutes for the proper lenses.

Mr. Hughes asked Mr. Dawson if he had properly understood him to say that Mr. Wilson had abandoned compound lenses for landscape purposes?

Mr. Dawson said for stereoscopic purposes, yes; and the other size of pictures he had been taking he was giving up, as he found they did not sell.

After a few further remarks the subject dropped.

The nomination of officers to be elected at the annual meeting in March then took place, after which the proceedings terminated.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 26th February, 1862.*

M. Niepce de Saint Victor, in continuing his researches upon heliochromy, has succeeded in giving greater permanence to the colours obtained, chiefly by the employment of a bath of chloride of lead and dextrine. In diffused light, the coloured images obtained will stand ten or twelve hours. This is certainly a step in advance towards the solution of this very interesting problem; and, as M. Niepce remarks, if it be not yet completely solved, it affords encouragement to hope that it may be, ere long.

M. Wothly, of Aix-la-Chapelle, whose process for obtaining positives on paper, without the use of nitrate of silver, was held in doubt, as regards permanence, has addressed a communication to our Photographic Society, in which he states, that by his new process he obtained proofs which, fixed by means of the sulphides of sodium, antimony, and lead, leave no doubt of their permanency.

Photography on wood has received the attention of M.M. Columbat and Couvez, who operate by means of a film of chlorided albumen, which is treated in exactly the same manner as albumenized paper. They claim, for the advantages of this method, great sharpness in the design, and the infinitesmal thickness of the film upon the surface of the wood. Experienced engravers to whom the prepared blocks have been submitted for trial in cutting, state that the ligneous tissue is not attacked by the chemical agents to which it is submitted, and that they could work as well on the photographed block as upon blocks prepared in the ordinary manner.

Designs upon metal plates are obtained by these gentlemen by a different process to that usually employed. It is, well known that certain salts of iron, as the lactate, perchloride, &c. are modified under the influence of light, and become extremely hygrometric: this is the starting point of the new process.

Upon a plate of metal carefully cleansed, they spread a film of gum arabic, which is allowed to drain and dry; when dry, it is impregnated by means of a soft brush with a solution of tartaric acid and of perchloride of iron, and again left to dry during four and twenty hours. It is then exposed in the pressure frame under a positive or a negative, and, after exposure, the length of which will depend upon the intensity of the light, the plate is carried into the dark room. The light has decomposed the perchloride into protochloride, and the design appears as a negative; it is next submitted for a few seconds to the steam of water, which impregnates, in proportion to the degree of solarization, the sensitized portions; with a soft brush charged with resin the whole plate is carefully gone over, the resin adheres to those portions which have absorbed steam in greater or lesser quantity.

Then, without washing, the plate is heated; the resin melts and forms *a grain*, which varies according to its thickness, and thus gives all the tones of black and white correctly. It is afterwards submitted to the usual processes of engraving.

Among the new publications of interest to photographers, we may mention M. Arthur Chevalier's "Treatise on Enlarging Photographs, in a Theoretical and Practical Point of View," and Messrs. Barreswill and Davanne's "Dictionary of Industrial Chemistry."

The editor of *La Lumière*, M. Gaudin, has some remarks in the last number of his journal upon Emerson J. Reynolds's printing process with the salts of iron, and on Mr. Hannaford's criticisms upon the same. He says:—"Mr. Hannaford's remarks are indeed rather severe, and may be better understood when it is remembered that he has himself proposed a printing process with salts of iron. He is perfectly correct when he states that the development of images by nitrate of silver must form chloride of silver in the paper, which a simple washing in water would remove, and which might subsequently alter the lights of a proof. Mr. Reynolds, on the other hand, says, that these chlorides must be removed by the ammonia *in excess*, which exists in the ammoniacal nitrate of silver. This salt has, in fact, always an alkaline reaction to test paper, and it really contains free ammonia: this latter, capable of easily dissolving chloride of silver, also decomposes the oxalate of iron, and produces free oxide of iron, which immediately stains the paper yellow. Does ammoniacal nitrate of silver worthy of the name, that is, prepared with ammonia in excess, and then boiled, dissolve chloride of silver? This case appears to me doubtful; I cannot at present throw any light on the matter; but without reckoning, like Mr. Reynolds, upon the free ammonia which may not exist, I rather believe that the solvent power of ammoniacal nitrate of silver will be strong enough to remove naturally the feeble traces of chloride of silver formed spontaneously in the papers of commerce.

"I have continued making experiments to arrive at producing proofs by this process, without having recourse to nitrate of silver; I have ascertained that the peroxalate of iron is more sensitive with a feeble excess of oxalic acid, and especially, when united with organic matter, such as gelatine; and by this latter addition, I reckoned upon making proofs which will resist washing, by the gelatine being coagulated; but I was mistaken, a single washing in water caused the image to disappear almost entirely, leaving only a general yellow tint, which, with the tincture of galls, formed a reversed image. The printing always proceeds slowly, and I begin to suspect that this process, which was so seductive at first, presents no superiority over other iron printing processes already published."

## Photographic Notes and Queries.

### Transferring Engravings to Glass.

Dear Mr. Editor.—In the days when I was young, transferring engravings on wood and glass was a fashionable amusement, but like poona tinting, and many others of this class, have, I believe, long since ceased to be in request. I remember that the thing to be desired was, that only the ink impression should remain on the glass when finished, and none of the paper. To succeed well, requires a very careful and somewhat tedious manipulation. Procure a tenacious, but quick drying spirit varnish; the engraving must be well soaked for some hours in warm water to take out the size, then dry between sheets of blotting-paper until *surface dry only*, that the varnish may adhere to the fatty substance of the ink, and not sink into the paper; the glass must be evenly coated with varnish quickly, and perfectly free from dust and bubbles. These operations must be performed in a warm room, the glass and engraving being at such a temperature as not to chill the varnish; the engraving must be quickly and firmly pressed down to the glass in every part, and if any bubbles of air should be between the engraving and glass, prick them with a needle. The varnish must be allowed to dry thoroughly, then the glass and engraving should be immersed in acidulated water, as you name, for some time; then, while damp, proceed to rub off the paper by light circular rubs with the finger, dipping the finger new and then into water; when only the impression remains let it dry, then finally varnish with a penetrating varnish.

I have more than once, in out-of-the-way nooks and corners, seen old mezzo-tint engravings transferred to glass, and so finely back-painted as to appear at first sight as old oil paintings by good masters.

I shall be gratified if the above is of service to your correspondent, Mr. Clarke. T. P. E.

### The Alkaline Dry Process.

Sir,—There is so wide a difference betwixt Mr. Bartholomew's mode of preparing his alkaline dry plates, and that suggested by "E. T." in your last impression, that I shall esteem it a favour if you will insert this letter for the purpose of promoting further discussion thereon,

Mr. B. does not anticipate any bad results from a combination of the soda and gelatine, because he says that the alkali may be dissolved in it, whilst "E. T." states that if any combination takes place between the soda and gelatine, certain markings "fatal to good negatives" will result.

Will Mr. B., as the author of this new alkaline process, favour us with his opinion upon "E. T's." observations.—I am, sir, your obedient servant, F. M. Young.

*London, February* 25, 1862.

## Miscellaneous.

### CEMENTS FOR PORCELAIN, MARBLE, ALABASTER, GLASS, &c.

Take of isinglass two drachms, wet it with water, and allow it to stand until softened then add as much proof spirit as will rather more than cover it, and dissolve with a moderate heat. Take of gum mastic one drachm, dissolve it in two or three drachms of rectified spirit. Mix the two solutions and stir in one drachm of gum ammoniacum in a fine powder, and rubbed down with a little water. Keep the cement in a bottle. When required for use place the bottle in warm water, and apply the cement with a stick or small hard brush to the china previously warmed. Compress the pieces firmly together until cold, taking care to make the contact perfect, and using a very thin layer of cement.

The white of eggs thickened with powdered quicklime is also used as a cement for broken china, marble, and glass.

White resin and white beeswax melted and mixed with plaster of Paris make a good cement for mending alabaster and marble ornaments.

A transparent cement for glass is made by dissolving one part of india rubber in chloroform, and adding sixteen parts, by measure, of gum mastic in powder. Digest for two days, and frequently shake the vessel in which these substances are contained. The cement is applied with a fine camel's-hair brush.

The silicate of soda is about the best cement that can be used for mending broken crystal.—*Scientific American.*

## Talk in the Studio.

Singular Photographic Accident.—A somewhat curious, and happily uncommon, accident recently occurred to a well known photographer in Liverpool, and was nearly attended by serious consequences. A stoppered bottle nearly full of crystals of hyposulphite of soda, having stood in a place where it was exposed to a severe frost, the stopper had become consequently somewhat fixed, it was placed near a fire to loosen; after standing a short time, the operator was just grasping it in his hand, when at the first touch it suddenly exploded, the part in his hand inflicting a deep gash across the ball of the thumb. The blood flowed very copiously, and the surgeon on dressing the wound expressed to the friends of the sufferer his certain conviction that lock-jaw must inevitably result. After remaining three weeks in an extremely critical state, and enduring great agony, the patient was declared out of danger, and was happily enabled to resume his duties.

American Photography in the International Exhibition.—The *American Journal of Photography* says:—The differences between the Commissioners of the London World's Fair and the photographers appears to have been satisfactorily compromised, and the photographic department of the exhibition will now be attended to with the good will and support of all concerned. The photography of Continental Europe will no doubt be fully represented, and the photographic exhibition will be extensive and brilliant. But the American department will probably be a vacancy. Congress has just refused to make appropriations for the encouragement of American exhibitors, and our photographers are supposed to be too much engrossed with affairs at home to care anything about what is going on in Europe. Let us console ourselves with the fact that in former competitions we have covered ourselves with glory, and with faith that in the future friendly contests, we shall still retain our strength.

New Photographic Journal.—A monthly journal devoted to photography has recently been issued in Belgium under the title of *Bulletin Belge de la Photographie*. It is edited by M. Leon Delteure, with the aid of Messrs. Monchhoven, Gosselens, Romberg, Ommegauck, and Neyt.

Works of Fine Art.—The Solicitor-General, it was announced, would, on Thursday, in committee of the whole House, move for leave to bring in a bill to amend the law relating to copyright in works of fine art; and Lord Elcho has given notice that he shall on an early day call the attention of the House to the present and future provision for the exhibition of the national collection of pictures, and to the position of the Royal Academy in relation to the fine arts and the National Gallery.

The Late Prince Consort.—It is stated that the photographic portraits of Prince Albert have been rapidly sold in Paris to French as much as English purchasers. In one day a printseller sold 30,000 *cartes de visite* bearing the likeness of the deceased prince.

The Photographic Exchange Club.—The third monthly exchange of this club was recently completed. There was an improvement in the quality of the prints sent for exchange, and in the attention to the rules. There is still, however, room for improvement in both respects. We trust all the members will bear this in mind.

International Exchange Club.—Referring to the recent proposal in our pages to institute an exchange of prints with photographers in America, the editor of the *American Journal of Photography* says:—"A writer in Photographic News, of January 17th, proposes an exchange of photographs between America and England. The suggestion is a wise one, and meets our hearty approbation. Especially at this time, when the silly politicians are doing so much to excite international animosity, it is gratifying to believe that friendship may still continue with those whom we care most about. There is probably nothing in the way of the proposed exchange system, and it may be inaugurated within a few weeks. Perhaps it would be the simplest way to make existing clubs the nucleus of the undertaking. Whether the initiative package is started from England or America, we are sure it will be courteously received, and the favour be reciprocated. The writer in the News suggests that our correspondent, Coleman Sellers, would be a desirable person to superintend the American department. We endorse the recommendation, and hope to be able to give Mr. Sellers' views on the subject in our next issue."

## To Correspondents.

J. F.—The best mode of storing dry plates, so as to be of little bulk, is that adopted by Dr Hill Norris. Strips of cartridge paper are folded alternately each way, making each fold about a quarter of an inch broad. Each strip, when completed, forms a series of crimped grooves. The ends of the plates are placed into these, so that a double edge of paper is compressed between each pair of plates, and a groove of paper round the edge of each plate. Placing tissue paper so as to come in contact with the surface of each plate would be dangerous. 2. We are obliged for your method of intensifying. It is one, however, with which we are perfectly familiar. We have experimented largely on every method of intensifying, by the agency of bichloride of mercury. The simplest, least dangerous, and best, is, we think, that in which, after treating the plate with a hasty wash of bichloride, it is next treated with iodide of potassium, about one grain to the ounce. This gives a negative of a greenish grey, and is very satisfactory in printing. 3. The best mode of changing dry plates is much a matter of taste. We prefer the use of a few double backs to carry a sufficient stock of plates for the day's work without changing. The simplest method of changing is by means of a changing box, as it involves no extra luggage for the purpose. 4. We use a stereoscopic camera, with bellows body and folding tailboard, made by Meagher, which we find light and convenient.

T. P. E.—It is doubtful whether there will be much gold in your old hypo bath If you precipitate both silver and gold by means of zinc, the gold will be left as an insoluble residue on dissolving the silver in nitric acid.

St. Dennis.—After fixing and wasbing the negative, pour over it a solution of bichloride of mercury, about 10 grains to an ounce of water. Allow it to remain a few minutes, until the surface presents a uniform grey. Now wash, and then coat with a one-grain solution of iodide of potassium; pour this off and on until the right intensity is obtained. See article on intensifying in Photographic News Almanac.

W. D.—In printing from several negatives on one sheet of paper to form one picture, or "composition printing" as it is usually called, the prevention of hard lines and distinct edges entirely depends upon manipulation, skill, and practice. Every other part of the sheet but that to be printed at the time is carefully masked. The best modes of doing this have repeatedly been explained in our pages. You will find a simple method explained by Mr. Fry, having special reference to printing separate skies, on page 350 of our third volume. 2. Where "fresh hypo" is spoken of, it simply means that the hypo must not have been used so as to have become exhausted or acid. Your method of keeping the solution neutral, and adding continually fresh crystals, may be used with propriety so long as care and judgment are exercised. 3. Make some fresh toning solution of gold and acetate of soda, and add to the old; this will probably revive it.

A. G. Grant.—Your advertisement is inserted. Regarding the Exchange Club, write to the Secretary. Portraits to be suitable for exchange should possess some especial excellence or interest. Public characters, beautiful faces, or very fine photography, would confer such interest.

G. P. has overlooked our answer. It appeared in the No. for January 31st. Albumen is a very complex organic compound: we have no data at hand for stating its atomic weight. The fact of a chemical combination being formed between albumen and silver is "established," and for convenience the term "albuminate of silver" has been applied to that compound in the absence of a more precise term. How far the term is a correct one, chemically speaking, we do not undertake to determine, not being responsible for the origin of the term. We see no reason for doubting Stockhardt as to the proportion of albumen and water in white of egg.

J. Lomas.—Various forms of view meters may be constructed. A very simple one consists of a tube with a small aperture at one end just sufficient to see through; and at the other an oblong aperture, the usual shape of a picture. The length of this tube must be proportioned to the lens to be used; so that when you look through it just the amount of subject will be seen which your lens includes on the plate it covers. By having different sized oblong apertures you may arrange them so as to give the amount of subject your lens will include on different sized plates; and by making the tube with a sliding body it might be graduated, and marked to suit lenses of different focal lengths.

C. W.—The amount of subject included in the stereo-slide would not be quite so much with the No. 1 B lens as with the compound stereo lenses. For card portraits, however, the former would be best, and would also give excellent results for stereoscopic pictures. 2. Almost any good bromo-iodized collodion will give good results in both wet and dry processes The formula given in the Photographic News Almanac, which we also briefly stated at the South London Meeting, reported in our last, gives excellent negatives for the wet process, and most of the dry processes. 3. In purchasing yellow glass ask particularly for that flashed with silver, and if possible get a sample first. We shall always have pleasure in trying it

J. H. W.—You may purchase agate burnishers at most of the houses dealing in artists' materials. We cannot tell you the price. Your book-binder could give you information, as the burnisher is used in burnishing the edges of books. Rolling presses, which have recently been brought before photographers at much more moderate prices than they used to be, answer the purpose much better than burnishers.

W. W. B. P.—The lenses to which you refer, and regarding the prices of which you institute comparisons, are of entirely different kind and capabilities. Those with the higher price, although intended for the same class of work, are much larger lenses. Their especial peculiarity consists in extreme rapidity, flat field, and perfect defining power. The same maker produces lenses for card portraits at half the price you quote; but, to those who can afford it, those at the higher price are worth the money. An ordinary good half plate lens will answer for card portraits; but will be slow compared with those lenses especially made for the purpose. Your specimen is of average quality; but is disfigured by the row of white balustrades running straight across the picture.

H. V. R.—We generally use kaolin for removing the colour from our exciting bath. A little citric acid or common salt, added so as to cause a slight precipitate of citrate or chloride of silver will also answer the purpose. 2. We cannot recommend you which tent to select. There are several in the market, each of which have some advantages. Their prices range from about 30s. to £6 or £7. A properly made bromo-iodized collodion will keep without deterioration, for months or years after it is iodized. We have some in use at present, made and iodized two years ago: we find it as sensitive now as any collodion in the market.

We are compelled to defer answers to a large number of correspondents until our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 183.—*March* 7, 1862.

## SUPPRESSION OF PHOTOGRAPHIC PIRACY.

The growing prevalence of photographic piracy demands some prompt measures for its suppression. The injury to the art is as great as the loss to artists. The metropolis teems with card portraits which are at once a libel on the persons portrayed, a wrong to the original artist in reputation and in purse, and a deep degradation to the art by which they are produced. Even common decency is disregarded by these pirates; photographs of Her Majesty the Queen meet the eye at every turn, in which the original photograph has received certain additions from the pencil of the painter, so that the pirated reduplications represent her in that garb of widowhood which should render the meanest of her subjects sacred from such an impertinence. As might be anticipated, these piracies are rarely undertaken by artists who can make a living by the skilful and honourable practice of the art, and the pictures are what might be expected from the incompetent blunderer. Flat, mealy, fading, and worthless, the prints, as we have said, degrade the art. Apart from the injury to his pocket, this cause alone is almost sufficient to make the photographer who values his reputation forswear publishing altogether. For, it often happens, that when a picture of any value is first published, it generally becomes identified with the name of the artist; and when the town is flooded with vile copies, all their shortcomings are charged by an indiscriminating public upon the luckless artist who was so unfortunate as to issue something tempting enough to become the prey of pirates.

The somewhat complicated state of the law of copyright, as relating to this subject, and the expense of conducting a prosecution against persons from whom, after a case is gained, it is impossible to recover costs, has hitherto prevented decisive steps being taken; and, emboldened by impunity, the offenders seem to challenge consequences. It appears, however, that there is strong ground for coming to the conclusion that the existing law on the subject may, by observing certain conditions, be made to protect the copyright in photographs. We have been favoured by Mr. Mayall with a copy of counsel's opinion on this subject, which as it is not long, and the subject is important, we shall give in its entirety.

### Re Mayall.

(Copy of Counsel's Opinion.)

I have considered the question submitted on behalf of Mr. Mayall, viz., whether the portraits of Her Majesty, and of various members of the Royal Family, produced by him by photography, and intended to be published and sold by Her Majesty's permission, are, or not, protected from piracy by the various Acts of Parliament which have from time to time been made for the regulation of copyright in engravings; and upon the whole, although the question cannot be considered free from doubt, I am of opinion that they are so protected.

The effect of those Acts may be shortly stated:—The first statute, 8 Geo. ii., c. 13 (known as Hogarth's Act), confers the sole right of printing or reprinting any historical, or other print, for the term of 14 years, upon the person who shall invent and design, engrave, etch, or work in mezzotinto, or chiaro-oscuro, or from his own work and invention shall cause to be designed, &c., any such work.

The second statute, 7 Geo. iii., c. 38, in effect, extends the provisions of the first Act to prints generally, made or caused to be made from a person's own design or invention, and also to prints made from any picture, drawing, model, or sculpture, ancient or modern. This Act also enlarges the copyright term to 28 years.

Both of these statutes appear to be limited to engravings in mezzotinto or chiaro-oscuro.

The next statute, 17 Geo. iii., c. 57, however, in effect, extends the provisions of the former Acts to any prints whatsoever which shall be engraved, etched, drawn, or designed.

The following statute, 5 and 6 William iv., c. 59, extends the provisions of the former Acts to Ireland, and gives a right of action to the proprietor of "any engraving or print of any description whatsoever," against any person who shall engrave, etch, or publish any such print without the written consent of the proprietor of any such print.

The last statute upon the subject is the 15th and 16th Vict., c. 12. By the 14th section of this Act, after reciting the former Acts, and that doubts were entertained whether their provisions extended to lithographs *and certain other impressions*, it is declared that the provisions of these Acts were intended to include prints taken by lithography, or any other mechanical process by which prints or impressions of drawings or designs are capable of being multiplied indefinitely.

The question, therefore, appears to be reduced to this, viz., whether the means by which copies of a photograph are produced are a "mechanical process" within the last mentioned Act of Parliament; and I am of opinion that they are. It is certain that they constitute a process by which drawings or designs can be indefinitely multiplied, and they were a process known, and in operation, at the time when that Act was passed, and may well be considered to be included amongst the "other impressions," as to which it is recited that doubts existed, and which it was intended to include in the provisions of the earlier Acts.

I think, however, that to obtain the protection of these Acts, the name of the proprietor of the photograph, and the date of its first publication, must be placed on the photographic plate or negative from which the photograph or positive print is taken, and on all the prints of it (see Newton *v.* Cowie, 4 Bingham, 234; Brookes *v.* Cock, 3 Ad. and Ell., 138). This may be in a similar manner to that usual on engravings; as thus—

"J. E. Mayall, proprietor;" or

"J. E. Mayall, fecit, 1 January, 1861;"

and address; or, the name in one corner, and the date of publication in another corner.

The opinion I have above expressed applies, properly, to positive photographs, or prints produced from negative photographs, and published for sale. The right of the photographer in the original negative, or in a positive, prior to any publication, seems to be the same as that of the painter of any picture to his picture, and depends on ownership, and not on the copyright statutes.

I think also that Mr. Mayall might, perhaps, obtain the protection of the Literary Copyright Act, 5 and 6 Vict., c. 45, for his series of portraits of Her Majesty and the Royal Family collectively, by having them connected together so as to be formed into a book, and adding some short descriptive matter, such as the names, ages, place of birth, &c., of the various persons whose portraits are comprised in the series; and the circumstances under which they were taken. For this purpose, of course, it would be necessary to register the work, and comply in all other respects with the requisitions of that Act (see Bogue *v.* Houlston, 5 Dessex and S. M., 267).

(Signed) Stephen Cracknall,

3, New Square, Lincoln's Inn, 12th March, 1861.

From the extracts of acts above given it appears very clear in the first place that photographs must be included in the term, "print of any description whatever;" and if it be argued that photographs were not in existence at the time that act was passed, it may be answered that the enactment of the 15th and 16th Victoria appears to set aside all possibility of dispute. For the veriest opponent of regarding photography as a mechanical art, will admit that the process of photographic printing is a "mechanical process," by which designs can be "multiplied indefinitely."

The chief difficulty, then, is the cost of putting in operation the law. Each person concerned naturally feels that what is for the benefit of the aggregate body of photographers, or at least those of them who publish their productions ought not to be secured at the expense of a single individual. We have heard it urged that the steps to protect the art ought to be taken by the Photographic Society. It must be obvious, however, that the funds of the society could not with propriety be expended in undertaking such prosecutions, or indeed in interfering in any way with the commercial interests of photographers.

The legitimate mode of effecting the object in question appears to us to be by the formation of an association for the purpose, consisting of those practically interested in the question. We have ascertained that several of the first photographers are favourable to the adoption of such a measure, and our object now is to elicit from any of our readers concerned in the question an expression of opinion on the subject. That will be easy to any association which would be difficult for an individual to achieve. It is very unlikely, however, that more than one or two prosecutions would be necessary, as the mere existence of a body of gentlemen resolved on the protection of the art and their own interests would operate as a terror to evil-doers, and effectually check the abuse which is now uncontrolled by fear of consequences.

It is unnecessary here to enter into any detail of the steps necessary in forming such an association, or to discuss the extent and limitation of its operations. These will be matters for private action. But there is one subject to which it will be important to allude in this connection. A Bill has again been introduced into the House of Commons for amending the law of copyright as relating to works of fine art. In this bill protection is given to photographers as in that which was lost last year. Several of the obnoxious clauses which occasioned the loss of the Bill last session have been removed. The near approach of the International Exhibition renders some legislation on the subject imperative. These considerations give a greater probability to the passing of the Bill than existed last year. But the measure is very far from safe as yet; and every aid should be given to its supporters. To organize such support amongst photographers would be a very proper duty for such an association, as the passing of the Bill into law would at once simplify all future proceedings, and at the same time render them certain and efficient in securing the protection of the art and its votaries.

## PHOTOGRAPHY IN THE LAW COURTS.

Photography has been making acquaintance with the law courts, and is, we fear, but little understood there. In the French courts it was recently denied protection because it "neither creates nor invents, but servilely reproduces what is placed before the lens." In the case recently in the Court of Exchequer, where a clear right of property was involved, Mr. Mayall obtained but half a victory. And on Friday in the Court of Common Pleas, an action was tried, which brought together a number of photographers sufficient to make the court like a photographic meeting, which resulted in a verdict which cannot fail to be unsatisfactory to both parties concerned.

In the case referred to, Mason *v.* Heath, the plaintiff alledged that Mr. Vernon Heath had contracted to produce for him two negatives of His Royal Highness, the late Prince Consort, suitable for a portrait gallery he published, at a fair and reasonable price. The late Prince had been solicited by Mr. Mason to sit for this gallery as early as April 1860. At that time he declined, giving the manifestly sufficient reason, that he could not lend himself to aid the commercial success of any private undertaking. The applications were repeated, and eventually, the work being better established, His Royal Highness consented to sit, somewhat reluctantly we have reason to believe; but there being no absolute reason why he should not sit, with the considerate and princely courtesy which always distinguished him he consented. He was about to sit as president of a congress of the Statistical Society and for other portraits, and had selected Mr. Heath as the artist. Mr. Mason was informed that the Prince would sit to Mr. Heath for him, if he arranged with that gentleman as to terms. This Mr. Mason alleges he did; but that although the Prince sat, and the negatives were taken and approved, he never was able to obtain them; that he was put off on one excuse or other, and finally, that one negative only was offered him, at what he conceived to be an exorbitant price. He brought this action therefore to obtain damages for the loss he had suffered through this alleged breach of contract.

Mr. Heath, on the other hand, entirely denies the existence of any contract of any kind, either absolutely made or implied. He alleges that he was angry and insulted, because Mr. Mason came to him with an untruth, implying that he was bringing the patronage of the Prince to him, with a view to influencing his terms. That so far from making a contract, he informed Mr. Mason that his conduct should be reported at Court. He affirms that he could not make a contract which would bind him to deliver any negative at all, as he had to abide solely by the instructions of the Prince; still less could he contract to deliver *two* negatives, as two only of the size required were taken, one of which was for the Statistical Society absolutely, and the other for Mr. Mason conditionally. When the Prince had decided that one negative was to be given up to Mr. Mason, he was at once prepared to deliver it on receiving fifteen guineas, which he conceived to be a fair and reasonable price. The consideration, on which this question of price was based, was the fact that two days were devoted to the production of four negatives: one day to preparation, so as to secure the highest possible conditions of success, and another day to the sittings and arrangements in connection therewith. Notwithstanding this, however, it appears Mr. Heath had, in a letter, informed Mr. Mason that he would have charged him only five guineas, but for his attempt to impose upon him.

So far as the statements of the plaintiff and defendant are concerned, it becomes simply a question of credibility of evidence. Whatever may be our own personal conviction, it is no part of our duty to express an opinion on this part of the subject here. If Mr. Mason's statement be correct, it is unfortunate for him that he is entirely without evidence to corroborate him as to the existence of a contract at all; whilst, as regards the existence of a contract for two negatives, there is evidence which renders it highly improbable, if not impossible. Mr. Heath is confirmed in many particulars by Mr. Ruland, the Prince Consort's secretary, who states that Mr. Heath reported to him the nature of Mr. Mason's first application to him regarding the portrait. He also confirms Mr. Heath regarding the number of negatives taken, and their destination as decided by the Prince.

As to the value of the negative, we apprehend there was really very little difference of opinion, if the question of contract were set aside. All the evidence of the eminent photographers on both sides tended in one direction so far as that was concerned. Those gentlemen called by the plaintiff gave evidence of the existence of an arrangement whereby they had taken negatives for a guinea each. One of them admitted that the publicity thus involved was a more important element than the guinea. It was also stated that in these cases Mr. Mason always introduced the eminent personages, and in addition to the payment of a guinea, permitted the photographer to obtain a negative for himself. We mention these circumstances, because the general impression which might have resulted from much of the evidence would have been, that one guinea was the regular and understood price amongst photographers for the most valuable negatives. As regards this individual negative, we may state further, that we know that in one case a hundred and fifty guineas, and in another two hundred guineas, have been offered for it, should it be for sale.

The jury, as we have stated, returned an unsatisfactory verdict. Practically for the defendant, but with a recommendation which nullifies it as a decision. The matter will stand over until Easter term, when, on some amendment of the pleas by the judge, the plaintiff may move that the verdict may be entered for himself, for one negative at five guineas, with nominal damages. The defendant's counsel will oppose this on the ground that, if one negative only had been claimed no action could have arisen, as the question of price was entirely a subsidiary one, and would never have been contested; that the action was resisted simply because it was for two negatives, when there was only one to deliver. On this point we can speak, as we remember that several months ago Mr. Heath asked us, personally, if we would act as referee in the matter, and he then stated that it was purely a question of the delivery of one or two negatives, the question of price being to him of minor importance; and we have moreover seen a letter addressed to Sir Charles Phipps in December last, in which Mr. Heath states that had the claim been for one negative he would have been very glad to have been quit of the affair by delivering *the* negative to Mr. Mason "on any terms he chose to offer."

We have made a few remarks on this case, not because, beyond its general interest to photographers, it involves any great principle; but chiefly because we were struck with the inadequacy of a court of law to decide questions of a technical character. The judge was attentive and patient; the counsel on either side were able and watchful; the jury being special were we presume of beyond the average intelligence and respectability. But with all this the verdict is a manifest compromise, an attempt to make it pleasant to all parties. "There is no contract," say the jury, "and so far the defendant is right. Still we should not like the plaintiff, poor fellow, to lose his negative, and we recommend that it be given to him on payment of five guineas." Such a decision decides nothing and pleases nobody.

Surely a couple or half-a-dozen respectable photographers, being familiar with all that legitimately affects such a question, could have arrived at a better decision six months ago, without troubling a jury at all. If Mr. Mason had consented to decide the matter by arbitration, some hundreds of pounds would have been saved in law expenses, and Mr. Mason might have pocketed some thousands by a circulation, the extent of which, under existing circumstances, would have only have been limited by his power of production.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

CAMERAS.—*Continued.*

*Field Cameras.*—As in the preceding article upon the studio camera, it is rather my intention to examine the question of cameras for the field in a general way, than to offer a criticism upon the comparative merits of any individual pattern. This not only would be an invidious task, but it would also be beside my purpose, which is to enquire into the suitability of our apparatus for taking perfect pictures; and not to prescribe the use of one instrument in preference to another when the choice between them lies in a mere question of convenience or taste. Also this question of the superior convenience of one design of camera over another depends much upon the character of work to be executed, and what would be the most suited to one class of operations might be totally unfitted for another.

The forms of camera most generally used in the field are: the rigid box camera, mostly used by wet collodion photographers, and also generally in India and tropical countries; the double body camera, the same as for the studio; the folding camera which folds by hinges in the sides; the folding double bodied camera; and the folding bellows camera. I am not aware of any thing that renders any one of these designs unsuited for producing perfect pictures, so their selection must be decided by the individual opinion of the artist, guided by the nature of the work he wishes to perform with it.

In every form of camera for the field there are certain requirements which must be met, in order to produce the best effects; and it is these which I propose to investigate. I shall assume mostly that the field camera is to be employed for dry plates. The wet collodion photographer has generally so much baggage to carry with the tent and chemicals, that one or more assistants, or a vehicle are necessary to transport it; he has therefore less encouragement to study the portability of his instrument, which to him is only one of many things to be carried, than the dry plate photographer, whose only load is his camera and who generally bears it himself. Therefore the wet plate photographers principally use a double body camera such as I have previously described, or one of rigid construction.

*The body.*—The body of the portable camera is the most most important part, and the greatest attention should be paid not only to its design but to its mode of construction. It has to be carried about from place to place through heat cold, and rain. It has to battle with railway porters who are not a race celebrated for the careful handling of goods committed to their mercies, and to bear the numerous chances and mischances incident upon pedestrian and cross country expeditions. Thus while there is every temptation to *cut down* the material to a minimum, to decrease weight and achieve portability, there is also a necessity for sufficient strength and stamina in the instrument to enable it to bear a good deal of rough treatment without injury to its working parts.

The work which falls short of this sufficiency of strength is to be condemned, as it will probably fail in the hour of need, and at the best will prove to be an unwise economy. Work with more material than is required to give the necessary strength is an evidence of clumsiness in a portable instrument, as it adds useless weight. So we should endeavour to avoid excess either way, and steer a middle course between the flimsy and the ponderous when we select a camera for field work.

All the wood work of the body should be secured by screws as well as glue, and the edges and corners should be rounded off to lessen the danger of injury from blows on those parts. If the price admits of metal bracing, so much the better, and in this case the thickness of the wood may be diminished a little. Flanges and projections generally should be avoided as much as possible, as they are liable to be broken off in ordinary wear and tear; and parts intended to work in each other—such as inner bodies, shutters, doors, &c.—should be made sufficiently free that the ordinary swelling from damp weather will not interfere with their action.

In those cameras having an expanding motion the greatest care should be taken to ensure the parallelism of the movement, and the firmness of the whole when in a working position. The means of doing so, of course are various, and must be adopted according to the kind of camera, but it is very important to avoid all appliances which are in themselves unsteady or tend with a little wear to become rickety.

When a flexible material is used for the body of a camera it should be strained taut when in use, as if it were allowed to bag it would be taken with the least wind, and by its movement create a vibration of the whole instrument. Those cameras of this nature, (such as the bellows camera), which by their form cannot be strained perfectly taut, must be rendered incapable of vibration by some other means.

Much of what I have said in reference to the construction of cameras for the studio applies equally to field cameras, and I need not repeat it in this place: the reader's judgement will readily decide whether the suggestions I have offered have any relation to the requirements of any particular case he may have under consideration.

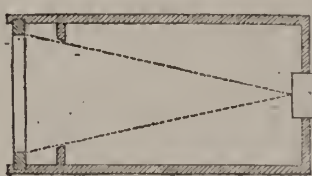
* Continued from page 100.

With respect to the diaphragm that I recommend so strongly for the studio camera, to be placed in front of the plate, at a distance of about an inch and a half from it, this protection is still more necessary in the field camera. While a landscape picture is being taken there is a greater amount of white light inside the camera than when a portrait is being taken in the studio. In the latter instance the aperture used is generally larger, but the principal objects covered by the lens are of a sombre hue; in landscape photography the lens is more stopped down, but about a third of its range mostly includes a bright sky which throws a great volume of white light into the camera.

Several cameras from their form do not admit of such a diaphragm being introduced, as it would interfere with some of their parts. I think that these should only be used for exceptional purposes, and cameras whose construction and design permit ot this protection being added should be preferred for general use in the field.

In most instruments a diaphragm of this nature may be employed, the frame of which exceeds slightly in breadth that of the frame of the plate holder; (see fig. 8, showing a sectional plan). This will be a great protection to the plate, but it would be still better if this diaphragm stood out an inch or an inch and a half from the body of the camera. This could only be effected by making the camera or at least that part of it slightly larger in all directions; and the photographer must decide whether he considers the advantage to be gained by doing so is equivalent to the trifling extra bulk.

Fig. 8.



When an object has to be photographed that is either wholly or in part above or below the range of the lens when the camera is in a horizontal position, so that the instrument has to be "cocked" upwards or downwards to bring the picture into the proper place on the ground-glass, it is necessary to have a camera with a swing back, to avoid the image being distorted, which it will always be when the plane of the object, and of the plate upon which its representation is impressed are not parallel to each other. In representing horizontal lines on different planes this effect produces perspective, and is necessary to the proper delineation of the picture, but all the vertical lines of every view being in reality on parallel planes, must also be represented truthfully parallel to each.

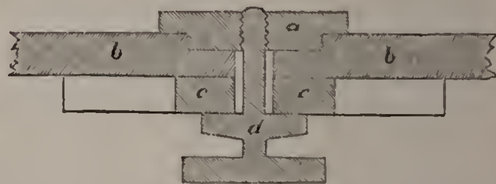
A swing-back is rather an expensive addition to a camera, and, therefore, very few are supplied with it; but whenever the camera has to be "cocked" it is absolutely essential for architectural subjects in which the slightest distortion is so immediately visible and unsightly, and, indeed, without it the truthfulness of the copy is impaired in every subject, although the fact may not be so readily detected in ordinary landscapes without buildings in the first or second plan.

A swing-back consists of a frame into which the plate-slide fits and which is swung at the middle upon two pivots one on either side of the camera. Accuracy of fit is generally depended upon to secure the exclusion of all light at the joints, but it would be safer, I think, to place a beading inside to intercept any stray ray that might filter through, in the same manner that I have described for the studio camera body. A rack and pinion are generally added, by means of which this back carrying the foccussing-screen or plate-slide is brought parallel to the horizon when the camera is "cocked," and a set screw serves to clamp it in position.

As the cases in which the camera requires to be tilted are not of very frequent occurrence this is not a necessary addition to all cameras, but as I have before remarked cameras that are not provided with it must always be placed horizontally to obtain an exact representation of any subject.

The camera is generally attached to the tripod stand by means of a large headed bronze screw passing downward through a hole in the bottom of the camera body, and clamped underneath the triangle by means of a nut. It will be found advisable in all cameras to reverse these parts, and to fix the nut *a* (fig 9) permanently on the inside of the bottom of the camera body *b*, the flanged screw *d*, passing through the boss of the triangle *c*, as usual, works into this nut and clamps the body and triangle together. The advantage of this plan over the uusal loose nut and screw arrangement is that it is more easy to use, and the camera

Fig. 9.





if a folding one, or one that has to be prepared in any way before it is ready for use, can be attached at once to the stand, *before* opening it, and it is thus in a more convenient position to complete the necessary arrangements. Also it reduces by one the number of small loose objects which have to be taken into the field, that run the chance of being lost or left behind, and whose absence is always a source of annoyance, even if it does not bring the day's work to an abrupt end.

(*To be continued.*)

## INSTANTANEOUS PHOTOGRAPHY ON ORDINARY TANNIN PLATES.

BY HENRY DRAPER, M.D., OF NEW YORK.

The process consists essentially in keeping the plate at a high temperature during development, the developer itself being poured on when at the ordinary temperature of the room. I obtained a street view with a lens of 1½-inches aperture, in less than a second, the plate during development being maintained at 200° F.

In a communication to the American Photographic Society at its last meeting (February 10th, 1862), the details of the process were given, and are published in the *American Journal of Photography.* They may be briefly recapitulated as follows:—

A plate is prepared in the manner recommended by Major Russell, except that the film is held at the edges in the way commonly in use in American, that is, by a rim of a solution of albumen one part to water six parts. After exposure in the camera the plate is heated in hot water. The ordinary developer *not* having been warmed, is poured on as soon as it comes out of the water, and worked in the usual manner. If the plate cools sensibly before the picture is developed enough, hot water is to be poured on, and the development then continued.

At a trial before two of the best amateurs of our Society, Messrs. Hull and Cottenes, in my father's (Professor J. W. Draper) laboratory, in the University, by using water only at 130° F., we shortened the exposure to one-twentieth of that which was necessary when another of the same set of plates with the same diaphragm was used, and developed in the ordinary way with water from a tap. The length of time required in the camera depends on the heat of the water into which the plate is put before its development. The shorter the exposure the hotter the water must be. I have been using this process for about six months, having first tried it with marked effect on Dr. Hill Norris's plates, when photographing the sun in my 13-feet reflector of 16-inches aperture. Several of the members of the Society spoke of the great advantages that would accrue from the use of this method for portraits, &c., and said that although they had used hot developers, not noticed any such shortening action as in this instance, where the plate is hot and the developer cold.

Protochloride of palladium, which I introduced as a strengthener some years ago, can be applied with great advantage to negatives produced by this method.

*University of New York, February 13th*, 1862.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Hydrosulphuric acid* (continued).—The reactions of hydrosulphuric acid with the salts of different metals are very important, both to the chemist and photographer. In the chemical laboratory this substance, both in solution and in the gaseous state is of the utmost importance, inasmuch as the very definite nature of the compounds which it forms with metals, and their ready separation by this means into three classes, forms the basis of almost all systems of qualitative analysis. These classes are—1st, those metals which form insoluble sulphides when sulphuretted hydrogen is passed into their *acid* solutions; 2nd, those metals which are not precipitated in the insoluble form when sulphuretted hydrogen is passed into their acid solutions, but which come down as sulphides or oxides in solutions rendered alkaline by ammonia; and 3rd, those metals which are not precipitated by sulphuretted hydrogen either in an acid or alkaline solution. The first group of metals consists of gold, silver, platinum, tin, arsenic, antimony, bismuth, lead, mercury, copper, and cadmium. The second consists of nickel, cobalt, manganese, iron, chromium, alumina, and zinc; while the third contains the alkalies and alkaline earths. It is not necessary for the photographer to enter very minutely into the analytical details, connected with these sulphides, but the broad facts just mentioned should, if possible, be remembered for many reasons, some of which may now be mentioned, whilst others will appear subsequently. Owing to the decided colours and great permanency of several of the sulphides of the first group, they are largely used in painting, whilst on the other hand, several compounds of these metals with other bodies are also used in painting. The above knowledge will enable anyone to know beforehand that a pigment consisting of a member of the first group with sulphur—sulphide of cadmium for instance which is of a beautiful yellow colour—will stand the attacks of sulphuretted hydrogen in the atmosphere, unchanged: whilst another pigment consisting of a member of this group with some other body—chrome yellow (chromate of lead) or white lead, (carbonate and oxide of lead) for instance—will, under the influence of sulphuretted hydrogen lose its own colour and assume that of the sulphide of the metal which is present. Chrome yellow and white lead are therefore not permanent colours, but are liable to *tarnish* in the presence of sulphuretted hydrogen; the proper colour of sulphide of lead being black. The advantage of zinc white over white lead in this respect is also apparent from a knowledge of the chemistryof these sulphides. Sulphide of lead being black whilst that of zinc is white, the latter can stand, undimmed, an atmosphere which would instantly darken white lead. Further details on this subject must be deferred till we speak of the principal metallic sulphides *seriatim*. We cannot warn photographers too strongly against the danger of allowing sulphuretted hydrogen to escape from the bottle into a room where any photographic operation is going on. The metal silver is in the first group above named, and hence it will be understood, that it readily unites with sulphur, forming a sulphide which is unacted upon by the ordinary acids, and which, indeed, is formed in their presence.

We will now pass on to the most important sulphides. *Sulphide of potassium.* These two elements are capable of uniting in various proportions. The only compound which is of interest to the photographer is the one called *liver of sulphide* or *hepar sulphuris.* This consists of tersulphide, pentasulphide, and intermediate sulphides of potassium, mixed with sulphate, and frequently with carbonate of potash, varying according to the proportion of sulphur used in its manufacture. The common receipt is to take two parts of carbonate of potash and one part of sulphur and heat them together in a covered earthen or cast-iron crucible. When the mass is melted, it is allowed to fuse quietly for some time, and afterwards poured out on to an iron or stone slab. As soon as it is cold it must be broken up, and preserved for future use in a well stoppered wide-mouthed bottle. The above proportion of sulphur to carbonate is too small. The smallest quantity that ought to be used is, for 276·8 parts (four atoms) of carbonate of potash 160 parts of sulphur, which forms one atom of sulphate of potash and three atoms of tersulphide of potassium. The largest quantity of sulphur which can be used with 276·8 parts of carbonate of potash is 256 parts of sulphur, which when heated together forms sulphate of potash and pentasulphide of potassium, any excess of sulphur beyond this volatilises without entering into combination. Liver of sulphur forms a dark grey or brown mass, soluble in water, alcohol also dissolves the poly-sulphides of potassium which may be present, and leaves the impurities of sulphur, sulphate, carbonate, and hyposulphite of potash undissolved. When the solid mass is kept in badly closed vessels it gradually oxidises and forms a mixture of hyposulphite of potash and sulphur. When the aqueous solution is added to a liquid, silver, containing gold, platinum, or in fact any of the metals of the first or second group, they are precipitated as sulphides, an excess of sulphur coming down at the same time. On this account, and by reason of its cheapness, liver of sulphur is recommended for precipitating the valuable metals from the photographer's old solutions. This it does in a very perfect manner if care be taken not to employ an excess, but it is liable to the objection of throwing down considerable quantities of sulphur as well unless the operation be conducted by an experienced chemist, who would know exactly when to stop. On this account we do not like liver of sulphur for this purpose so well as sulphide of ammonium, and even this is not so good a means of separating the silver, &c., as the passage of sulphuretted hydrogen through the clear liquids.

*Sulphide of Ammonium* is a very extensively used salt. It is prepared by dividing a quantity of solution of ammonia into two equal parts, and then saturating one with hydrosulphuric acid gas. When no more is absorbed, the other portion of the ammonia is added to the liquid, and the whole shaken together, and preserved in a well stoppered bottle. When freshly prepared, this solution is colourless, and smells strongly of both ingredients; after some time, especially if free access of air can be obtained, it becomes yellow, in consequence of the absorption of oxygen and separation of sulphur, which latter is dissolved by the excess of the sulphide of ammonium. The formula of sulphide of ammonium being $NH_4S$, and that of ammonia $NH_4O$, the reaction expressing this decomposition will be

$$2NH_4S+O=NH_4S_2+NH_4O.$$

This bisulphide of ammonium ($NH_4S_2$) is not injurious when in small quantity, and it is even advantageous in some precipitations. Its presence, therefore, may be disregarded. When sulphide of ammonium is fresh, it will precipitate the pure metallic sulphide from solutions containing silver or gold, without the admixture of any free sulphur. When it has stood for some time, and has acquired a yellow tinge, free sulphur of a white colour is precipitated along with the metallic sulphide. A white precipitate of pure sulphur is obtained when hydrochloric acid is mixed with yellow sulphide of ammonium. As a precipitating agent for silver residues, sulphide of ammonium gives a purer product than poly-sulphide of potassium, but is more expensive. It is also much more convenient in its application than hydrosulphuric acid gas, although for efficiency there is nothing which is equal to this latter.

*Sulphide of Sodium.*—By substituting carbonate of soda for carbonate of potash in the preparation of liver of sulphur, a product is obtained in every respect analogous to the potash compound, which is called *soda-liver of sulphur*. It may be prepared by heating together equal weights of sulphur and dry carbonate of soda. Carbonate of soda being a trifle cheaper than carbonate of potash, it may be advisable in working on the large scale to use it instead of the potash salt. The properties of polysulphide of sodium are identical with those of the potassium compound.

## PROFESSOR TYNDALL'S LECTURES ON LIGHT.

Lecture vi.—Jan. 7, 1862.

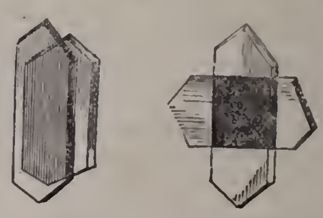
This lecture, the concluding one of the course, was prefaced by a warning that it was going to be a very hard lecture, but the Professor said that his audience had been so attentive during the preceding lectures that he was quite persuaded that he could calculate upon their atteutiou during the concluding hour. The subject was commenced by recalling attention to the phenomena of the reflection of waves on the surfaces of liquids. A boat passing along a canal produces a series of ripples as it proceeds. These ripples or waves strike against the side of the canal, and are then reflected back again, producing a series of waves crossing the original ones, and causing the whole surface of the water to be chased, and reduced to a beautiful mosaic work. Au oval tray was then filled with water, and a reflection from its surface having beeu projected by means of the electric light on to the screen, waves were formed by allowing small drops of water to fall on it from a fine pipette. Owing to the shape of the vessel, the waves were oval, aud by their repeated reflection from the sides of the tray, they coursed backwards and forwards, coiling and encircling one another in the most beautiful manner.

Returning to the phenomena of sound for an illustration of interference, the lecturer asked his audience to suppose two watches—one producing 100 ticks, while the other produced 101. They start together, and the two ticks unite to give an additional impulse to the ear; at the 101st tick they also coincide again, and on each of these two occasions they would have the united ticks of the watches beating agaiust the drum of the ear. But in the intermediate times it was easy to imagine that one tick of a watch was in the act of pushing the drum of the ear in, whilst the other tick was in the act of pulling it out. This action, here illustrated in a very rough way, was shown actnally to be the case when two sounds were produced, the vibrations of which differed in a certain degree. Two organ pipes placed side by side, were then sounded. They were so tuned that at certain times the vibrations of the sounds of the pipes coincided, and produced a loud sound, whilst at others they acted in opposite directions, and produced comparative silence. The alternate beats of sound and silence were very distinctly heard. This was called the interference of sound. It was further showu that if one sound started at a certain time, and then another sound of exactly the same character were to follow the first, but half a wave leugth behind it, they would mutually destroy each other.

Exactly the same phenomena takes place with respect to light. The colours of the soap bubbles and other thin films are produced by interference, thus:—The light falling ou the film is partially reflected at its front surface; but a portion of the light enters the film and is reflected at its back surface. If the film be of suitable thickness these two beams will clash and destroy each other; whilst by a different thickness the two beams may be made to combine and help each other. To cause two red rays to coincide requires a thicker film than that necessary for the coincidence of the blue rays; hence a thickness which destroys one colour developes another: if the thickness of the film be uniform the colour will be uniform; if the thickuess vary the colour will vary. It is owing to the varying thickness of this film that the varying splendours of a soap bubble are due.

The subject of the polarization of light was next touched upon. A ray of light must be supposed as performiug its vibrations in all directions; but when reflected at a certaiu angle ($35\frac{1}{2}°$) from a plate of black glass, all the vibrations are reduced to a common plane. A snake wriggling along on a flat surface was employed as an illustration, all its oscillations or sinuosities being confined to a flat surface. A serpent also wriggling along with vertical folds would represent another beam of this kind. Light, with its vibrations thus circumscribed, is said to be *polarized*; and the rays corresponding to the mode of progression of the snake and serpent are polarized in opposite directions. A beam of electric light was then reflected upwards from a piece of black glass, aud a clearly defined disc of polarized light projected on to the ceiling. Another black glass reflector was then placed at the proper angle in the path of this polarized ray, and its action on it examined. The ray, after it had been polarized, might be likened to a flat ruler, all its oscillations being performed in one plane. It has therefore what may be termed a side and au edge. When the second reflector was held so that the *side* of the polarized ray struck it, the light was reflected off again undiminished in intensity; but when the reflector was turned rouud so that the *edge* of the ray struck it, the light was entirely quenched, not any being reflected.

Polarized light may be obtained in other ways. On passiug through slices of certain crystals called tourmalines, cut parallel to the axis, the light is polarized, all the vibrations which run in the same direction to the axis of the crystal being allowed to pass through, whilst the transverse vibrations are entirely stopped. This beam of polarized light can pass through a second slice of tourmaline, if its axis be parallel to that of the first; but if the axes are crossed at right angles, the beam which passes through the front plate is cut off by the one behind. By projecting the images of these tourmalines on to the screen by means of the electric light, these remarkable effects were beautifully shown. Upon placing them parallel, the light passed readily through them, but upon crossing them they were quite black.



Polarized light can also be obtained by passing common light through a crystal of Iceland spar. The beam is split up into two, one of which is more refracted than the other. This is called double refraction. The images of the coke points were projected on to the screen; by the interposition of a piece of Iceland spar, two images of the points, polarized in opposite directions, were produced. Upon throwing an image of a tourmaliue ou the screen, and dividing it into two in this way, one image was seen to be opaque, and the other transparent.

It was next shown that by the iuterposition of slices and films of crystalline bodies in the path of the polarized ray, and then receiving this ray on a second polarizer, (tourmaline, black glass, or Iceland spar,) some of the phenomena of *interference* would be occasioued, and spleudid colours would be produced. Similar phenomena were shown to be caused when glass in a state of partial tension, by heat and rapid cooling, was interposed in the path of the rays. The two tourmalines of a polarizing apparatus fastened to the electric light were first crossed so as to prevent any light passing through on to the screen, and then slices of crystals, pieces of unannealed glass, &c., were placed between the tourmalines. Films of selenite possessed the power of restoring the light on the disc and giving brilliant colours, varying with the thickness of the film; a wedge of selenite, showing the colours arranged in parallel bars from the thin edge upwards, and a concave lens-shaped piece giving a series of coloured rings. An oblong piece of glass was then taken and placed in the field of the instrument. In its ordinary state it had no power to act upon the light, but upon applying pressure to the middle, so as to bend it slightly, the parts which were in a strain immediately became visible. Another piece of glass was placed in the apparatus, and its particles were thrown in a state of tension by heating one corner with a lamp: it acted in a similar way to the former piece of glass; the particles being thrown into a state of strain by the heat, and assuming temporarily the condition of a crystalline body. A square glass plate was then placed in the apparatus, and its centre touched with the tip of a hot poker; the four arms of a luminous cross were seen gradually to radiate from the part touched by the poker to the edges of the glass.

Professor Tyndall concluded this lecture, the last of the course, in the following impressive words which we heartily recommend to the attention of all our readers, young and old:—"I will say over and over again, that you must not be content—those who pursue the subject must not be content with admiring those beautiful experiments, you must try to get at the law and order and philosophy that underlies them; that is the grand point. There are two classes of people in this world with regard to science. One class—a highly cultivated class—fine fellows, noble men, generous souls, of great knowledge—men of literature; but, unfortunately, they say they have not time at all for science—they are very ignorant of science—they know nothing at all about it. These men I respect; of them there is some hope. But there is another class of men who see in science simply what it produces in the market. These are the men that will shout and yell about the electric telegraph, and about the steam-engine—anything that brings country butter to town is good and great, anything by which you can send messages, anything that you can bring into the market and get money for will be appreciated by these men, and they will stand by science on that account. Boys, that is not science. I cannot point you to a single great discovery in the world, in the history of science made by these men. They are not the men who make discoveries. It is those men who pursue the thing for the love of the thing—whether it be natural philosophy or any other branch of science. It is those men who create these people of the market by thousands. Why, there is Volta of Italy, and Oersted, of Copenhagen, and Mr. Faraday of the Royal Institution; these three men have created ten thousand of your self-styled practical men. All honour to practical men as long as they do not limit to their ends the aims of philosophy. But let us pursue science for its own sake; let us not pursue it merely because it has a certain market value. I trust that when you become men, and become philosophers, you will bear this in mind, and take care to seek to draw all these men of high culture over to our side. The really great practical men sympathise with us, but the market men are incorrigible, we cannot do much with them; but with the other men you can do much. They have high and noble sympathies, and I have no doubt that by-and-bye we shall lay hold of these men, and that they, as well as you, will see that science is a glorious thing, and a noble subject for the human intellect to be engaged upon."

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## MASON *v.* HEATH.

THIS case, relating to a negative of the late Prince Consort, was heard at the Court of Common Pleas, Guildhall, before Chief Justice Erle and a special jury, on Friday, February 28. Mr. Montague Smith, Q.C., and Mr. Maude were for the plaintiff; and Mr. Hawkins, Q.C., and Mr. Gray for the defendant.

The action was for an alleged breach of contract, the plaintiff stating that the defendant had contracted to supply him with two negatives of the late Prince Consort at a reasonable price. He had since refused to supply more than one negative, for which he demanded fifteen guineas, which the plaintiff was unwilling to pay.

The defendant denied that any contract had been made, and stated that fifteen guineas was a fair and reasonable price for the one negative he was prepared to deliver.

Mr. MONTAGUE SMITH, having stated the case and read a variety of correspondence relating to the subject, called

Mr. MASON, who stated that he was the publisher of a serial work, issued at irregular intervals, entitled the *British Portrait Gallery*. He had made repeated applications to his late Royal Highness the Prince Consort to sit for a portrait to be published in the *Gallery:* His Royal Highness at first refused; but subsequently, when the work was more fully established, agreed to let him have a portrait. In June, 1861, he received a letter from Sir Charles Phipps stating that the late Prince was going to sit to Mr. Heath, and would at the same time sit for a negative for his *Gallery*, and that he was to call on Mr. Heath and make terms with him. He accordingly called and saw Mr. Heath, who said to him, "I suppose you have heard I am about to take a portrait of the Prince, and want to bargain with me for a negative." He (Mr. Mason) denied that this was the case, and produced the letter of Sir Charles Phipps. Mr. Heath then asked him what he was in the habit of paying other artists. He told him a guinea for each negative, and he would require two or more; and added, as Mr. Heath would probably have to go to the Palace, he would not mind a guinea or two extra. Every artist had fixed his own price, and charged one guinea for each negative. Mr. Heath asked him for the names of some of the artists he had employed, and he mentioned Mr. Kilburn. Mr. Heath said he knew him, and would ask him about terms; if he found what he (Mr. Mason) said was correct, he (Mr. Heath) would do as others did. He subsequently called on Mr. Heath, who told him that the Prince had sat, and that he had obtained two negatives, two of which were suitable for his *Portrait Gallery*. He showed him a print, and said, "Of course I have got the duplicate negative to this for you." Mr. Mason then proceeded to say that he had called and sent repeatedly, and had been put off from time to time without the negatives. He had tendered five guineas for the two, and had, after considerable delay, received a letter stating that he could have one negative on payment of fifteen guineas. If he had received the negative according to contract, he could have sold 40,000 copies, his profit upon each of which would have been sixpence.

The witness was cross-examined closely by Mr. Hawkins as to the truth of many of his statements, and as to his omission of facts of importance; but he maintained that the facts were just as he had stated them.

Mr. BARKER stated that he was in the employ of Mr. Mason, and had repeatedly gone to Mr. Heath's for the negatives, and had at one time tendered five guineas, without receiving them.

In cross-examination, this witness confused the singular and plural; at one time stating he went for a negative, and other times for negatives.

Mr. KILBURN stated that he had taken negatives for Mr. Mason's publication for a guinea each, and would have charged a guinea for a negative of the late Prince for the same purpose.

Mr. T. R. WILLIAMS had taken portraits for Mr. Mason's *Gallery*. Mr. Mason told him that other artists charged him a guinea for each negative, and he agreed to do them at the same price.

In cross-examination the witness stated that in the absence of any agreement, he did not consider fifteen guineas an unreasonable price.

Mr. LENTHALL, successor to Mr. Kilburn, had taken negatives for Mr. Mason's *Gallery* at a guinea each.

Mr. CUNDALL gave similar testimony.

Mr. JOHN WATKINS gave evidence to the same effect; but admitted on cross-examination that the extensive publicity obtained by the issue of portraits of eminent persons with his name appended, was an element considered; and that, apart from that, a guinea would be insufficient remuneration.

Mr. Melhuish stated that he had considerable experience in photographic printing. By adopting a process of his own, he could produce from one to two hundred prints in a day from a negative, the exposure necessary with a good light being less than a second.

During the examination of the witnesses, copies of the portraits of the late Prince were shown to several of them, and pronounced very fine.

Mr. Hawkins having stated the case for the defence to the jury, called

Mr. Vernon Heath, who stated that in June of last year he received intimation of the wish of his late Royal Highness the Prince Consort to sit to him for a portrait, intended for the Statistical Society of a recent congress of which, his Royal Highness had been president; he was also informed that a letter had been written to Mr. Mason to the effect that the Prince would sit for a portrait for his *Gallery*, at the same time if he (Mr. Mason) made his arrangements with Mr. Heath. The same day Mr. Mason called upon him and stated that the Prince was about to sit for a portrait, to be published in his *Gallery*, and that he had to submit the names of three photographers to His Royal Highness who would select one of the three, and that he wished to know Mr. Heath's terms in order to mention his name as one of the number. He (Mr. Heath) naturally felt angry that Mr. Mason should come to him with an untruth, inasmuch as he knew that there was no choice in the matter. He told him, therefore, that he would have nothing to do with him until he produced Sir Charles Phipps's letter. This he did, and it proved that no choice was left, as it stated that His Royal Highness was going to sit to him (Mr. Heath) and no one else. Subsequently he told Mr. Mason that he would report this conduct at the palace, and that if His Royal Highness still consented to let Mr. Mason have a portrait, he would leave the price to be decided by any eminent photographer, mentioning Mr. Claudet, Mr. Lake Price, and Mr. Kilburn. He declined entirely to name any price or to enter into any contract at all. The same afternoon he related these circumstances to Mr. Ruland, the Prince's private secretary. A few days afterwards the late Prince sat to him, and he obtained four negatives, two of a size suitable either for the Statistical Society, or for Mr. Mason's publication, and two vignette heads. Before leaving he asked His Royal Highness if one of these negatives was to be for Mr. Mason. The Prince answered "No;" after he had seen prints of the various negatives he would decide. Prints were forwarded to His Royal Highness and met with his entire approval. About a month afterwards he received a letter from Mr. Ruland saying that the Prince had now decided that the plate of the full-faced portrait might be given up to Mr. Mason. He wrote to this effect to Mr. Mason who called upon him and asked him to produce duplicate negatives the same size, and enlarged and reduced. He declined to have anything to do with either of the latter, and advised Mr. Mason to be content with using the negative for the purpose for which it was obtained. He promised to try to duplicate it the same size to increase printing facilities, and charge a guinea for each duplicate negative. After trying, he was not satisfied with the result; and so declined to proceed with the duplicates. He then sent and told Mr. Mason that the negative would be given up to him on payment of fifteen guineas. He then had to leave town and had, personally, no further communication with Mr. Mason, until he received a letter demanding the negatives without further delay. To this he replied, reminding Mr. Mason that he had first come to him with an untruth on his lips, and that his conduct throughout had not been such as to induce him (Mr. Heath) to give up a valuable negative until he received its price. Adding that had Mr. Mason's conduct been straightforward he should have charged only five guineas for the negative. He had never informed Mr. Mason that he had taken five negatives, nor had he on the occasion alleged by Mr. Mason shown him any prints whatever. He had offered to decide this question by reference, and had mentioned the Lord Chief Baron and Sir Charles Phipps, by whose decision he would have been prepared to abide. He had never made any contract at all with Mr. Mason, had never mentioned any price, nor could possibly have agreed to deliver two negatives since His Royal Highness only awarded one.

Mr. Ruland, librarian to his late Royal Highness, confirmed the evidence of Mr. Heath, as related to the arrangements and decisions of the Prince, as to the number of negative taken, and as to Mr. Heath having informed him, on the day named, of Mr. Mason's attempt to bargain with him on the assumption of having to name three photographers.

Mr. Robert Murray said he assisted Mr. Heath when taking the portraits of the late Prince, and prepared the plates: there were not five, only four negatives taken. He described also the visits of Mr. Mason's messenger, first for a negative, and subsequently, for two negatives, offering five guineas.

Mr. G. Wharton Simpson, Editor of the Photographic News, deposed as to the excellence of the negative, and stated his conviction that, under the circumstances detailed, fifteen guineas was a very reasonable price for such a negative.

Mr. C. Jabez Hughes stated that, considering the especial preparation and the anxiety involved in photographing a royal personage, the skill of the artist, and excellence of the result, he thought fifteen guineas was a reasonable price.

Mr. Bishop, manager for Marion's in Regent Street, stated that he had large experience in the publication and sale of photographs, having not less than 50,000 portraits through his hands every month. He considered that fifteen guineas was a very reasonable price.

Mr. Hawkins and Mr. Montague Smith having each ably addressed the jury for their respective clients,

His Lordship summed up very carefully, directing attention to the probabilities of the conflicting evidence, and pointing out that the especial points for their consideration were, firstly, was there a contract to furnish two negatives at a reasonable price? and if so, was the price offered by the plaintiff, five guineas, a reasonable price?

The Jury retired for about half an hour, and then returned with the following verdict:—"We find there was no contract for two negatives, but we think the plaintiff should receive the one negative on payment of five guineas."

The Chief Justice said that was in effect a verdict for the defendant. He would, however, endeavour to give effect to the recommendation of the jury by giving leave to the plaintiff to move to that effect.

Verdict for the defendant, with leave for the plaintiff to move to enter the verdict for him with nominal damages of £20, if the Court could be of opinion that effect could be given upon the pleadings to the recommendation of the jury.

The case occupied the whole day on Friday, the court sitting until nearly eight o'clock. A very large number of photographers were in attendance during the action.

## COPYRIGHT IN WORKS OF ART.

A new copyright bill, of great interest to photographers, was read for the first time on Thursday the 27th ult. in the House of Commons.

The Solicitor-General said that the law on this subject was at present in a very imperfect and anomalous condition. A copyright had been created in books and other subjects. With respect to the fine arts, two series of Acts had been granted, giving a copyright of a limited and special nature. In 1735 an Act was passed giving a copyright in prints and engravings, but awarding no protection to the pictures from which they were taken. In the present reign that protection was extended to lithographs. Another series of Acts gave copyright to sculptures, models, and casts. That was the extent to which works of fine art were protected in this country. It might appear a singular thing that while an engraving enjoyed protection the picture from which it was taken should be divested of any protection at all. Yet that was the present state of the law. This, the principal evil he proposed to remedy, was almost peculiar to England. Foreign countries, by international copyrights, were enabled to give us whatever we gave them. In almost all these countries the principal of copyright extended through the whole range of the fine arts, and especially existed in regard to pictures. The periods for which copyright were given in this country varied rather arbitrarily. He had taken as the period of copyright for pictures, drawings, and photographs, the period of life and seven years beyond. That was one period adopted in Mr. Serjeant Talfourd's Act giving a copyright in books. He believed that this limited protection for life and seven years beyond, would be satisfactory to artists, and this protection would extend to every painting, drawing, and photograph, to be hereafter made and for the first time disposed of. He had not thought it expedient to make the Act retrospective, so as to give a copyright either to the painter or purchaser of pictures, &c., already parted with. The Bill proposed to give the purchaser the copyright as a matter of course, unless the copyright were especially reserved by the author. He did not propose to extend the protection beyond paintings, drawings, and photographs. The Bill would give the ordinary legal remedies and penalties to secure copyright. Another object was to put a stop to a considerable trade which had grown up in spurious pictures, the manufacturers of which, counterfeited the marks and monagrams of artists of eminence, whose reputation suffered by the fraud, while the public were imposed upon. The Bill proposed to make this offence a misdemeanour, and to protect artists against frauds. The Bill somewhat differed from that of last year. It was simplified, and some of the more questionable provisions of the measure of last year were omitted. In the previous Bill there was a provision that, even in cases where there was no subsisting copyright, and where any one was at perfect liberty to engrave a work, the name of the author should not be affixed to the republication. That did not appear to him a reasonable provision, and he had not retained it. In other respects the Bill was much simplified. The penalties would be found to be not so severe as before, some having been omittted and others modified. It was of considerable importance in the present year that such a Bill, if the principle was approved by the House, should be passed with despatch; otherwise foreign artists who had a copyright in their own country in those works which we were most anxious to see in the Great Exhibition, must either withhold their contributions, or expose themselves to the danger of having their rights invaded.—(Hear, hear.) He begged to move for leave to bring in the Bill.

The motion was agreed to, and the bill having been brought in, was read a first time.

## Proceedings of Societies.

### London Photographic Society.

The usual monthly meeting of the Photographic Society of London was held in King's College on the evening of Tuesday, March 4th, James Glaisher, F.R.S., in the chair.

The minutes of a previous meeting having been read and confirmed, Mr. C. F. Bailey, was elected a member of the society.

The Secretary called the attention of the members to some photographs illustrative of the works of Sir Christopher Wren, taken on dry plates by Mr. Cole. Some of the pictures exhibited much softness and delicacy. A letter was read from Herr Kohnke, accompanied by some specimens produced without the use of chloride of silver, or hyposulphite of soda. The purport of the letter was similar to that addressed to the North London Socity, and read at its January meeting (see p. 23). Some conversation on this subject followed. A number of sheets of albumenized paper, prepared by Mr. Watson for Mr. Bourquin, were placed upon the table, and any member was invited to take samples for trial.

Mr. Joubert then read an interesting paper, tracing the history of photography, more especially in its application to ceramic wares. The paper will appear in our next. Some very fine specimens of enamel photographs were laid on the table.

Mr. Shadbolt congratulated Mr. Joubert on the marked improvement in his specimens since he had last seen them. He suggested to him, as a means of avoiding the reversal of the image, the production of direct transmitted positives, by exposing the negative for a few moments to light, just at the commencement of development.

Mr. Joubert was obliged for the hint, and would try it. The specimens to which Mr. Shadbolt referred were reversed; but he now avoided the reversal of the image, by producing his transparency in the camera, placing the negative with the film towards him.

Mr. H. Pollock asked whether, in the specimens containing a variety of colours, the skill of the painter was necessary?

Mr. Joubert stated that the pictures were produced at first in monochrome, and were then tinted by the careful application of ceramic colours.

The Chairman, in proposing a vote of thanks to Mr. Joubert, expressed his great satisfaction with the progress of enamel photography, as illustrated by the specimens before them, which now seemed scarcely to leave room for improvement.

Mr. England then exhibited a very fine series of transparencies from instantaneous and other stereoscopic negatives, consisting chiefly of Paris street scenes and interiors, and of American scenery. The views were projected on a screen about ten feet square, giving an amount of amplification, roughly estimated, of about forty diameters. They were illuminated with the oxyhydrogen light, using the common carburetted hydrogen at hand in the room, instead of pure hydrogen. Notwithstanding the large amount of magnifying power on pictures taken with lenses of very short focus, the effect was highly satisfactory, the distortion in the street scenes of Paris being scarcely perceptible. Some of the latter, in which every detail, even on the shadowed side of crowded streets, was well made out, whilst there were fine natural skies, with light clouds, elicited much applause; as did also the interiors of the church of St. Etienne du Mont, and the scenes in the Bois de Boulogne, and on the Niagara.

In answer to various questions, Mr. England stated that the transparencies were produced on tannin plates. The majority of the negatives were taken by Mr. Dallmeyer's stereoscopic lens of short focus. He developed his negatives with iron. In taking the instantaneous pictures he used a half-inch stop.

After a vote of thanks to Mr. England,

The Chairman said Mr. Claudet had addressed a letter to their Secretary, relative to an exhibition of photographs, independent of that at the International Exhibition. He would read the letter to the meeting. After stating that a general impression existed that another exhibition was desirable, and that it ought to be under the auspices of the Society, the letter proceeded as follows:—

"When we consider that a single building, however great it may be, is to contain the works of art, science, industry, and manufacture of all the world, it could never have been expected that all applicants should have been admitted, and that there should have been space enough for holding all their productions. It is, indeed, to be wondered how the Royal Commissioners have been able to grant 3,000 square feet for the display of photographic pictures. Supposing that the vertical space of hanging photographs should be 5 feet (and it can hardly be so much for a convenient sight), that gives a length of 600 feet, or about 1-9th of a mile of wall in the building. Such a space, certainly, is as much as could ever have been devoted to a single branch of productions. Therefore it would be unjust to complain, and unreasonable to ask more for photography alone. There is no remedy on that score.

"But if, owing to the great number of photographers who are to exhibit, every one has a space in which he cannot display specimens of every kind of photographs, how can he show his capabilities? One of the new features of photography is the enlargement of small photographs by means of the solar camera. Now, suppose that a photographer would have to exhibit only two portraits as large as nature, in suitable frames, one of a lady and one of a gentleman, these two portraits would occupy the entire space allotted to the most favoured.

"Foreign photographers, working in a more favourable climate, where they can operate nearly every week all the year round with the sun, will be able to exhibit those kinds of enlarged pictures, portraits, or landscapes, and if, with immense difficulty under our cloudy sky, we have been able in England to produce such photographs, we shall be prevented by want of space from exhibiting them at all.

"Besides, every photographer who exhibits painted portraits must also exhibit copies of the black photographs which have served to the painters, in order to show the accuracy of the likeness. How can he display the number of pictures exemplifying the various styles of the art? Must he not show how he can treat every subject of portraiture—groups, old and young of both sexes, children, white and dark dresses, uniforms; in fine, all that is constituting the difficulties of photography? The fact is, that photography for the whole United Kingdom cannot be fairly represented at the International Exhibition in 3,000 square feet: it cannot but be incomplete and unsatisfactory.

"I consider that it is the duty of the Protographic Society of London to protect the interest of the art it represents, and to endeavour to prove to the world who is invited to London, that photography in this country has had its share in the wonderful progress made since the Great Exhibition of 1851; that, notwithstanding the absurdities of ignorant and prejudicial writers, the jealousy of incapable *soi-disant* artists, it has attained the highest perfection, and deserves to be ranked among the fine arts.

"The opportunity should not be lost. Let it not be said that those who come to London from all the centres of civilization and knowledge, in order to witness the progress of arts, sciences, and manufactures, the wonderful feats of an era of peace and reason, had no other means of judging the state of photography in England than to see in some parts of the building of the Great Exhibition, not an exhibition of photography, but only, as it were, a catalogue of all those who have worked in the hope of being able to exhibit their productions.

"When it is known that, besides the few specimens of every photographer admitted at the Palace of the International Exhibition, there is somewhere in London a special and complete exhibition of photography, there is no doubt that all those who take an interest in the progress of the art will come and visit this exhibition. There nothing will distract their attention, and they will be able to devote all their mind to study and examine the works of photography, guided by a catalogue full of all the particulars required, and aided by any explanations they may require from competent officers appointed for that purpose.

"The Photographic Exhibition should be in London; and it is supposed that a proper and convenient building may be found in some central part of the town, capable of holding all the numerous and varied works which will be proposed for the exhibition of photography.

"A very simple scheme to secure the success of the undertaking in a financified point of view, would be the entrance fee of 2s. 6d., 1s. to 6d. for specified days and evenings, added to a moderate rent charged to every exhibitor in proportion to the space occupied; this would, it may well be supposed, not only cover the expenditure, but leave a surplus at the credit of the account.

"Before engaging the building and organizing the exhibition, it would be necessary to open a list of guarantors for the success of the Exhibition, in order that the Photographic Society should in no case be exposed to suffer from any excess of expenditure over the receipts. Nothing should be done before having ascertained, by another list, the space demanded by every exhibitor, and having received his engagement to fill up the space occupied, and pay the amount according to the price fixed.

"I propose that the Council of the Society will allow that the question of a separate exhibition under its superintendence should be discussed at the next meeting; and I hope that the reasons I have given for its propriety, and showing its advantages, will induce the Council to have the plan carried out.

"The immense concourse of visitors who will be attracted to London during the time of the International Exhibition of 1862, as it was the case at the time of the Great Exhibition of 1851, will flock to all the minor exhibitions, so that it cannot be doubted that a well managed and complete exhibition of photography will prove to be an excellent commercial speculation, and afford to the Photographic Society the occasion of increasing the fund, which is so essential for the protection and welfare of the art of photography in England.—I am, dear sir, yours very truly, "A. Claudet.

"*February* 21.

"P.S. I see, in this day's number of The Photographic News, that the South London Photographic Society is proposing a Photographic Exhibition at the Crystal Palace at Sydenham. Certainly, such an exhibition would be better than no exhibtion at all, and the proof of it is, that for several years there has been an exhibition of photography there, and that, besides this gratuitous display, several professional photographers think it their interest to pay very high rents to exhibit their specimens in various courts of the Crystal Palace, in order to get customers among its numerous pleasure-seekers. But I am convinced that the Crystal Palace is not the proper place for a serious exhibition of photography. We want an exclusive exhibition in London, under our own management, where people will go for no other purpose than to examine the productions of photography, to judge of its progress, study both its scientific and artistic characters, and compare the various styles of the art. This cannot be done in the midst of singing, concerts, and all the frivolous gaieties of the Crystal Palace."

The Chairman, after reading the letter, stated that it had been determined by the Council to bring the matter before the Society at large, and he would now be glad to hear any suggestions on the subject from members.

Mr. Sebastian Davis said that the South London Photographic Society had been in communication with the Crystal Palace Company with a view to opening an exhibition of photographs, in addition to that to be held at Kensington. He was happy to say the directors of that company had come forward very liberally, and placed at their disposal a large space in the first gallery immediately over the central transept, and had also added some other advantages. The South London Society had acted cautiously in this matter. Not only was the exhibition intended to be in no way opposed to the International Exhibition, but they had waited until they understood that the Photographic Society of London did not intend to hold an exhibition before they took definite steps in the matter; and they would now have pleasure in co-operating with this society in any way in the matter.

Mr. Shadbolt had nothing to say against a suburban or provincial Photographic Society holding an exhibition of its own, but that was quite a different thing to *the* exhibition which ought to be held by *the* Photographic Society of London. He agreed entirely with the arguments of Mr. Claudet's letter, and especially in relation to the Crystal Palace not being suited for the exhibition wanted.

Mr. Durham said the great difficulty was the place. The Council were perfectly willing to have this exhibition if that difficulty were met. He had recently been engaged, with three or four others, in seeking a place for an exhibition, and they spent a whole fortnight without any success. He believed it would be quite impossible to find a place large enough at anything like a reasonable expense.

Mr. Shadbolt did not think expense at such a time should be an object. He thought that a place might be found. There was the German Fair in Regent Street, opposite the Polytechnic, perhaps might be obtained. Perhaps those rooms in the Polytechnic, which were entered from Cavendish Square, might suit; or possibly some of the rooms in St. James's Hall.

The Chairman said, regarding the German Fair referred to by Mr. Shadbolt, he believed they charged very high. The rooms in the Polytechnic referred to were not, he thought, suited to such an exhibition. Perhaps the best plan would be for members interested in the subject to obtain further information as to the rooms and communicate with the secretary.

Mr. Nottage suggested the formation of a sub-committee, say consisting of Mr. Claudet and Mr. Shadbolt, to enquire and report.

After some further conversation on the subject

Mr. Henry Pollock said, the short time seemed to him an insuperable difficulty. Time would be required to get the names of guarantors, and he scarcely knew what gentleman would like to come forward to undertake a possible loss without any chance of gain. Time would be required to get the building, to issue advertisements, to collect photographs; and he thought May would arrive before these things could be done. Regarding the limited space at the Kensington Exhibition, it would be better for visitors to complain of want of quantity than want of quality. He thought the matter would be better left in the hands of the Council, who, he conceived, were fully able to manage the affairs of the society.

Dr. Wright thought Mr. Claudet did not intend that the exhibition should necessarily open on the first of May; but some time during the period in which visitors would be in London.

The Chairman said perhaps it might be desirable that the meeting should know that this subject had been discussed at a former meeting of the Council, and it was then decided that the society would not be justified in taking action in the matter, but that the steps for promoting such an exhibition should be left to those more personally interested in the matter.

Mr. Radcliffe said he was recently one of a committee for holding a large bazaar. The cost of the only room in St. James' Hall, suitable for the purpose, was £90 for three days

It was finally determined that any member obtaining further information on the subject, should communicate with the secretary; who would, if necessary, call a special meeting of the committee. The proceedings then terminated.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 5th March*, 1862.

There will be a Photographic Exhibition at Amsterdam in May next. The International Society of Arts is now busy making arrangements for its fourth exhibition of works representing every department of the photographic art. The exhibition will remain open three months from the first of May next. All the specimens, &c., intended for exhibition must be addressed to the Secretary, Dr. J. A. Van Eijk, before the 20th instant, accompanied by a note indicating the number of specimens sent, signed by the exhibitor, with a summary description of the process by which the proof or proofs have been obtained. Any subsequent information as to processes, methods, &c., will be thankfully received. The specimens must be sent in a portfolio, without frame or *passe-partout*. They will be framed and glazed by the Society, at its expense. The Society will also pay the expense of carriage to and fro. Exhibitors who desire to sell their proofs must send the price, under cover, in a note addressed to the Secretary, and no proof can be removed by the exhibitors before the close of the exhibition.

With reference to M. Niepce de Saint Victor's last researches in Heliochromy, M. Chevreul has taken occasion to call the attention of the Academy to two important facts; *the first* is that the image produced by the sun is direct and not reversed, like all the images produced by other processes; *second*, that the light whitens the part it falls upon by a peculiar action of the dextrine varnish containing chloride of lead, while without this varnish it turns the chloride of silver of the Daguerrean plate violet, giving a very remarkable result, as M. Niepce has observed that the black lines of an engraving are reproduced in black on plates prepared with his varnish. The colours of the model are not all produced concurrently; for example, yellow makes its appearance before green, and by the time the latter has come out the yellow is enfeebled, if not effaced. Does it not then follow, he asks, that a means of faithfully reproducing the colours of the model consists in having screens cut out in certain portions, with which to cover those parts of the model where the colours that manifest themselves the soonest exist, so as to give to the colours which require longer to manifest themselves, the time they require. It seems very desirable, he adds, that a skilful and experienced chemist should endeavour to recognise the molecular actions which sensitive materials undergo in ordinary photography and in heliochromy.

At the last meeting of the Academy M. Paul Desains exhibited some photographs which he considered very suitable for facilitating the study of the fascinating science of optics. These consisted of photographic representations of the figures which the luminous ray depicts when projected on a screen, and in its passage through a crystal of one or of two axes, has undergone double refraction. The curves obtained in this manner, and which are intersections of the surface of undulation, circles or ellipses, give, in fact, a very correct idea of the path of light. The projections were given by the well constructed apparatus of M. Jules Duboscq, in which either solar light or electric light may be employed.

Signor Polli, of Milan, has made some very remarkable experiments with a new antidote, which, if verified in practice, will lead to unexpected results in therapeutics. If putrid blood, or the glanders mucus, or pus, be injected into the femoral vein of a dog, general infection very soon manifests itself of a certainty. But if, some days previous to the operation, we administer to the dog some *sulphite of soda* (150 grains in five days), the animal only experiences symptoms of disturbance during the first day; it is dull, and refuses its food; but soon recovers its appetite and liveliness. Whatever may be the theory of this phenomenon, the result is so important as to claim the attention of all hygienists, and cannot receive too much publicity.

The question of copyright in photographs has lately been tested at Milan, in Italy, where Sig. Duroni, who had published a portrait of King Victor Emmanuel, accused one Tuminello, of Milan, of having issued pirated copies of this portrait, and brought him before the Tribunal of Commerce, claiming damages and the destruction of the counterfeits. But the Tribunal declared its incompetence to interfere. Like the Tribunal of Paris, it regards "photography as a purely mechanical process, in which, it is true, the photographer may display more or less skill, but without ever having any right to be classed, as an artist, among those who, true professors of the fine arts, exercise mind and imagination, and sometimes genius based on the principles of art. But the photographer neither draws nor paints, he has only learned to work a machine he may have bought, and put in action certain chemical operations necessary to the obtaining a pictorial result; his mechanical labour cannot, therefore, give birth to products which may justly be ranked among the productions of the human mind."

The plaintiff lost his cause, and was condemned to pay costs.

## COMPOUND LENSES FOR VIEWS.

Sir,—Allow me to offer a few remarks in reference to some statements put forth at the last meeting of the North London Photographic Association (see Photographic News, page 106). A member is there reported as having stated that Mr. Wilson, of Aberdeen, has "abandoned compound lenses for landscape purposes," and returned to the use of single combinations; and again, that he (Mr. W.) "was giving up" the taking of the other size picture (meaning, I suppose, those plates $7\frac{1}{4}\times4\frac{1}{2}$), "as he found they did not sell." Now I beg to say that this is *not* the case, for so far from Mr. Wilson abandoning compound lenses, I need only mention the fact, that amongst other things, I am just about sending him two more lenses of the same kind; and as to the pictures not selling, they have *never* as yet been offered for sale at all; indeed, the numerous enquiries after them have probably induced Mr. Wilson to expedite his bringing them before the public; for I learn from him this day, that the triplet views are to be published by Messrs. Marion on the 1st of May, but he is "anxious to have some stock of them printed before they are announced." The member whom I have quoted must, therefore, have been misinformed.

With regard to some other observations made at the same time, about the angle included in pictures of different forms or shapes. Photographers generally appear to be quite aware of the fact that by measuring the *diagonal* of any given size picture, they have at once the capabilities of the lens; but since the shape of Mr. Wilson's pictures occasions the remark, I may as well state that the No. 1 triple achromatic lens ($7\frac{3}{4}$-in. equivalent focal length), and used for plates $7\frac{1}{4}$ by $4\frac{1}{2}$, covers a plate 7 by 7 also, as can be seen by a picture in my possession. However, Mr. Wilson and others would seem to prefer the oblong form, independent of the convenience attending the use of the same size plate and camera for stereoscopic views. Those interested in the subject of the the respective angles included by the single combination view lens, and the No. 1 triple can readily satisfy themselves by inspecting two prints kindly sent me by Mr. Wilson, taken with both kinds of lenses from the same spot, from which it appears that the picture taken with the triple contains about $\frac{1}{3}$ more of subject or angle (definition being equal), and Mr. Wilson is led to conclude that nothing short of a 10-in. focus view lens would cover the same size plate for which he now uses the No. 1 triple.

In conclusion, permit me to say a word or two about the adaptation of a particular lens, for a particular given purpose. It is now an acknowledged fact that the triple lens is entirely free from distortion, and on that account is not only the most suitable lens for copying, but *especially* also for architecture, or indeed wherever a correct and faithful representation of the original is required. The good quality, moreover, said to be possessed by the orthographic, that when "titled" it reproduces straight marginal lines (otherwise known to be a lens reproducing all straight marginal lines pincushion shaped) is truly a fallacy, for a little consideration will render it obvious, that when thus used, all marginal lines on the lower half of a plate, will be more distorted (leaning inwards) than when taken with any other form of lens, and that it is only in the upper half of the picture where any amelioration takes place.

Apologizing for the intrusion in your space—I remain, Sir, your obedient servant, J. H. Dallmeyer.

19, *Bloomsbury Street, March 5th*, 1862.

## Photographic Notes and Queries.

### The Alkaline Dry Process.

Sir,—In conformity with the wish of Mr. Young, I hope you will grant me a short space for a few remarks about the alkaline dry process.

I do not think that the markings E. T. mentions are caused by any combination between the soda and gelatine, and I am at a loss to account for his success after washing off the soda, in my hands such a proceeding resulted in failure. I believe I am indebted to E. T. for a private communication (from the similarity of the letter in the News), and he there states that he developes with pyrogallic acid, and consequently it is slower than iron development, which I have always adopted, and is, to my idea, much to be preferred; apply the gelatine solution hot, say at least 100°, avoid scratched plates, use rapid iron development, and intensify with pyrogallic acid, and I think the finest results will be obtained.

But I feel sure that others must have tried it, and I hope they will come forward with their experiences, and not prejudice a process, like a gentleman did a few weeks back, in the News, when he stated (with regard to the caramel Fothergill process) that he did not think that caramel could have any accelerating effect on a Fothergill plate, I have tried it over and over again, and I say that it does, have proved it, and recommended him to try it and dispel his doubts. I have another treatment for mealiness to recommend, from personal trial of its merits, viz., make your sensitizing paper bath *alkaline* and tone without the intermediate acetate bath as usual.—I am, sir, yours respectfully, Wm. Bartholomew.

*Fareham, Hants, March 1st*, 1862.

## Talk in the Studio.

Extremes of Comparison.—"They [things altogether unlike] resemble each other no more than do the photographs taken by the leading West-end artists the awful likenesses displayed at the doors of those delusive proprietors who plant bullies on the pavement opposite their premises to worry and torment the passers-by."—*Daily Telegraph.*

Robbery of Specimen Cases.—Mr. Ewin, of the Old Kent Road, writes to us as follows:—"I had a show frame, with 20 carte de visite portraits, stolen from outside of my house on Friday evening. As the Inspector of Police informed me that robberies of this description were very prevalent just now, I thought I would write to you, that you may kindly be induced to give it insertion in next week's News, that it may put photographers on their guard, and probably assist me in discovering the delinquent. Last week, a fellow was taken up on suspicion of stealing a specimen case, in which a scuffle ensued, and the case got broken. The fellow demanded 15s. damages. He was allowed to depart, as there was no proof of his stealing it; he returned in two hours for the amount of the damage; in the interval, the party having lost the case made application to the police respecting it. Of course, when the scamp returned, instead of receiving the 15s., as he expected, he was locked up for stealing the case, which he was proved to have done." Photographers will do well to take the hint, and make their cases secure.

A Hint on Plate Boxes.—M. G. Quincy Thorndike, a correspondent in the United States, sends us the following:—During my travels this past summer I made use of dry collodion plates. As economy of space is a great desideratum when "living in a trunk," it occurred to me that much room was wasted in the present style of plate-box, and that a great improvement could be made thereon. I have adopted the following simple plan, which is successful:—I had a box made similar to an ordinary plate-box, with the exception that, instead of grooves being cut in the wood with the distance of one-eighth of an inch between them (which is the space lost), narrow cuts are made the depth of the box, with a fine saw, of the thickness of an ordinary playing-card, to the depth of one-eighth of an inch. These are made of the thickness of a plate apart—say an eighth of an inch. Into these fine grooves a strip of *glazed* cardboard three-eighths of an inch wide is inserted, with a little gum, which is unnecessary if the cardboard fits tightly, so that a box (old style) of the size necessary to hold *twenty-four* plates can be made to contain *forty-two* plates. Besides the advantage of containing nearly double the amount of plates, there is this superiority over the other method: the plate, when introduced, is not so apt to cut the glazed cardboard partitions, as it invariably does when the sides are of wood, thereby producing dust.

## To Correspondents.

J. M.—Most of the intensifying processes which are used after the picture is fixed may generally be conducted in daylight without risk. In using pyrogallic acid and silver, however, we prefer to avoid white light, as there is some risk of general reduction and fogging.

Wm. Creach, Jun.—The specimen of glass, flashed on one side with ruby, and on the other side with yellow, completely obstructs the passage of all actinic rays; allowing none but the red to pass. Cutting off the luminous, but non-actinic yellow rays, it repels a great deal of light; and it would, we fear, be somewhat trying to the eyes. It may, however, be used with perfect safety with either the iodide or bromide of silver. The yellow flashing only, as tested, where the ruby is ground away, is quite inefficient, allowing all the green rays to pass, and traces of the blue rays.

W. O. W.—If you have read and tried the various suggestions on the subject of mealiness, which have appeared in our pages without success, we fear we cannot help you. Do you take care to have the toning bath mixed at least 24 hours before using it? Try that, if you have not done so. Some recent correspondents tell us that they find keeping the exciting bath quite neutral a remedy. Have you tried the use of distilled water in washing and preparing the gold bath? A change of paper is often the best remedy in desperate cases.

T. H. McAllan.—We can only counsel you to use a cone with the inside blackened attached to the lens to cut off diffused light, and to see that the inside of the lens and camera is well covered with dead black. Read the articles on apparatus at present appearing in our pages. The figure taken in the room does not appear to be sufficiently well lighted. 2. We prefer a twin-lens camera for stereoscopic pictures. The lenses may be about three inches apart. Your lens appears to cover card portraits pretty well.

B. Mew.—The term "correct," as applied to any formula for developing, is scarcely applicable. Either of the formulæ you name, or any modification of them, may be used; but in making modifications, judgment and experience are necessary. Try both the formulæ, and adhere to that which gives you the best results.

Fothergillian.—1. Your selection of a plain paper process will depend much on the kind of results you wish to obtain, and the class of negatives from which to print. If your negatives are weak, the ammonio-nitrate process will give the most vigour and depth. Some of the finest plain paper prints we have seen for some time were on arrowroot paper, according to the formula given in our 4th volume. 2. You must remember that as we do not work out every suggestion given by our correspondents, we cannot always undertake to be the exponents of the exact advantages proposed. We give publicity to such suggestions as appear worthy of attention, and the best mode of ascertaining the worth or relative advantages of any two given processes, is to try them. 3. A hot brick or jug of water is an excellent aid to the drying of Fothergill plates. 4. We cannot recommend the collodion of any especial maker; indeed, different samples from the same makers often vary. The best plan is to have a small stock from the different makers on hand, and mix them in such proportion as a little experience of their qualities may suggest. 5. We cannot tell you why the lenses you use are sold cheap, or whether they are good or bad, as you do not say by whom they are made or sold. If, however, you are satisfied with the quality of the one you have purchased, there can be no reason why you should not buy another like it. 6. The correspondent referred to said he had taken all the precautions you suggest.

J. H. Jones.—We will write to you shortly.

S. J.—Pure silver may be obtained from nitrate of silver by precipitating it with common salt, and then fusing the chloride in a crucible with double its weight of a mixture of carbonate of potash and soda. The silver may be recovered from filtering papers and clippings of prints, by burning them and fusing the ashes, as described above, or with borax and carbonate of soda. The gold may be precipitated from a solution of its chloride by means of protosulphite of iron.

A Constant Subscriber.—It entirely depends on the arrangement the gentleman made with the artist who took the original negative. See our first article in this number. 2. There is no reason why a new bath should serve you as you describe, unless you have failed to saturate it with iodide of silver.

Tyro.—We have not tried the formula, but it strikes us that a large proportion of borax is desirable. We believe some samples of the bleached shellac are considerably adulterated, which may also account for your failure in effecting solution.

J. P.—The difficulty you describe is what is generally known as *mealiness.* Read the various communications in our pages on the subject.

A Young Photo.—You will find full instructions in the calotype process in our first volume. The process there given is substantially the same as that which Dr. Diamond practised, and his calotype negatives are the finest we have seen. We have not tried Mr. Long's formula, but have heard it described as impracticable.

Despair.—The fault is probably in your silver bath. Make a fresh one and try. Or, test the bath to ascertain whether it is acid or alkaline. If the latter, add a trace of nitric acid. If the former, it is probably from an accumulation of nitric acid; in which case neutralize with freshly precipitated oxide of silver or carbonate of soda, and then slightly acidify. Several correspondents have informed us that they have tried the suggestion given some time ago in our pages, of adding a little cyanide solution to cure a foggy bath, with the completest success. If the bath be neutral the addition of a little free iodine to the collodion will often prevent fogging.

W. G. G.—Lime is only soluble in alcohol when it contains water. Oxalic acid, or a soluble oxalate, is the test for lime; a precipitate of oxalate of lime being thrown down from the most dilute solutions.

W. Bartholomew.—We are unable to say, certainly, which of the view lenses you name is the quickest. We should choose either 2 or 3 in preference to 1, as regards defining power; and as No. 2 can be used with the largest aperture perhaps it may be quickest.

N.—Nothing is more easy than to make a collodion which shall produce negatives which do not require intensifying; and in the days when intensity was the *summum bonum* in a negative, such a collodion was in demand. Occasionally delicate and soft pictures were obtained; but not one in ten would compare with those now considered good. The use of bromo-iodized collodion and iron development has brought softness, delicacy, and detail; but it has also rendered intensifying frequently necessary. This, if properly done, *does* increase the scale of the picture, for it adds to the density of the lights; but does not alter the deepest shadows, which should be bare glass. We endeavoured to explain the philosophy of this question in the Photographic News Almanac, in articles on modes of development and intensifying. We shall probably recur to the subject again when we have time. 2. There are three qualities desirable in a dry process; namely, certainty, rapidity, and simplicity. The first, we believe, is best attained in the Taupenot process; the second and third quality are now being anxiously sought by experimentalists. Washed collodion, without preservative, appears by far the simplest process; and it is not improbable may be found to give the greatest sensitiveness; but it has not yet established its certainty. The process to which you refer we have not tried. It may probably be efficient, but it is not particularly simple, as it involves three operations. The plates would not keep; and there would be some liability to stains. We believe all dry plates will keep some hours between exposure and development without deterioration. Dr. Hill Norris believes there is a gradual tendency to return to the normal condition. 3. We do not know of a photographic architect. On p. 73 of our third volume there is some practical information on the construction of glass rooms, and we hope to give some further details shortly. 4. We have not tried the suggestion of S. H., but have generally added ammonia to the albumen solution.

Sigma.—Specimens for the Exchange Club should be sent to the secretary to be submitted to the referees. We should think good prints from your negatives would be accepted. Your queries in our next.

John Hawke.—Your specimens are admirable. The tones of these are very fine; but we like the former ones as well. The balustrade is much better, being lower in tone than it was before. We will write to you shortly.

Rher. Rd.—We are obliged by the specimens. We will examine and report upon them in our next.

R. H. C., An Old Sub, Bolus, P. R. A., R. D., W. Larchin, Tripod, T. Burgoyne, and several other correspondents in our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to 32, Paternoster-Row.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 184.—March 14, 1862.

## SUPPLEMENTARY PHOTOGRAPHIC EXHIBITION.

If further argument were necessary to set forth the necessity of an exhibition of photographs, which shall more amply illustrate the present position of the art, than can possibly be effected in the limited space to be devoted to the purpose in the International Exhibition, the able letter of M. Claudet, read at a meeting of the Photographic Society, and published in our last, puts the matter beyond a question. Not a tithe of the pictures of ordinary size which it is desirable should be exhibited, can be accommodated at South Kensington, whilst as regards anything like a fair display of the productions of the solar camera, which undoubtedly constitute a feature of the utmost importance, as illustrating the art as now practised, the case is hopeless. We do not however, so entirely agree with M. Claudet in his view of the unsuitableness of the Crystal Palace for such an exhibition. Many of the qualifications necessary in a place for a large exhibition of photographs the Crystal Palace possesses in a pre-eminent degree. Ample space and hanging convenience, a most perfect light, and the utmost publicity will certainly be secured. And as regards the drawbacks supposed to exist, which will prevent the serious examination and comparison desirable, we must remind M. Claudet, that the "singing, concerts, and frivolous gaieties" to which he refers, are only present certain days, and even then are confined to certain hours of those days, and need never, therefore, act as a barrier to the most thoughtful contemplation which any enthusiastic lover of the art may desire to bestow on its productions. It is with pleasure, therefore, we call attention to the regulations for exhibitors, intending to contribute which we publish on another page of our present issue.

At the same time we see not the slightest objection to the formation of another exhibition, either under the auspices of the parent society, or got up and sustained by private enterprize, if M. Claudet's scheme can be carried out. We must confess we see grave difficulties in the way, both as to time and place, and also as to funds. It is possible indeed as regards the latter that the plan of obtaining a number of guarantors, ready to bear any probable loss, might possibly meet the difficulty. Sometime ago, we had personal applications from several gentlemen, who, when it was understood the society's exhibition would not be held, asked us to aid in initiating such a scheme. One gentleman was willing to put down his name for some hundreds: others, doubtless, would have followed. But then came the difficulty of forming, independent of any society, a working committee. Next came what proved, on inquiry, the still greater difficulty, of obtaining a suitable place. To these would now have to be added another difficulty quite as great: the limited time in which to take all the necessary preliminary steps to make arrangements; for unless such an exhibition were opened some time before the month of May were passed, much of the *préstige* of such an undertaking would, we take it, be lost. The influx of visitors to the metropolis will, doubtless, be great throughout the summer; but it is during the month in which the World's Fair will be inaugurated, that the greatest number of persons from all parts of the world may naturally be anticipated. Nevertheless, if the difficulties can be overcome, and the necessary facilities of all kinds can be provided, by all means let us have another exhibition; and the more central the place, the larger the accommodation, the more numerous and perfect the contributors, and the more complete the arrangements the better. All the aid and publicity we can give it shall be willingly recorded.

As we have before remarked, it was not until the parent society had not only announced that its annual exhibition would not be held this year, but after it had received and considered in council a renewed application to hold an independent exhibition, and had come to a resolution that it was not desirable that it should take any steps in such a matter,—it was not until they were acquainted with all this, we say, that the South London Society began to make any definite arrangements for holding an exhibition at the Crystal Palace. For whilst every society, "suburban or provincial," has doubtless the right to hold an exhibition of its own, it would not have been deemed wise or right by the South London Society to initiate any movement which would have had a tendency to divide the interest, or divert any contributions from any exhibition in connection with the parent society. The arrangements for their exhibition are now presented in a definite form: the committee will, we doubt not, gladly receive co-operation of any kind either from independent photographers, or from members of other societies, as such; their aim being simply a worthy illustration of the art as it now exists, at a time when such an illustration may receive the utmost publicity and recognition.

## HINTS ON ROLLING PRINTS.

The rage for card portraits has introduced into the atelier of the photographer as a necessity, an instrument which at one time few dreamed of indulging in, even as a luxury: we refer to the Rolling Press. In the early days of photography the professional portraitist would have deemed it slovenly in the highest degree to send out a picture without a case or passepartout. Now, however, the simply mounted print, of whatever size, with suitable margin, has become the rule, and some means of calendering without sending out to the hot presser, has become, as we have said, a necessity. Until very recently all the presses of this kind were of French manufacture, and were imported into this country. Since the demand for them has increased, however, English machinists have given their attention to the matter, and presses of first rate quality are to be had of home manufacture.

We have lately been using one of the rolling machines manufactured by Messrs. Bury, Brothers, of Manchester, and can speak in terms of the highest commendation of its simplicity, convenience, and efficiency. It is free from unnecessary complication in structure, but is, withal, easy to work and very powerful. The press we have had in use has two four-inch polished wrought iron cylinders, eighteen inches long; between which the bed travels, on which is a very highly burnished steel plate twenty-four inches long by eighteen inches broad. Others of a smaller size, are. of course, made; and are, we believe, quite as efficient. By means of a fly-wheel of fifteen inches diameter, and what are termed "double gearing" cogwheels, an enormous pressure is obtained with very slight exertion, the amount of force in that we are using being equivalent, we believe, to a pressure of forty hundred weight. The wheels for adjusting the pressure at each end of the cylinder are worked separately. We believe it is a moot point as to whether it is better to adjust each separately, or to have them so connected, as, by the turn of one wheel to adjust both ends at once. Our own experience on this point is insufficient to enable us to form an opinion; but in a recent conversation with a photographer who had been in the habit of using machines with both arrangements, he gave a decided preference to the separate adjustment, on the ground that the slightest derangement of the single adjustment gave an uneven pressure, without the means of regulating it.

The results produced by the machine we have been working are in the highest degree satisfactory; a most perfectly even burnished surface is given to the print, which seems to have a similar effect to the varnishing of a painting or polishing of wood; detail before scarcely seen seems to bear out in a most surprising manner, giving the utmost delicacy and finish to the print. Until the trial is actually made, it is difficult to believe the difference in a print which can be produced by the mere change of surface. Of course, this improvement in appearance results from rolling by any good machine possessing a perfectly burnished plate, and giving very powerful pressure. The especial claim to attention which Messrs. Bury's presses possess consists in the fact that whilst they are very strongly made, very easy to use, and very efficient in result, they are also very cheap. As our readers are aware, we are very cautious at any time of becoming the advocate of cheapness, or rather of lowness of price, if efficiency in the slightest degree have to be sacrificed in its attainment. Cheapness, falsely so called, has been the bane of photography, multiplying difficulties and spoiling results. But where moderation in price can be secured, especially in articles necessarily expensive, without any sacrifice of efficiency, we have pleasure in calling the attention of our readers to the advantage. A short time ago, if we are not mistaken, a rolling press of the smallest size cost £12, now they can be purchased without any sacrifice of quality for less than half that amount; a press of the size we have been trying used to be charged something like £40; now it can be purchased for less than one fourth of that sum.

A few hints as to the mode of using rolling machines may not be uninteresting. Of course they must be kept dry. If kept in a dry place, and in tolerably constant use, there is no danger of injury from rust. It is manifest that the highest efficiency should be the first consideration; if that were not the case, brass might, as has been suggested, take the place of the plate of burnished steel, as being much more easily kept in order; but the superiority of the latter, in point of hardness and polish, will fully repay the extra care required in keeping it in order. Where the machine is only occasionally used, especially if it be not kept in a very dry atmosphere, a thin coat of tallow or wax spread over the polished plate would effectually protect it; and under all circumstances it will be wise to have a green baize cover for the hours when not in use, which will protect it from dust, and in some measure from other injurious influences.

Where it is necessary to use very heavy pressure so as to secure the highest surface, it will be found desirable to pass the mounted picture through the press first with a lighter pressure, and then again with the rollers screwed tighter down. The result will be better, and more easily attained than if the heavier pressure were put on at once. This is especially desirable where the print is cockled or inclined to curl, as in that case there is some danger of a crease being formed, which will leave an indelible mark in the print. In rolling unmounted prints especial care in this respect is necessary, as if a print in the crumpled rough state, common to some samples of albumenized paper, be submitted to a heavy pressure at once, creases, which will mark or cut the print, are inevitably formed.

The best mode of rolling unmounted prints is to place their face to the plate under a piece of card-board, and submit them first to gentle pressure so as to get them flat and smooth, and then roll heavier if necessary. There is less danger of the unmounted print being drawn into creases when a piece of card-board interposes between it and the roller than when it is without such protection. In rolling small pictures, such as cards, it is desirable to place several in the press at once, so as to cover the whole breadth of the plate. This economises time and saves the machines. Where one small picture at a time is rolled, and that always in the middle of the plate, the bed gradually gets sunken, and the roller worn in the centre. This renders necessary the refacing of the roller in the lathe, and the substitution of an entirely new bed.

A short time ago we called attention to the great improvement effected on the appearance of a print by mounting with a small margin of India paper, or a tint to resemble it. Another great improvement, giving a satisfactory appearance of finish, is the plate mark. It is probably a purely conventional taste which is pleased with this plate mark; but still the effect is admired. We recently suggested to Messrs. Bury, Brothers, that a series of copperplates for different sizes of pictures to produce this mark, would be useful; they now supply sets with each size of press; but these are not necessarily included with the press, and must, therefore, be ordered separate by those who require them. We may here suggest, however, a very simple mode of getting the same result, without the copper-plates. It consists in cutting a piece of stout cardboard with a fine surface to the necessary size, and trimming it carefully so as to have a true edge with a slight bevel. The print should be well rolled first; the piece of cardboard must then be placed in the right position on the face of the print which must then be passed through the press again; the print will this time be placed on the plate face upwards with the smoothest surface of the cardboard in contact with it, and between it and the roller: care must be used to prevent the roller displacing the piece of card. This will give the plate mark very well; especially if—as where the India tint is used is commonly the case—plate paper be used instead of cardboard for the mount. The effect is worth the trouble, especially whenever an ample margin is present.

We may add, in conclusion, that the press should always be screwed on to a firm bench or table; or, where it is as large as the one we have spoken of, it should have a strong stand of its own; as it is impossible to work with satisfactory pressure unless the machine is firmly fixed.

## Scientific Gossip.

Photometric Experiments—Value of various kinds of Glass as Transparent Media—Effects of Ground Glass—Bouguer's Experiments on Transparency of Air, Water, and Glass—Draper on the Spectrum of Incandescent Platinum—Examination of Coloured Glass in the Spectroscope.

Some time ago* we gave an account of some experiments on the absorption of light by glass, which had been recently tried by Mr. King. The importance of the subject from a photographic point of view is very great, and we are therefore glad to be enabled to lay before our readers some additional experiments on the same subject, which have more recently come under our notice. The experimentalist is Mr. F. H. Storer, and the trials have been conducted with considerable care. The gas employed was prepared from caking coal expressly for these experiments, and was contained in a special gas-holder. The illuminating power of the gas when consumed from the Parliamentary Argand burner, at the rate of five cubic feet per hour, was equal to 16 candles, consuming 120 grains of spermaceti per hour. Instead of lamp shades, which were used in Mr. King's experiments, flat sheets of glass, six inches wide by eight inches high, were fitted to a rack of blackened wire, which was fastened to the photometer bar (100 inches long) at a distance of three feet from the gas-light. It did not appear that the distance from the source of light at which the glass screen was placed had any appreciable influence upon the amount of light transmitted by it. At all events, no such influence could be detected in a number of experiments made purposely to test this question. The experiments were made in a blackened experimental chamber, with a Bunsen's photometer; every precaution being taken to ensure accu-

* Photographic News, vol. v. p. 18.

racy. We may also mention that none of the measurements (of the distance of the photometer from the standard candle) obtained by actual experiment were calculated—*i. e.*, reduced to their equivalent in candles—until the whole series of experiments was completed, and that no comparison of the results among themselves or with those of Mr. King was made until each result was calculated as given below. Whatever the experiments may be worth, therefore, they have at least the merit of being entirely independent and wholly unbiassed. For convenience of reference, we will arrange the results in a tabular form. The first column gives the description of glass employed. the second column the thickness of the sheet, and the the third column the loss of light in per centages, taking the whole amount of incident rays at 100.

| | | |
|---|---|---|
| "Single German" window glass | $\frac{1}{16}$ of an inch | 4·27 per cent. |
| Thick English plate | $\frac{1}{3}$ " " | 6·15 " |
| Crystal plate | $\frac{1}{8}$ " " | 8·61 " |
| "Double English" window glass | $\frac{1}{8}$ " " | 9·39 " |
| "Double German" ditto | $\frac{1}{8}$ " " | 13·00 " |
| English crown | $\frac{1}{8}$ " " | 13·08 " |
| Orange coloured window glass | $\frac{1}{16}$ " " | 34·48 " |
| "Berkshire" enamelled, *i.e.*, ground only upon portions of its surface, small figure | $\frac{1}{16}$ " " | 51·23 " |
| "Double German." ground | $\frac{1}{8}$ " " | 62·34 " |
| "Berkshire," ground | $\frac{1}{16}$ " " | 62·74 " |
| "Single German," ground | $\frac{1}{16}$ " " | 65·75 " |
| Green coloured window glass | $\frac{1}{16}$ " " | 81·97 " |
| Purple coloured ditto | $\frac{1}{8}$ " " | 85·11 " |
| Ruby coloured ditto | $\frac{1}{16}$ " " | 89·62 " |
| Porcelain transparency (Tyrolese Hunter) | $\frac{1}{16}$ " " | 97·68 " |

On looking over the above results the reader cannot fail to notice the enormous resistance to the passage of light which is offered by ground-glass. This is certainly worth the attention of photographers and others who are accustomed to employ this medium for glazing their operating-rooms, or, indeed, for any purpose where plenty of light is desirable. The term "loss of light" may be objected to as being scarcely appropriate, for a very considerable portion of the light not transmitted by a glass shade might be reflected against the walls of the apartment in which the lamp is burning, and thus aid in the general illumination of the room. The meaning here attached to the term is, however, perfectly evident, and there can be no doubt that the numbers given above express, as accurately as the circumstances of the case will admit, the actual diminution of the amount of light falling, for example, upon the pages of a book held near to its source, which would be occasioned by the interposition of the shade enumerated in the table.

Referring to these experiments, Mr. B. Silliman, jun., suggests that the great loss of light proved by these experiments may be in part, at least, accounted for by the conversion of a portion of the light into heat, an effect perfectly in harmony with the theory of transverse vibrations as applied to explain the phenomena of the polarization of heat. On this theory heat and light are different effects produced by one and the same cause, and they differ physically only in the rapidity and amplitude of their vibrations. The screen through which the vibrations of light are propagated serves to diminish, first the rapidity of the vibrations requisite to produce the most refrangible rays, and in proportion as the transparency of the screen is diminished by any cause, inherent or superficial, this arrest becomes more and more complete. Hence, the loss of light from polished screens is small compared with that observed in screens of opaline or roughened glass. It would be instructive to examine the spectrum obtained from a pencil of rays under each of the cases given by means of a complete quartz train of prisms and lenses.

The subject of absorption of light by screens has long since been carefully examined by Bouguer. By a photometric method, essentially like Rumford's, Bouguer measured the loss of light in the beam of a candle compared with a flambeau and also with the light of the full moon in passing through 16 thicknesses of common window glass having an united thickness of 0·85 inch. The mean loss of light shown by these trials was as 247 : 1 or over 99 per cent. of the whole quantity. Six plates of the purest mirror plate glass, having an united thickness of 15·128 millimètres diminished the light in the ratio of 10 : 3 occasioning a loss of about 70 per cent. of diffused daylight. A mass of very pure glass about three inches thick diminished the light only about half the latter amount owing to its being in a single mass, and not cut up into many planes. He also measured the absorbing power of sea water for light, and found as the results of experiments made in France, and of observations also in the torrid zone, that at the depth of 311 French feet the light of the sun would be equal only to that of the full moon, and at the depth of 679 feet would wholly disappear. He estimated the transparency of air as 4,575 times greater than that of sea water, and from the properties of a logarithmic curve, whose functions he had determined experimentally, he sought to fix the outer limits of the atmosphere. Bouguer was an expert geometer, and sustains all his conclusions by mathematical demonstrations. His results seem to have received less attention than they merit, the only reference to his researches we have seen being by Daguin, in his excellent "Traité de Physique," vol. iii. p. 300. We should not omit, in connection with this, to refer to the very interesting observations of Draper * on the spectrum, formed by means of a platinum wire heated gradually from dull redness to perfect whiteness by a voltaic current. He observed the red part of the spectrum to appear first, and as the heat and brilliancy of the wire increased the other colours of the spectrum appeared after the violet. This result perfectly harmonises with the views above expressed.

C. W.—A specimen of glass has been forwarded to us for examination in the spectroscope. It is a silver-coloured flashed glass, of the peculiar deep orange colour which experience has shown to be so adiactinic. Examined in the instrument it is seen to cut off all the higher actinic rays in a most perfect manner, but upon attentive scrutiny in a bright light we can detect traces of the higher green rays struggling through. As these are actine on bromide of silver it might theoretically be injudicious to make use of this glass, but the proportion of active rays transmitted is so small, that if the window be not exposed to very bright incident light it might be used with safety. At the same time it should be remembered that any future increase in the sensitiveness of the photographic media would increase the possibility of injury from the use of such a glass.

## GLASS OPERATING ROOMS.

BY M. VOYTOT.

Hitherto, when a photographer has wished to construct an operating room, his first care has been to obtain a northern aspect entirely sheltered from the sun's rays; experience had proved that these rays caused much inconvenience, therefore, it was concluded, they must be entirely avoided.

But of late years photography has taken such an extension, that most available northern aspects have become occupied, and the photographer is now content to acquire any position. no matter what the aspect may be, if otherwise suitable. Fully satisfied that the progress of photography will not be checked by a cause which appears to me quite accidental, I have not hesitated to instal myself in a locality, under conditions which most photographers would have considered impossible. I have constructed, in a full southern aspect, on the sixth storey, an operating room, 30 feet long by 10 feet wide, and 12 feet high. As may be supposed, the light is very strong, and sometimes even unsupportable.

* *American Journal of Science* (2), iv. 388 and v. 1.

I quite understood that to modify this light to suit the requirements of photographic operations, it would be necessary to have coloured glass here, ground glass there, and curtains everywhere. I spared for nothing. But like all my predecessors who had employed the same means, I experienced similar disappointment to theirs.

I had been too long engaged in photography not to have encountered many difficulties, which, at first appearing insurmountable, were gradually overcome by perseverance, and often, too, by suggestions made by members of our society. In the present case, therefore, I would not confess myself baffled. I submitted my difficulties to many friends, who gave me very good advice, but I adopted in preference that afforded by M. Dumonteil, which completely solved my difficulty.

His starting point, elementary as it is, is not to be found, that I am aware of, in any treatise on photography. It may be communicated in a few words; if, like all attempts, it be not perfect, it is, at least, in my opiuion, a great step in the way of improvement.

In an operating room with a southern exposure, where there is nothing to intercept the rays of the sun, it is evident that all the space between the camera and the sitter will be inundated with these rays, which are the more intense when they fall direct.

In this state of things the rays proceeding from the sitter to be reflected in the lens are, comparatively, much weaker than the sun's rays, and therefore they arrive at the lens with much difficulty: they are always weakened by crossing the others, and they are sometimes diverted. To intercept the sun's rays without taking away their light, and make them serve to augment those proceeding from the model to the lens, and thus change what was an obstacle into a means of success, such is the problem to be solved.

To attain this end I employ a series of moveable screens which occupy the whole height of the gallery; these screens' are placed all along the glazed portion, and inclined so as to reflect the light upon the model; they must be arranged so as to overlap each other about 5 or 6 per cent. of their width, which may be about a foot. Under these conditions the diffused light penetrates into the operating room, after being successively reflected by the two surfaces of the screens, which are simply of light blue-grey paper.

With this arrangement made in the unfavourable position for an operating room I have described, I find myself working under as good couditions as if I had a gallery facing the north, and I have at least the advantage of being able to work in all kiuds of weather.

## ON ENAMEL PHOTOGRAPHS.

BY F. JOUBERT.*

Having been invited by our excellent Secretary Dr. Diamond to exhibit, this evening, some specimens of my photographic transfer on glass, in enamel colour burnt-in, so that a novel application of photography might be placed under the notice of the Society, I shall endeavour, briefly, to give some information respecting the process itself, and to poiut out in what direction it might receive great development.

But, previous to entering into the subject immediately before us, I would take this opportunity of casting a retrospective glance at the origin of the discovery of photography, having had the advantage of watching the progress of the invention almost from the very first essays of the inventor.

Although not intimately acquainted with Daguerre, my late and regretted friend, Chevalier Bouton, his partner at the Diorama, first mentioned to me the subject which at that time engrossed Daguerre's thoughts almost exclusively; and one of the first specimens brought under my notice was a portion of a figure, with draperies of such refinement and definition of texture, as to cause a feeling of perfect admiration amongst the few friends to whom Daguerre showed it.

* Read at the Photographic Society, March 4, 1862.

It is well known that before his name became associated with the production of *sun-pictures*, as they were first designated, Daguerre had acquired considerable repute as a landscape-painter, and he had exhibited at various times, amongst other fine works, some interior views of old buildings, which denoted in the artist, besides other great qualities, a complete understanding of the theory of light and shade as applicable to a picture. Daguerre, being ambitious of spreading his works upon a larger scale, conceived the idea of attaining a perfect representation of natural objects, the size of life, lighted as though they were the real scenery, through an arrangement or system of windows much the same as that in use for lighting panoramas, but he painted a picture upon a flat plane instead of a circular one, by means of which he was enabled to introduce side-lights also with great effect.

The success of the diorama in Paris was immense, and many persons may yet remember, among other pictures, one representing the Valley of Unterseen in Switzerland, aud a view of the Royal Chapel at Holyrood, both of which were, I believe, exhibited later in London at the diorama in the Regent's Park.

Daguerre had for many years been in the habit of using both the camera obscura and the camera lucida; the first-named one was particularly serviceable to him in obtaining an accurate representation of the scene he required to paint for his diorama, with all the gradation of light, and he used a camera obscura of very large proportions for the purpose. Many a time in observing upon the white drum in his dark room the beautiful definition of objects outside, which the opening of the room-door caused to disappear immediately, Daguerre had been heard to exclaim, "Ah! that means could be found to fix such an image!" and with his ardent and enterprising mind he had imagined to try the effect of a sensitive paper, without, however, alighting upon the right medium. He tried several agents, and actually by accident obtained, one day, a faint outline of objects upon a sheet of paper, which outline remained some little time, even when exposed to the light, before it passed away. This was assuredly an important step in the right direction; but after trying many experiments, rejecting them, resorting to new ones day after day, and having already, it must be said, far progressed towards the discovery of the object he had in view, a circumstance occurred which was destined to have a great influence in bringing the iuvention to a positive result. Daguerre called one day on a well-known optician of whom he had purchased his instruments, and to whom he had, from time to time, made a confidential communication of the progress of his researches. The optician said to him, "I believe, M. Daguerre, I know a young man who is trying for the same thing that you are trying for; he is extremely clever, and I should much wish you to know him—he might perhaps be of use to you:" this was M. Nièpce.

Daguerre was so struck with the results that Nièpce had arrived at, that he offered to him to combine their efforts, and very soon after the invention was brought before the public by the great astronomer Arago, in a paper read at the Academy of Sciences; and shortly after this, in a series of experiments made by Daguerre himself in a government office, where a vast and select assemblage had been invited, these experiments were perfectly successful. The French Government rewarded Dauguerre nobly for his discovery, and also acknowledged the claims of Nièpce by granting him a pension for life.

Daguerre's invention, ingenious as it is, would scarcely have led to the immense development that we now witness in photography. By a very singular coincidence, about the same time, and perfectly unknown to Daguerre, Mr. Fox Talbot, in this country, after having worked alone with great perseverance and courage, brought out the "Talbotype," which has changed its name, and become better known as "Photography."

It was very natural to expect that many persons, considering the beautiful results of the new discovery on the one hand, and the admitted want of permanency of the photographic prints on the other, should exert themselves to find a mode of giving durability to that which, from its transient nature, was undoubtedly destined to perish sooner or later. The Daguerreotype image being liable to be affected by damp, or by rubbing off, had to be carefully protected by a piece of glass being fastened in front of the image; the Talbotype proofs also were at first frequently found to fade away after a short time if exposed to the bright light.

A better method of fixing the proofs is now generally adopted; but who can tell for certain how much of the best fixed photographic prints will remain on the paper twenty years hence? A mode of preserving the photographic image intact from any atmospheric influence was generally wanted; and soon after the introduction of the method for taking a photograph upon glass by means of the collodion process, many were the attempts at fixing the image by fire, under the notion that the metallic principle of the nitrate of silver would run into the substance of the glass when heated sufficiently, so as to combine with the glass itself, and retain the image when looked at by transmitted light.

This, however, was not the case. 1. Although some portion of the silver was retained in a yellow tint on the glass when taken out of the kiln, the greater portion of the photograph had disappeared; for the organic substance of the collodion was burnt off, and left no trace on the glass in many instances. It was thought that by fixing another piece of glass in front of a photographic image copied in a *positive* by the albumen or other process, a certain degree of permanency could be obtained, and some very interesting results were arrived at by that means. Then the usual mode of printing on ceramic substances was also tried, but failed for want of a medium to apply the pigment required for printing off. In the manufacture of earthenware, as every one knows, the image to be applied to decorate the ceramic wares is first printed from an engraved copper-plate on what is called tissue-paper, or very thin paper, in vitrifiable colour or colours, and applied before the colour has had time to set upon the objects to be decorated; the same process has been in use for decorating glass; but the expenditure of time and money required to obtain first an original plate stood in the way of any great progress being made in that direction.

Having been for many years professionally acquainted with printing in connection with the fine arts, and having observed the immense development the new art of photography has taken, and the large field it has opened for representing all sorts of subjects, of animated, as well as still life, it occurred to me that if a means could be found to print the photographic image on glass, as easily as it is done on paper, and through the agency of some chemical composition which would admit of employing ceramic or vitrifiable colours, and burning them in, a great result would be attained, and a new and considerable branch of industrial art might thereby be opened. Considering the numerous and various attempts which have from time to time been made to introduce a substitute for glass painting in the decoration of houses, I believe it can be said that a want was generally felt for supplying the growing taste for pictorial decoration; for glass painting is an expensive process, and requires also a considerable time to obtain a perfect result.

The invention which occupies us now is resting upon this singular fact, that all saccharine or sticky substances seem to be easily absorbed by light. In consequence, a certain convenient solution being prepared, sensitive to the light in order to obtain the image, photographically, if to this solution there could be added a principle which would combine the property above alluded to with the sensitive property necessary to obtain the fac-simile representation of the object to be copied, then the application of an enamel colour of pigment would become an easy and almost mechanical matter. To render this more easy of comprehension, I shall now read that part of my specification which relates to placing the image on the glass and fixing it by fire:—

"For this purpose, I proceed in the following way:—A piece of glass, which may be crown or flatted glass, being selected as free from defect as possible, is first well cleaned, and held horizontally while a certain liquid is poured on it. This liquid is composed of a saturated solution of bichromate of ammonia in the proportion of five parts, honey and albumen three parts of each, well mixed together, and thinned with from twenty to thirty parts of distilled water, the whole carefully filtered before using it. The preparation of the solution, and the mixing up with other ingredients, should be conducted in a room from which light is partially excluded, or under yellow light, the same as in photographic operating rooms, so that the sensitiveness of the solution may not be diminished or destroyed.

In order to obtain a perfect transfer of the image to be reproduced, the piece of glass coated with the solution, which has been properly dried by means of a gas stove (this will only occupy a few minutes), is placed face downwards on the subject to be copied in an ordinary pressure frame, such as is used for printing photographs.

The subject must be a positive picture on glass, or else on paper rendered transparent by waxing or other mode, and and an exposure to the light will, in a few seconds, according to the state of the weather, show, on removing the coated glass from the pressure frame, a faintly indicated picture in a negative condition. To bring it out, an enamel colour, in a very finely divided powder, is gently rubbed over with a soft brush, until the whole composition or subject appears in a perfect positive form. It is then fixed by alcohol, in which a small quantity of acid, either nitric or acetic, has been mixed, being poured over the whole surface and drained off at one corner.

When the alcohol has completely evaporated, which will generally be the case in a very short time, the glass is quietly immersed horizontally in a large pan of clean water, and left until the chromic solution has dissolved off, and nothing remains besides the enamel colour on the glass; it is then allowed to dry by itself near a heated stove, and when dry is ready to be placed in the kiln for firing."

## PRACTICAL REMARKS ON THE TANNIN PROCESS.

BY E. BORDA.*

Considering the number of new processes which crowd tho photographic papers, and how confusing it is to select amongst tho number; I am inclined to think that what my views and short experience may be worth respecting a process already very popular amongst our amateurs, will be moro welcome than anything new, presenting no decided advantage over processes now in use.

The process I allude to is tho tannin.—I am not prepared to say it is the best, but as far as my experience goes it is decidedly so, and, though able to devote but little time to photography, I have so far attained that confidence in my tannin plates that I can remove the main "objection" of the adversaries of dry processes, viz., the uncertainty of obtaining a satisfactory result. I have had failures of various kinds, but from tho beginning suspected that they could be traced in almost every instance to the development, and I am now convinced of it.—"There's the rub."—If plates are prepared with ordinary care, none of the details apparently trifling, neglected, tho views not too much over, or under exposed, I do not seo why, starting on a trip with a number of tannin plates, the same number of good negatives could not be secured if the development is conducted as it ought to be.

The preparation of the plates is very simple, and if conducted systematically ten of the stereoscopic size can easily be prepared in one hour. The glass should bo thoroughly clean; I clean mine with nitric acid diluted with equal volume of water, leaving them in that solution until wanted, and give the last cleaning with old collodion diluted with alcohol. Tho edges must be ground finely, not only to avoid cutting the fingers, but to allow the collodion to grasp firmly at the sides; a rough grinding is objectionable, creating a multitude of little notches, in which chemicals accumulate during the series of

* Condensed from the *American Journal of Photography.*

operations, very difficult to dislodge thoroughly, and which may be the source of spots during development. A good working bath, working well with wet process will answer, it should not be too weak, and decidedly acid, sufficiently so to prevent fogging, if too much so the sensitiveness will be affected, but it is preferable to lengthen the exposure and have a clear negative to the risk of a foggy one, which is inevitably the case not only with an alkaline bath but even with a neutral one. I have acidified a forty grain silver bath with acetic and with nitric acid, and find either to answer; one drop of nitric acid for ten ounces of fresh silver bath made of crystallised nitrate of silver, such as is sold by the best dealers, is sufficient. I have not yet found a collodion giving good results with the wet process, which did not answer with tannin, and I have used collodions giving inferior results wet, with more success after applying tannin; I may say the same respecting the silver bath, having obtained good tannin negatives with an old bath which I found very deficient in intensity with wet process; this is no doubt owing to the great intensity imparted to the film by the application of tannin.

Some collodions must be better adapted to the tannin process than others, but so many things affect collodion that a formula for a particular one is rarely sufficient to secure the same results, especially if it is kept any length of time. To insure the identity of the two collodions, not only the purity of the chemicals, the preparation of the gun cotton, &c., must be the same, but the temperature itself will effect great changes. Indeed, it is one of the great advantages of the tannin over all other dry processes that the particular structure of the collodion is not of such importance as to prevent good results from being attained with any good negative collodion. I have used old and new, single or mixed, iodides and bromides of ammonium and cadmium, mixed and unmixed, collodions purchased and containing I do not know what, and have been successful with all.

I prefer collodion not too thin, giving a rich creamy film, being a little reddened by age, fine free iodine, and containing a full proportion of bromide, from one-third to two-fifths. The addition of bromide appears essential, great hardness being produced by the use of the iodides alone. I prefer bromide of magnesium or cadmium, readily soluble in alcohol, without addition of water.

From fifteen to twenty grains of tannin to the ounce, is a good proportion, more ought to be used if it contained too much resinous matter, which will not dissolve in water. The stronger the tannin solution, the greater the intensity attained rapidly by development, hence with great contrasts it is desirable not to have it too strong to keep the development under better control; but for copying engravings I should think some advantage may be derived by exceeding thirty grains.

The solution of tannin need not absolutely be new; I have refiltered a solution one week old, already used, and found no difference in the result. I use it in a vertical bath, dipping the plate in it as I do in the nitrate of silver solution, and moving it up and down and sideways. A twelve ounce solution will do me for twenty four to thirty 7 by 4 stereoscopic plates, and may do for more, provided it is not too much weakened by the water introduced in it with every plate as it comes out of the water. The nitrate of silver must be thoroughly washed off, and the plates never handled without previously wiping the fingers perfectly clean. If it is very warm, and the hand prespiring freely, india-rubber tips for the thumb and middle finger ought to be used, or spots, while developing, may extend far enough to spoil a negative, will start from the points held. All dust is of course to be avoided as much as possible, and while preparing plates it is desirable not to "fuss" too much about the laboratory, or disturb anything on the shelves; everything that is needed while the preparation of the plate goes on, ought to be laid in its proper place before beginning.

Some operators consider all these precautions as trifling and useless, but nothing in a dry process is too trifling, if there is a good reason for it, and the common occurrence of persons able to obtain good results with the wet process, and entirely unable to command a dry process, is, I think, mostly owing to this disregard of apparently useless precautions. On taking the plates out of the tannin bath, I wipe the back with a sponge, and stand them on blotting-paper in a box containing one or two hot irons, which I cover, keeping it warm enough to dry a plate in less than from five to six minutes. I have derived much benefit from this drying, and although many, and Mr. Russell amongst them, advise spontaneous drying, I have not been able to obtain as good plates in that way. The atmosphere of some operating rooms may be dry enough, at some seasons of the year, not to require artificial drying, but I find no harm done by it, and much benefit, and therefore would advise it. Plates so dried keep, I believe, somewhat longer. I have been unable to detect any loss of sensitiveness after keeping them one month, merely enclosed in a mahogany box, and in that same room where spontaneous drying did not answer.

The same collodion has more tendency to wrinkle, when the plate is plunged in water, if it is done within two or three days after it is prepared than if kept a little longer. To prevent the water from getting under the film I have used negative varnish, rather thick, applied on the edges after exposure; I find it to answer very well. Any one who has experimented with tannin plates, must know that, although they will stand much washing when the film is well secured, it is almost impossible to save it, owing to its great tenderness when it begins to tear, particularly when the negative is fixed.

The use of citric acid in the developer is important; acetic acid does not sufficiently retard the development unless used in large proportion, and it appears then to make the film more tender. It gives too red a tone, the tannin itself helping that red tint, which is more or less affected by the blue tinge given by the citric acid. A mixture of both acids to develop positives will be found very useful to secure a rich tone. It is also important to have the acid in the silver solution, so that to every drop of nitrate of silver solution added, a sufficient quantity of acid is sure to be added. and no more when it is necessary to push on the development of an under-exposed plate by the addition of pyrogallic acid without silver.

The development must begin with weak pyrogallic solution, and but little silver, to ascertain what further treatment the negative needs to bring out all the details. With proper exposure the relative strength of pyrogallic and silver need not be changed to finish the negative, over-exposure can be remedied by excess of silver, and under-exposure by excess of pyrogallic acid.

The latitude given in the exposure of a tannin plate is one of the peculiarities of this process, and a most valuable one. It is not to say that a good negative can be obtained with a plate much over or under-exposed, but the limits are within the degree of appreciation which practice and judgment can give. For instance, supposing five minutes to be the right time for a particular view, four to six minutes' exposure will give a very good negative of the same view. This I have tried conclusively, and went as far as doubling the time, and all the difference was, that distant hills, miles away, not well defined in either negative, as the day was hazy, were not presorved as distinct in the negative the most exposed, while the rest was perfect in both.

The nature of a view has much to do with the excess to be preferred, for an excess there must be when the landscape is taken, the different parts of which require very different exposure; a sort of compromise must be made, and in every instance it must be left to the taste of the operator; general rules do not apply to such cases. The operator must decide that point of the view which for artistical effect it is most desirable to expose correctly, and weigh the result for the rest, if too much is sacrificed to that one part, the compromise must be made. The strength of the tannin solution will determine whether or not a rapid intensity will be obtained, and the development must be regulated according to that, and to the subject. Success and artistic productions become the result of a harmony at the command of the operator, and the production bears an individuality which sets aside the clamour that photographs are mere mechanical productions. They are certainly nothing else in many cases, and very poor at that, but a large field is open beyond the mechanical part, and it remains for photographers to enlarge it more and more, so as to establish photography as truly a fine art.

A dry process giving as good results as the wet is certainly preferable for field work. The tannin I do not hesitate to say gives better results; the smoothness of the film insures better definition, which is not objectionable in the least, notwithstanding all that has been said against sharpness, and when everything is not sacrificed to it.

To substitute an exposure of five seconds to five minutes for a landscape is no object. Five seconds is entirely too long, and a view which need not be taken in much less time, can just as well be taken in five minutes. Neither exposure will secure moving objects, and if any happen to pass, what will be a blur on the plate exposed five seconds, will leave no impression on the other. It is desired to secure moving objects, or it is not: in the first case, an instantaneous collodion is needed; in the other, nothing is gained by too rapid an exposure, but a risk of failure from the impossibility of giving the exact time, except by mere chance, when a second more or less will materially affect the negative. The breakers of the sea, a street scene, cattle in a field, &c. are natural scenes in which much taste can be displayed, and which must be taken by wet process, until an instantaneous dry process is found, but the introduction of groups in a landscape is, except in a few instances, a matter of very doubtful taste.

I believe that the future of field photography will altogether be confined to small negatives on dry plates, obtained with short focus lenses. But two things are needed to accomplish that end: a very quick dry process, and a good magnifying apparatus.

*Woodside, January*, 1862.

## THE SOUTH LONDON SOCIETY'S EXHIBITION OF BRITISH AND FOREIGN PHOTOGRAPHY.

The Committee of the South London Photographic Society have great pleasure in announcing that they have made arrangements with the Directors of the Crystal Palace Company for holding at Sydenham, during the current year, an exhibition of British and Foreign photography. The Company have placed at the command of the Committee an eligible and well lighted portion of the palace, and they are, therefore, desirous of holding such an exposition of photographic art and science as shall worthily illustrate the present vast development of this great modern discovery. They are inclined to conceive that at the present period photographers are especially interested in exemplifying to the world the high artistic standard to which their works have attained as well as the more freely acknowledged practical character of its results. In the International Exhibition of 1862 the spirit of emulation will be mainly directed to a friendly recognition of the comparative progress made by photographers of different nations, and the limited space at the disposal of the Commissioners will be awarded accordingly. At the Sydenham International Exhibition, upon the other hand, the leading design will be the promotion of the progress of photography itself to be attained by an exposition of its most artistic specimens, a popular illustration of the scientific principles involved in their production, and a display of the varied and highly ingenious philosophical apparatus which have been employed in the attainment.

The Committee of the South London Photographic Society invite, therefore, your hearty co-operation in furtherance of the success of the exhibition, beg to draw your attention to the appended regulations with the least possible delay.

### Rules for Exhibitors.

The South London Society's Exhibition of British and Foreign Photography, to be held at the Crystal Palace, Sydenham, will be opened on or about the 15th of May, 1862, and will continue for a period not exceeding six, or less than three months.

All pictures intended for the exhibition must be framed, glazed, and mounted, with a suitable margin. The names of the subject, process, and artist, must be written legibly at the back of each picture, together with any especial observations, to be inserted in the catalogue.

Photographs for exhibition must be delivered free of charge on or before the 1st of May at the Palace; each package to be addressed as follows:—

*GEO. GROVE, Esq.,*
*South London Photographic Exhibition,*
*Crystal Palace,*
*Sydenham.*
*From (Name)* ______
*(Address)* ______
*Carriage Paid.*

The cost of the return carriage, and all risk of breakage or injury to the pictures or frames, will have to be sustained by the exhibitors; every reasonable care will however be exercised in order to prevent the occurrence of damage.

The Directors of the Crystal Palace Company will present to each exhibitor, upon the recommendation of the Committee, a season ticket available for six months, to be applied for to the Secretary of the South London Photographic Society.

The Committee of the South London Photographic Society, having entered into an arrangement with the Directors of the Crystal Palace Company to exclude all photographs unworthy of public exhibition, reserve to themselves the right of selection.

Coloured photographs will be admissible only when accompanied in the same frame with untouched specimens. This regulation will be strictly adhered to in every instance.

An adjoining, but separate gallery, will be appropriated to the reception of pictures, &c. illustrating the principles or history of photography, and the exhibition of apparatus. Cases for the protection of optical and philosophical instruments will have to be provided by the exhibitors.

The prices of copies of pictures exhibited intended for sale should be forwarded to the Secretary, so that they may be described accordingly in the catalogue kept in the gallery for the purpose; a commission of 20 per cent. will be charged upon all sales effected.

Alfred H. Wall, Hon. Secretary.

## RECOLLECTIONS OF AN AMATEUR PHOTOGRAPHER IN PORTRAITURE.

by NOEL E. FITCH.*

Some few years since I started one morning a full blown photographer with a complete set of apparatus of the value of £3, and, judging from the *number* of gentlemen who have commenced their photographic life with this most wonderful stock of appliances, I presume the originator of the idea of a "complete set" must now be reposing from all earthly toil on a handsome fortune. You all, gentlemen, recollect with what delight you proceeded to take your *first*, your maiden picture, most of you, I doubt not, have it still. *My* first production consisted of a quarter-plate portrait of a most obliging friend, who kindly consented to be taken in the garden of my house; the background is a brick wall, it was raining steadily at the time, and as the experiment was of considerable duration, I am inclined to think the operator had the best of the fun. Failure now followed failure, collodion wasted, baths spoiled, accidents happening, instruction books reading, and so months passed by, until by experience acquiring some dearly bought knowledge, I have arrived at that condition when, if I cannot *take* a good negative, I fancy I can recognise one when I see it, and appreciate the trouble, adjustment, nicety, and balance of each and every thing, from the plate itself to the final washing requisite in its production. However, in due course the poor "complete set" was at length discarded, and after a series of annoyances and disappointments with respect to lenses, having possessed myself of cheap instead of good ones, I equipped myself entirely afresh, built a glass-room and entered heart and hand into the delightful amusement of taking *my* friends and *their* friends portraits.

Individually, I never could see the "fun" of being taken, but my hobby having brought me in contact with a great number of people, I have come to the conclusion that with some the desire to see themselves represented in chloride of silver becomes absolutely a disease. I was once taking the card portrait of a gentleman, and after having taken him thrice was proceeding to wipe my hands as a signal that I had completed the operation, on seeing which he informed me that *he* was not tired and was willing to be taken in a dozen different attitudes. I pleaded lack of time, another opportunity, &c., and thus got out of the difficulty, evidently much to his disappointment, as he was in full uniform, being a member of a rifle corps. He subsequently met me, reminded me of my promise, and I then had to take him thrice again, and was compelled to tell him at last that I could do no more. On another occasion a young lady had the honesty to tell me that to her the operation

* Read at a Meeting of the South London Photographic Society, Feb. 13th.

was a pleasant and agreeable one, and begged me at any time that I might be in want of a sitter, either for experiment or a study, to send for her, and she would be delighted to come. There were, however, certain facial objections to my so doing, and consequently I have not availed myself of her offer.

Another young lady was so determined to have herself taken that although suffering severely from the tooth ache, she first paid a visit to the operating-room of a dentist, and from thence immediately came to mine. This portrait does not represent a happy caste of countenance. In fact, I may assert that out of the very many portraits that I have taken I have never yet met with one sitter who *disliked* the *operation*, and but few who had much consideration for the *operator*, for whether practised as a profession or as an amusement, too much of it becomes irksome, especially with the thermometer showing 90° of heat in the dark-room.

I can scarcely believe that when people are having their portraits taken they give a thought that the operator, when focussing, can see them and their actions most distinctly on the greyed glass, for, if such a consciousness pervaded them, how much amusement we amateurs and professionals would lose. Desiring to get a certain effect of light and shade on the face of a gentleman, I desired him to look and turn his head somewhat to the left, but as he was slightly deaf I had to suit the action to the word by going up to him and with my hand turning his head in the direction I wished it to remain; but I had no sooner enveloped my head in the velvet than curiosity overcame his prudence, and round came his head to look into the lens of the camera. This operation being repeated several times I was at length, of necessity, compelled to take him "full face" and thus spoil the general effect of the portrait. I assure you it amounted at last to the ludicrous to see the old gentleman so persistently gratify his curiosity, although it has since occurred to me that a certain amount of fear might have been mixed up with his feelings on account of the novelty and formidable appearance of the instrument before him.

It is scarcely fair to reveal the secrets of the camera with respect to the fair sex, but as by far the greater number of my young lady sitters repeat their visits only to have their new dress taken one, cannot help taking a very long time in focussing for the purpose of watching how very particular they are in the *set* of it; how that stray piece of trimming is brought forward; how that part arranged or set out; the head daintily felt all over to ascertain that no trace of disorder is there either in the net, hair, or ornament, and then the final effort to compose the entire person and dress for the most pleasing attitude and expression. Then, again, if your sitter is possessed of great personal attractions, you can gaze your full upon the charming picture presented to you on the screen (notwithstanding she is standing on her head), in all the perfections of colour and rotundity, and only regret when the plate has to be inserted which *as yet* fails in copying so beautiful a shadow in all its integrity of life and colour; it is these little episodes in portraiture that give so great a charm to it in the eyes of an amateur.

Our worthy Treasurer, Mr. Howard, in a paper read by him some time since, portrayed with vivid thruthfulness some of the manipulative difficulties of an amateur photographer in portraiture as distinguished from the easy pleasure of those gentlemen who prosecute that part of the art represented by the various dry processes; but while he told you of baths neglected, and glasses to be cleaned, developer to mix, and the sundry and sudden other calls upon the amateur, he omitted to mention to you, on account, I believe, of his limited experience in the matter, a most serious and destructive difficulty applicable, I may almost say exclusively to the practice of an amateur, I mean the familiarity which exists between the amateur operator and his sitter. This may, or may not have occurred to other gentlemen, but, personally, I affirm it is great drawback to my success and tries my temper most dreadfully. It may be taken as an axiom that without patience there can be no successful photographer, for to attempt to take a picture of any sort without a large share of it in your composition, is in my opinion simply folly, and in scarcely any science does the motto that "Patience and perseverence overcometh difficulties" apply so forcibly as to photography. From beginning to end it is the same, success or non-success, the same thing applies; each step we take is one in which we have identically, some time or other, failed before. Now the light is bad; how patiently we try to use what there is or wait with equal calmness for a better; now a dirty plate; now badly exposed, or developed; or the front toned, fixed, or washed imperfectly; still we go on, and the thousand and one difficulties which we *all* experience more or less are usually successfully surmounted simply by patient determination.

But to me the greatest, in fact the insurmountable difficulty, is the friendly sitters who honour an amateur by *being* taken. With gentlemen who practice the art as a profession there *is not* this difficulty to contend with to anything like the same extent. I have observed (for I have the *entrée* to several studios), that the sitters are for the most part placid, quiet, and obedient; the operator does with them what he will, and their dismissal takes place the moment he informs them of his success. Any *pose* that he thinks artistic or elegant, to that will his sitter submit without a murmur, and even if they place themselves in some eccentric or particular position, a little polite and judicious management soon sets things straight, and the artist nearly always has his own way. That occasionally frumpy and disagreeable people do enter glass rooms there can be no doubt, but the quietude that usually reigns there subdues them mostly, and in ninety-nine cases out of every hundred satisfaction, if not felt, is at least expressed. I have seen the case frequently of people who have lost their temper in the waiting room calmly regain it under the mesmeric influence of a Ross or Dallmeyer lens; that momentous second when the cap is removed from the lens, must, I suppose, have something to do with it; for when you come to think it is really a serious question whether you are to be represented with a scowl upon your face or with all the calm benignity of your better tempered self. With amateurs, however, or rather in my individual instance, the case is different. My sitters care naught for me, will not be posed, insist on moving, nay, even speaking during the operation, treat the whole affair as a good joke, imagine that each failure caused by themselves is my amusement, and usually wind up the entertainment by asking for impressions by the dozen. I assure you this is no romance, it is purely the fact, and did I choose I could call upon a gentleman now present to bear me out in the assertion. Curiosity leads some to open the door of the dark room to find out what I am about during that most critical of all periods, development, others remove negatives recently taken, from the rack on which they are placed to dry, and by incautiously touching, spoil them, all complain of the heat, and the last question is "When can they have the copies?" You will have the kindness to remember that I do not exactly complain of this, I am only sometimes a little annoyed that I am not allowed to take my friends my way, instead of being compelled (out of politeness, I must say) to take them their own; for I recently took the card portrait of a gentleman, by profession an artist, engaged on the leading illustrated paper of the day, and whose occupation consists in representing people with elegance of appearance and easiness of pose, who selected for himself the most eccentric, if not the most inelegant position it is possible to imagine, and notwithstanding, I represented this to him in language perhaps more forcible than refined, he insisted on retaining his self chosen attitude, asserting as a reason for so doing, that it was "characteristic of himself." I need scarcely tell you that I had no pleasure in taking the negative, or that an accident happened to it in the printing frame. I console myself somewhat, however, with the knowledge that the obligation is mutual, for if I take any friends "con amore" they supply me with sitters; but still people should remember that amateur photography is not the cheapest hobby a man can amuse himself with, and they should be somewhat moderate in their demands for impressions.

(*To be continued.*)

## THE NEW COPYRIGHT BILL.

We are now enabled to put our readers in possession of the measure which is before the House of Commons on Copyright. It is called "The Copyright (Works of Art) Bill." After reciting that by law as now established the authors of paintings, drawings, and photographs have no copyright in such their works, it is by the first section proposed to enact as follows:—"The author of every painting, drawing, and photograph which shall be made, or for the first time sold or disposed of, either in the British dominions *or elsewhere*, after the commencement of this act, and his assigns, shall have the sole and exclusive right of copying, reproducing and multiplying such painting, drawing, or photograph, *and the design thereof, by any means* and of any size, for the term of the natural life of such author, and seven years after his death: *provided*, that when any painting or drawing shall be for the first time sold or disposed of after the passing of this act, the person so selling or disposing of the same shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing, signed at or before the time of such sale or disposition, by the vendee or assignee of such painting or drawing." This section contains the *principles* of the bill; the other sections are mere details for protecting the right thus proposed to be granted. The bill leaves unrepealed and unaltered all the antiquated and inefficient Engravings and Sculpture Copyright Acts. But the most remarkable feature is, that it disregards those three great principles upon which Parliament has legislated with respect to copyright:—1. That it shall commence from the time a work is *first published*. 2. And, during the last twenty years, that no copyright shall be acquired by the author of a work, except upon condition of its being *registered*. 3. Also that the work to be so registered shall be new and *original*. Now, assuming this measure to have become law, let us see how it is intended to be read. As the section stands, it means that when an artist has acquired a copyright by executing a work, that copyright is to cease, unless when he first sells such work his purchaser signs an agreement for the purpose of reserving the copyright to the artist. It follows, that where an artist thus reserves his copyright he will have the exclusive privilege of making as many copies or repetitions of his work as he pleases; but where the purchaser declines to enter into such an agreement, and purchases the work without any such arrangement being made, then that the copyright will *thereupon cease*, and the artist will consequently, as at present, be able to make and sell as many unauthorized copies and repetitions of the work as he pleases; the only difference being, that he will not have the *monopoly* for that purpose. Amongst those who are conversant with this subject, it is well known that the prominent mischiefs which render legislative redress essential are these: the misconduct of a few eminent artists, who have brought disgrace upon a noble profession, by manufacturing and selling unauthorized copies or repetitions of their pictures and drawings, to the serious injury and annoyance of the proprietors of the *original* productions; the fraudulent manufacture and sale of spurious copies of pictures and drawings; and the injury thus inflicted upon artists and the purchasers of works of fine art, which injury also tends to limit and depress an important branch of our national industry. We submit that the present measure is wholly inadequate to remedy these mischiefs; and that, if it should become law, it will tend to increase rather than to diminish the injustice to which all honourable artists and the purchasers of works of fine arts are now exposed. Lastly, we may ask, why is Parliament to be required, in favour only of the authors of paintings, drawings and photographs, to abandon the great principles which it has so long established upon the subject of copyright; and especially when all that is needed to remedy the existing mischiefs may be safely and certainly obtained by adopting the precedent established in granting copyright under the Useful and Ornamental Designs Act, which has now been in operation for upwards of twenty years, and afforded the most efficient protection to the authors and proprietors of new and original designs? and why are sculptors, and the purchasers of their works, to be excluded from the benefit of any amendment of our laws of artistic copyright?—*Athenæum.*

# Photographic Tourist.

## PHOTOGRAPHIC PENCILLINGS OF AN EASTERN TOUR.*

I cannot say I learnt to like the Turks, or found their city improve much with a lengthened acquaintance, although the latter has redeeming features in its splendid cemeteries and the cool shady bazaars. The cemeteries seem from a little distance like path-intersected forests of thickly planted cypress, and afford very charming walks; and the latter are famous lounging places, to which one may escape from the glare and heat of the streets (which in the hot weather is something terrible), and listen to the tinkling, rippling, murmuring, and plashing of delicious fountains: basking in the meanwhile in the rich, deep, softened glow of the modified sunlight. Of these bazaars, I give the preference to that chiefly devoted to the sale of drugs.

Of course my readers are anxious to hear something about the ladies here. We always are curious to know all about things which are so ostentatiously concealed from us. Well, I must confess that the ideas I had previously held about these mysterious fair ones were far from those I shall now express. In the first place, they have both less and more liberty than our European dames. That is to say, while our ladies can gang about and talk to the men at their own sweet will and pleasure during the day, they are never—if at all respectable—supposed to go about alone, heaven only knows where, in the night; whereas the absence of a Moslem spouse from home during a night is no unusual thing, and excites little attention or suspicion. Supposing I am a nice old coffee-sipping Turkish gentleman, with the usual long beard and flowing robes, dozing and smoking away my days in the midst of my wives, young, pretty, and otherwise. One night I find outside the door of my prettiest's chamber her charming little slippers. This is a sign I reverence, intimating that I must go away, and accordingly go away I do. Again, I find this same fair absent from home all night. Well, wasn't she with Mrs. So-and-So, and am I not forbidden to speak to Mrs. So-and-So? while Mr. So-and-So can only tell me that on the evening in question *his* wife's slippers were placed outside *her* door. As the ladies visit each other, you perceive, some such arrangement as this becomes necessary. Intrigues of love, although dangerous, are indeed not so scarce as one might suppose from the scrupulous separation of the sexes. The women are to be seen in the streets and bazaars at all hours, either waddling along under their huge hats, swathed in their capacious drapery, like animated bundles, and looking in their yellow boots comically like ducks out of water, or crowded into vehicles something like infantine lord mayor's chariots.

As a rule, you see little of them beyond their eyes gleaming out at you through the yashmak, or veil; but you may sometimes have the unspeakable gratification of seeing a real female's puffy little nose, and occasionally get glimpses of an entire face and bosom through a yashmak of very thin muslin, and once I saw, without being immediately struck dead, or seeing the lady conveyed kicking and plunging to the water side in a sack—a real naked female face. Wasn't that a delicious event now? A woman in the harem is said to be a very charming object; but what with shawls, voluminous tucked-up skirts, two or three pairs of loose trousers, ungainly ill-fitting yellow boots, long loose cloaks, swollen perhaps by the wind as they walk, huge yellow hats, the white veil, covering from the eyes downwards, and its ends swathed about the neck and shoulders—these ladies of Stamboul are as ungraceful and unattractive-looking abroad as it is possible they could be made.

Next in popularity to the women of Stamboul come its dogs, to which I have already made a passing reference. One day, hearing a prodigious yelping, howling, and barking, I hastened to discover the cause, and found one of these

* Continued from page 45.

wretched animals covered with blood, and howling piteously as he tore along, pursued by a pack of his fierce, vindictive fellows, noisily and cruelly intent upon his punishment. It appeared from what I was then informed, that these animals have divided the place into what one may call parishes, and that the dogs of one parish are at deadly feud with those of the next parish, so that should any rash canine parishioner, tempted by hunger or a roving disposition, pass over the boundary of his own native parish, his breach of dog-law results in such a scene as I witnessed upon this occasion. This struck me as very singular, because it is the best piece of domestic or political economy which the animals could adopt, where they are so numerous, and so purely dependent upon their own efforts as industrious scavengers for support. Unlike the dogs of other countries, these seem to look upon man with a proud indifference, never attempting to enter your house (well knowing how soon they would be beaten forth again), and either allowing you to step over them, or moving reluctantly and lazily out of your way. They are seemingly harmless, fox-coloured curs, very like the sheep-dogs of our own country.

Selecting a bright, clear day, I took out my Turkish servant, with my photographic apparatus, and made my way towards one of the cemetries. Beyond a passing utterance of the word "Ingliz," neither myself nor my apparatus appeared to attract attention, and I was soon among the turban-headed tomb-stones and the tall, crowded cypresses. Many portions of the burial place evidenced no little neglect in their dilapidated condition; but some were as evidently kept and tended with the most scrupulous care. I had just set up my camera, when I espied, coming rapidly towards me, a funeral procession. Here was a piece of luck! my things were in excellent order, and I soon got a plate under weigh. If at no other time, the Turk is always in a hurry to bury his dead, believing that until after burial the soul of the deceased will not know peaceful rest. So quick were the bearers in their progress, that my slide was only ready just as they were preparing to lower the dead, with the usual accompanying pitcher of water, into the grave, and when my picture was developed, mourners and bearers had all gone from the nearly filled-in grave. Speaking of such unexpected luck as this, I may as well here name another similar instance.

I was stopping at the house of a friend, at the village of Therapia, a pretty place of which I got several nice views. It is on the European side of the Bosphorus, about five miles, or perhaps more, up, in a charming tree-sheltered bay, the place has an hotel which I can recommend to any photographer visiting there, and as it is the only one, no mistake can be made. I had pitched my tripod nearly opposite this hotel to get a view down the broad and unusually well kept road, when, just as my preparations were complete, there came riding lazily towards me a fellow followed by a female sitting astride a mule, seemingly a slave being conveyed to or from market. As she passed, attracted by the mysterious apparatus, she turned, and by way of rewarding me for the sight thereof, I suppose, she gave me a full view of one of the most beautiful faces I ever saw, lighted up with the sweetest of amiable smiles. The features were singularly delicate and cast in a mould of purely grecian beauty, *but they were unmistakably black.* Her figure, the costume concealing it less than usual, was evidently such as would be in harmonious keeping with so sweet a face, and as a whole, I should think she more nearly resembled a beautiful grecian statue of Venus, carved in black marble, and then animated, than anything else. Uttering an exclamation of pleasure, intended to attract the attention of my English companion to this lovely vision of novelty and delight, its charming object turned hurriedly away in some confusion, and just at that unfortunate instant, the old rickety-legged mule stumbled and fell, while over rolled our ebony Venus ignobly in the dust; I should have started off to raise her tenderly enough had not my friend restrained me. Not so, however, her undisturbed proprietor who coolly checked his animal and turned slowly round until the "lubly nigger gal" had gathered herself together and remounted her stupid steed.

"What a beautiful black woman!" exclaimed I. "Yes," said my friend, "I dare say she'll sell for as much as ten pounds English."

Before they were out of sight I had their retreating figures safely on a glass plate, with the elegant black face again visible smiling an assurance of being quite unhurt, over her graceful shoulder.

(*To be continued.*)

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris*, 12*th March*, 1862.

An important improvement in engraving by means of hydrofluoric acid has been made by MM. Jardin and Blancoud. Instead of acting upon the glass with the acid in a gaseous state, they employ it while liquid. They have sought to turn to account the remarkable properties of this acid in engraving hard siliceous stones, and have succeeded in producing, with the greatest facility, some very important artistic results. If a stone upon which it is wished to engrave a design be coated with a varnish of wax dissolved in turpentine, after the drawing is made with a fine point, the hydrofluoric acid is poured on. Immediately a white vapour rises which increases rapidly, and the proportion of which indicates the action of the acid. After a while, the duration of which experience alone can determine, the effect produced may be examined. If the engraving is satisfactory, the varnish may be removed; if the contrary, the action of the acid must be repeated as often and as long as may be necessary. In many instances it may be necessary to complete the action of the acid by the graving tool, in order to secure an artistic result. For ordinary engraving it is indispensable, as in the execution of a line engraving, or an engraving upon lithographic stone, not to prolong the action of the acid more than absolutely necessary, else the siliceous stone will become corroded all over, and so destroy the design. At other times, on the contrary, we can take advantage of this corrosive action to produce certain useful effects, permitting us to realize valuable results in an artistic point of view.

Every natural or artificial substance containing silica, and consequently attackable by hydrofluoric acid, is susceptible of being treated according to the process of MM. Jardin and Blancoud. When the action of the acid is concluded, the lines may be filled with coloured materials, metals, &c., and a kind of damascening obtained which presents a new resource in the ornamental arts. Various kinds of porcelain, transparent or opaline glass, may be treated by this process with very novel and tasteful results.

M. Fizeau, in repeating MM. Bunsen and Kirchoff's experiments on spectrum analysis, met with a very curious result. In burning sodium in the open air he discovered that when the combustion is not very active the spectrum exhibits the brilliant double ray D, which, in the solar spectrum, is replaced by a double black ray; but when the combustion is in full activity, the brilliant double ray D is replaced by the double obscure ray. In attempting to explain this naturally, we may attribute its absence at the commencement of combustion, to the deficiency of an atmosphere of sodium in vapour, which appears subsequently when the combustion is more active.

Among the specimens of photography that will figure at the forthcoming exhibition, I doubt if any will excite more surprise and admiration than those of the Glaciers of Swilzerland, taken by Messrs. Bisson, frères. They fully realize our idea of a perfect photograph, combining all the most desirable qualities, sharpness, brilliancy, tone, and breadth of effect, with a perfect aerial perspective. Instead of the "stopped out" skies which destroyed so many otherwise good pictures in former days, we have a delicately graduated tint which finely relieves the pure white of the snow. The masses of ice, of dazzling brilliancy, taken in full light, when examined under a powerful magnifier, develop a mass of minute details, without exhibiting a single flaw in the proof. In some of the pictures, taken at a moderate elevation, where the foreground consists of valleys filled with trees, it is impossible to imagine the perfection with which the verdure and foliage is rendered, even to the minutest detail, even in the deepest shadows. The atmosphere that pervades these pictures imparts an indescribable charm to them, there is an entire absence of that hardness which strikes the eye so unpleasantly in many views of similar scenes to these. By the union of three proofs, each nearly a yard long, a complete panorama of Alpine scenery is obtained, which is truly surprising.

## MASON *v.* HEATH.

Sir,—Mr. Mason, the plaintiff in this action, has, in letters to some of the daily papers, reiterated what he stated in the witness box, and although the jury, by their verdict, discredited Mr. Mason's account of what had passed between us, these statements may, if uncontradicted, do me serious injury.

Permit me, therefore, to repeat what I said in the witness-box, viz., that it is not true that I received or accepted any kind of order from Mr. Mason, and that it is equally untrue that I ever told him, or implied in any way, that I had two negatives for him. Of this I convinced the jury by other evidence besides my own. Mr. Ruland, librarian and secretary to His Royal Highness, gave evidence that His Royal Highness, who had seen certain photographic portraits taken by me, had himself expressed his intention (without any sort of application from me) to sit to me for some portraits he desired to have taken, before he consented to the application made by Mr. Mason; and that Mr. Mason's application having been renewed at this time, His Royal Highness had arranged that an additional negative should be taken for his publication. Mr. Mason, therefore, received directions to furnish me with the necessary particulars for its execution. I will say nothing here upon that portion of my own evidence which detailed the manner in which Mr. Mason attempted to mislead me as to what his instructions really were. Mr. Ruland proved that the Prince sat to me in my studio on the 2nd of July; that he attended him, and that four distinct negatives were taken. Mr. Ruland also proved that His Royal Highness stated, in reply to an inquiry from me, that he could not then come to any decision as to whether Mr. Mason should have any one of the four negatives, and that Mr. Mason was to be so informed.

A month afterwards His Royal Highness' decision was communicated to me in a letter, which was read in evidence. By this letter, in the clearest and most explicit terms, I was instructed to let Mr. Mason have one of the four negatives. This I communicated my readiness to do, and named a price for its delivery, which I still consider a very reasonable one—one, at all events, which could not be governed by any agreement or bargain he may have previously made with other persons for other portraits.

It was at this juncture, and no doubt in ignorance of the actual circumstances under which the Prince came to me, Mr. Mason set up a claim for two of the four negatives. My instructions were clear; I had but authority to deliver one, and hence the action: *an action which was expressly brought upon an alleged contract on my part, made the 29th of June, to deliver two negatives for a price named.* I was advised, and believed, that the facts herein stated were sufficient for my defence; but as Mr. Mason still thinks the question unsettled, permit me to say, that for the purpose of putting my position beyond doubt, at an early stage of the action, I wrote to Windsor for further instructions, and received the following reply from Mr. Ruland, dated, "*Windsor Castle, Nov. 24th,* 1861.

"As far as the question is concerned as to *what number, or which,* of the negatives taken by you in July last you were to give up to Mr. Mason, I can only refer you to my letter of the 6th of August, in which I distinctly stated and described as plainly as possible THE *particular and only negative* which, in compliance with His Royal Highness the Prince Consort's commands, you were to hand over to Mr. Mason for publication in a certain work, a copy of which had been submitted by Mr. Mason when he first applied for permission to insert a portrait of His Royal Highness into the said publication."

Mr. Mason in his letter to the daily press challenges some juryman to state the actual meaning of the recommendation attached to the verdict. I cannot, therefore, help remarking that I believe the jury would have considered any such recommendation superfluous, had they known that I, and all connected with me, had used our best efforts to prevent this action being tried. You will yourself remember my conversation with you as to my desire to refer it.

The following proposals were actually made. In the first place I stated my readiness to refer it to the President of the Photographic Society: then (after His Royal Highness's death) to Sir Charles Phipps, and then, at the suggestion of Sir Charles Phipps, to another gentleman, and in every instance I offered unconditionally to put my case in the hands of the persons named. It should be stated further, as can be proved by my leters, that I should have been but too glad to let Mr. Mason have *the negative at any time, upon any terms,* had he been willing to content himself with the only one which I had power to give him.

Vernon Heath.

## SOUTH LONDON SOCIETY'S EXHIBITION.

Sir,—I trust that the South London Society will not be prevented continuing their arrangements for an exhibition at the Crystal Palace, by what took place at the meeting of the London Society; it seems to me very unfair that the latter Society, having previously declined to hold an exhibition, should now step in at the last moment and interfere with arrangements made by an energetic "Suburban Society," my impression is, that hundreds would see and enjoy an exhibition at Sydenham, who would not take the trouble to visit one in London.

While on the subject of photography, may I ask what this new process of Mr. Melhuish's is? he stated in his evidence in Heath's case, that by a peculiar process of his own he could print 200 or 300 pictures a day, with one second's exposure to light; a very short time since at a meeting of the Amateur Photographic Association, he said that in consequence of the bad light he could not print much from the negatives sent in, how can I reconcile the two statements? It cannot be development printing, as "cartes" are always on albumenized paper.—I am, obedient servant,

A Photographer.

[You will find in another page the rules for the South London Exhibition. There is no antagonistic feeling to the exhibition on the part of the Executive of the Photographic Society, nor on the part of the society at large. Any such feeling, if it exist, is confined to individuals. Mr. Melhuish referred to printing by development. Of course his evidence could not legitimately apply to the pictures before the court.—Ed.]

## COPYRIGHT IN ENGRAVINGS.

Sir,—In connection with your article on "Photographic Piracy," in the News of Friday last, will you allow me to enquire of you or any of your correspondents how the fact of an engraving being "copyright" or not can be ascertained.

In the regular course of business it frequently happens that the possessor of a choice "proof" engraving wants to have it copied, and probably orders several impressions from the negative. Now as the photographer executing such a commission—assuming the engraving is copyright—obobviously renders himself liable to legal proceedings for infringement, it seems highly desirable there should be some means accessible for discovering whether a particular engraving is made copyright or not, so that one might be in a position to decide whether to accept or decline an order of this nature. There are hundreds of our profession who while they would not knowingly invade the privileges of others, at the same time do not wish to turn away work in cases where there exist "no just cause or impediment" to the contrary.—Obediently,

Copyist.

[The law of copyright in engravings is not by any means clear. We have not at hand the acts in force on the subject; but if we remember rightly the copyright of an engraving extends for twenty-eight years after its publication, the date of which and the name of the artist ought, to entitle it to the protection of the act, to be on each print. Whether the matter will be made clearer by the new act remains to be seen.—Ed.]

## Talk in the Studio.

Astronomy and Photography.—At the recent annual meeting of the Royal Astronomical Society, the gold medal of the society was awarded to Mr. Warren De la Rue for his valuable services in the application of photography to the extension of astronomical observations and their registration.

The Brussells Photographic Exhibition.—We observe that Mr. H. P. Robinson, of Leamington, received honourable mention for his contributions to the exhibition.

## To Correspondents.

Photographic Exchange.—The Secretary of the Photographic Exchange Club has received some views of Indian scenery from Lieut. Impey, but without any advice as to address, postage, &c. Will that gentleman be so good as to send the necessary information.

P. R. A.—Your print has been insufficiently toned. The use of a bath of salt and water before toning frequently causes the gold to deposit slowly. Try simple washing, or the use of the bath of acetate of soda recently recommended in our columns Your negative is manifestly a thin one, which does not allow of sufficient printing to get deep tones. The paper also appears of that quality which tones imperfectly. You will find a Saxe paper tone more easily.

Tripod.—The prices charged for tuition by London photographers vary according to their standing and ability, varying from one to ten guineas for a course of lessons. We believe the terms of Mr. Dawson, of King's College, are five guineas for a private pupil.

J. N.—The discoloration in your prints may arise either from the use of dirty dishes or dirty fingers. Handling the prints before fixing, with fingers which have touched hypo, or after they are fixed and before all the hypo is removed, with fingers which have touched nitrate of silver, will cause such stains to appear in the washing. 2. You will find full instructions for obtaining pure recrystallized nitrate of silver from metallic silver on pages 6 and 20 (Nos. 122 and 124) of our fifth volume.

B. H. C.—You will find all particulars and regulations regarding the Exhibition at the Crystal Palace in connection with the South London Society in another page.

Bolus.—A very low temperature is inimical to intensity. Use a larger proportion of Thomas's collodion in your mixture. The light is a little too evenly diffused around your sitter, a little more light on one side, and a little more shadow on the other, will give your pictures more brilliancy. We prefer a somewhat warmer tone. The picture is in many respects pleasing.

Cassandra.—You have accurately described what takes place on making a bath with impure nitrate of silver. We recently met with a very obstinate case of the same kind. An able practical photographer furnished us with half-a-pint of new silver bath, which had defied all means of making it work without fogging. We proceeded to adopt a course we had generally found successful; *i. e.*, adding oxide of silver, then exposing the solution to light for a few hours, filter, and adding a trace of nitric acid. In this case the treatment was entirely useless; we added a large quantity of nitric acid, hopelessly destroying sensitiveness before we got clean plates. We now added carbonate of soda, a large quantity being required, until a slight precipitate began to be formed; we then filtered, and found the bath neutral, and on trying a plate it gave a clean, rich, brilliant negative at once. The precipitate of carbonate of silver carried down with it some impurity which had been present. We do not charge any fee for advice; but we have not time to write private letters on personal difficulties.

R. D.—The various combinations which you describe might be made with the triple lens; but they would not be perfect, nor is the lens intended for so many purposes. As a copying lens the advantage claimed for it is freedom from distortion, and as a landscape lens, depth of definition. By removing the central negative lens, a portrait lens of short focus is obtained. By using the back lens an ordinary view lens of very long focus is obtained; hut neither of these are, we apprehend, quite so perfect as lenses made for the purpose. The front lens could not conveniently be used as a view lens in its present setting, and it would be too small. The curves of the back and central lenses are not such as render them suitable for forming part of an orthographic.

A. Johnstone proposes a method of exhibiting enlarged photographs with a reflecting steoroscope. The two halves of a stereoscopic transparency are placed in two magic lanterns and projected on to large screens. These screens are placed at the proper angles to be received by the mirrors of a reflecting stereoscope. We fear the result would not equal the trouble. The effect would he coarse unless the pictures and apparatus were all very first rate, and only one person could examine the result at a time.

E. E. L.—Our correspondent is right so far as the formation of chloracetic acid is concerned, but he has omitted a very important fact in the argument, and one of interest in other ways to the photographer, viz.—that the transformation only takes place under the influence of light. To form the compound he has given the formula of—*tri*-chloracetic acid $C_4\left\{\begin{matrix}H\\Cl_3\end{matrix}\right\}O_4$—the acetic acid must be exposed to the action of bright sunshine for some hours in the presence of a considerable excess of chlorine gas. If attempted to be prepared in the way he describes, diffused daylight at least would be required, and then only the mono-chloracetic acid would be formed $C_4\left\{\begin{matrix}H_3\\Cl\end{matrix}\right\}O_4$. Both these acids form soluble silver salts, indeed they are very similar to acetic acid. The supposition that a mixture of normal or partly reduced chloride of silver with acetate of soda would liberate an acid, is an error; and if it did not liberate an acid, it would not decompose the hypo in the way he thinks 2. Experience proves then the organic acid is better both for bath and developer, than the inorganic in all dry processes. Your other letter next week.

T. Burgoyne.—One or two errors or oversights in the paper of Mr. Sebastian Davis on the manufacture of Collodion are calculated to mislead. In the formula for plain collodion, drachms should be substituted for ounces. The formula should stand thus:

| | | | |
|---|---|---|---|
| Ether, methylated, sp. gr. 720 to 730 | ... | $4\frac{1}{2}$ | fluid drachms |
| Alcohol ... ... 837 | ... | $1\frac{1}{2}$ | " |
| Pyroxyline ... ... ... ... | ... | $6\frac{1}{2}$ | grains. |

This, with two drachms of the iodizer made according to formula, will give one ounce of collodion, containing $6\frac{1}{2}$ grains of pyroxyline, 6 grains of mixed iodides, and as much chloride of potassium and chloride of ammonium as it will take up. The phrase in which the proportion of iodizing to be added to the plain collodion is stated, requries the words "latter" and "former" to change places.

A. G. Z.—If you send us specimens of the prints, we shall be better able to help you. It seems probable from your description that your negatives lack intensity. If in toning you get some prints too brown, and some too blue, it would appear that care and experience alone are necessary to hit the medium. The best plan is to break the bottle of chloride of gold, and mix the whole of its contents at once with a definite proportion of water; say 15 ounces to the 15 grains of gold.

Beginner.—It is difficult to state the *best* formula for any process, as different methods succeed in different hands. Transparencies printed by superposition on tannin plates, give excellent results for the magic lantern. It is important to have very soft, well-detailed negatives. Several articles on transparencies appeared in our last volume.

A Subscriber from the Beginning.—There is no danger of your lens having deteriorated, unless you have put it together wrong. If it once worked sharp, it will always work sharp. Your phrase, "indistinct," is too vague to allow us to form an opinion of your difficulty. Indistinctness may arise from fog, movement, want of focus, &c. Send a specimen of the fault, and we will try to help you.

Blunderer.—The mixture of your silver bath with iron-developing solution inevitably spoils it as a bath. The iron will have partly reduced the silver; the only plan now is to complete the reduction and recover the silver originally contained in the bath. Place the solution in a flask, and boil over a spirit lamp until the reduction is complete. This may be ascertained by adding a little common salt, which, if all the silver be reduced, will cause no turbidity or precipitate. If any turbidity be produced add more iron, and continue the application of heat. Remove the precipitate and boil it for a few minutes with dilute hydrochloric acid, and then wash thoroughly. You will now have your silver in the form of a grey metallic powder.

Charles C. Macklay.—Pin holes in the negative arise from a variety of causes. Dust is one of the most fertile sources. The bath or developed requiring filtering, or the bath being super-saturated with iodide of silver will cause them. Where the negative requires the long-continued application of pyro and silver to produce intensity, they will often occur.

R. V.—The collodion which gives an image which entirely loses its brilliancy when dry is altogether unsuited for positives, and cannot be improved. The fault is in the pyroxyline. The collodion which has congealed in the bottle may be diluted by the addition of sufficient of a mixture of ether and alcohol in equal proportions. 2. The solution of bichloride of mercury used for whitening positives is generally saturated, or about 30 grains to the ounce. It is difficult to dissolve this amount in cold water, without the salt be well powdered.

A. You have applied insufficient heat, powder the slag, and proceed to again with the same process, adding a little more of the same flux, or a little borax instead, and use a higher heat this time.

E. F.—The value of your negatives, and the chance of disposing of them will depend largely on the interest of the subjects. Write to some photographic publishing house, such as the Stereoscopic Company.

Stereo.—Your suggestions shall be submitted to the Committee of the Exchange Club.

C. W.—You will find a report on your glass in the usual place. In the formula for the manufacture of pyroxyline given in our Almanack, for six measured *drachms* of mixed acids, read six *ounces*. The proportion of cotton and acids are not of great moment: it is only necessary to add no more cotton than can be immersed with comfort in the acids, so as to be completely submerged. With acids of the strength named no water is be added. Pyroxyline will keep very well keep very well in wide-mouthed bottles or jars, either stoppered or corked. Where more than an equal part of alcohol is added to the ether, a portion of the alcohol must be absolute. Where equal parts are used the alcohol may be of about 820 sp. gr. We prefer the excess of alcohol for all purposes: but mention the other formula because it is sometimes difficult to get absolute alcohol.

G. P.—A very simple method of ascertaining the amount of water in white of egg will will be to evaporate an ounce of it at a low temperature. We cannot help you to the atomic weight of albumen which is, as we before said, a very complex and somewhat variable organic compound. We regret that we cannot supply the information you seem to require, except so far as we have already attempted.

Sigma.—1. Not yet. 2. Yes. 3. Caustic potash will be supplied, under that name, by any chemist. 4. Boiling a nitrate bath will evaporate the ether and alcohol, and also some of the water, and facilitate the reduction of any organic matter present, but we should not boil one ourselves. Unless other causes were in operation, the bath on filtration would work properly afterwards. 5. Albumen being soluble in water could not be used in the same way as collodion without drying. The difference between a moist collodion film and a dry albumen film is very considerable. The former is simply a porous vehicle for holding a loosely compacted layer of iodide of silver, exercising little or no chemical influence on that film; the latter is a horny film forming a chemical compound of a complex character with the iodide of silver. 6. Photographic copies of music should have intense negatives which will bear deep printing: there will then be no difficulty in getting black and white prints. 7. Mr. Heath has not yet contributed his promised formula. We will bear your suggestion in mind.

William Dowler.—We do not know to what you refer as Mr. Sutton's quick-acting lens. Is it his instantaneous camera you mean?

An Old Sub.—The numbers you name are quite out of print.

W.—The use of methylated spirit should not in any way deteriorate a varnish. If it dry dull when sufficient heat is applied, add a little more of the gum. Nos. 6 and 8 of the Photographic News are out of print. The remaining numbers you require are in print. We are obliged by your offer of duplicates of the numbers you name; but of these we have stock.

Answers to a number of Correspondents, as well as the continuation of "Remarks on Apparatus," and a variety of other articles are compelled to stand over until next week.

# THE PHOTOGRAPHIC NEWS.

VOL. VI. No. 185.—*March* 21, 1862.



## INSTANTANEOUS DRY PLATES.

"If to do were as easy as to know what were good to do," exclaims Portia, "chapels had been churches, and poor men's cottages princes' palaces." The Photographic Society of Marseilles know what is desirable to be done, and what is more, are resolved to find out, if possible, the men who can do it. Our French neighbours have great faith in prizes, and if the offer made by the Marseilles Society, the conditions of which we append, have the effect of securing its end, beyond the possibility of a question, we shall be glad, even although we have to wait nearly two years for the accomplishment.

But we really hope the point will be satisfactorily settled long before December 1863. We ought, perhaps, to go further and say that it *is* settled, seeing that during the last few months we have frequently had to announce "Instantaneous Dry Processes" in our pages. Years ago Mr. Kibble produced instantaneous pictures of waves and shipping on collodio-albumen plates. We notice in another page of the present number a series of instantaneous stereographs, taken on Dr. Hill Norris's dry plates; and we have ourselves obtained instantaneous views on plates prepared in the same manner. Last summer we described M. Roman's instantaneous Taupenot process; and one of our correspondents, the Rev. J. Galloway Cowan, assured us of his perfect success in applying that method. Mr. Window recently described in our pages a dry process, in which the only application to the plate, after washing away the free silver, was gallic acid, and by which he obtained excellent instantaneous results. More recently, we received a communication from Dr. Draper of New York, describing his method of producing instantaneous pictures on tannin plates. Mr. Sutton has recently announced that he has discovered a series of modifications by which very rapid or instantaneous dry plates could be prepared. Mr. Bartholomew, and other gentlemen, have also made some contributions to the same end.

It would certainly seem, after this enumeration, that the offer of a prize, for the discovery within the next two years, of an instantaneous dry process, was somewhat late in the field. But although our French brethren are somewhat behind us in instantaneous work generally, and more especially in relation to dry processes, they are perhaps right in coming to the conclusion that something further is to be done. We think the most ardent dry photographer will scarcely say, we think, without *arrière pensée*, that instantaneous dry plates are certainties. We have not yet seen any results by the most rapid dry process which could fairly compare with the instantaneous pictures of Wilson, England, or Blanchard by the wet process. Something still remains to be done; and we have a firm conviction will be done, and that shortly. Long before the decision will be given at Marseilles an instantaneous dry process will, we hope, be amongst the familiar operations of photography.

We proceed, however, to lay before our readers particulars of the Marseilles prize. At the meeting of the society on the 31st of January last, it was decided to institute a general competition for the discovery of an instantaneous dry collodion process; the view of the Boulevard de Strasbourg, taken in full sunshine, with figures in motion, by Messrs. Ferrier and Soulier, being regarded as a standard of comparison. The following are the conditions:—

1. The prize shall be a gold medal value 500 francs; the competition to terminate on the 31st December, 1863.

2. The plates and details of processes intended for this competition should be addressed, free, to M. Leon Vidal, Secretary of the Society, 2, Rue Mazagran, Marseilles, and may be sent between the 1st of June, 1862, and the 15th of August, 1863.

3. The sensitive plates, for stereoscopic pictures, must be packed carefully sealed and light-tight, in a grooved plate-box, containing 12 plates; dimensions of the glass nine centimetres by twenty centimetres. [A centimetre contains 0·39371 of an inch, the plates will therefore be a fraction over $7\frac{7}{8}$ in. by $3\frac{1}{2}$ in.]

4. A communication describing, first, the nature of the process; and second, the method of development, must accompany each package.

5. The above condition as to the process will be required to be rigorously fulfilled only in the case of that which gains the prize. The Society will publish the formula and the process employed, but not in such a way as to deprive the inventor of his exclusive right of property therein; he will, in fact, be able to work his process profitably, and to improve its value in any way he may think proper.

6. The experiments will be made on the sensitive plates all with the same instrument, a quarter-plate combination, full aperture, of four and a-half inches focus, and under the same conditious.

7. One half at least of the members of the jury shall assist in the opening of the boxes and in the experiments, which shall be made with all possible and necessary precautions.

8. To test the keeping qualities of the plates, the development of some of them will be delayed from fifteen days to a month, according to the instructions attached.

9. The keeping qualities both before and after exposure will be carefully recorded, in order to aid the decision of the jury in those cases where they will have to choose between several instantaneous dry collodions possessing the other conditions named.

10. In the event of the jury being unable to award a prize of 500 francs, and cases occur meriting some acknowledgment, a medal of 250 francs value will be given to any one who has or has not taken part in the competition, but has nevertheless contributed by his researches to advance the discovery of a dry collodion possessing uniform and rapid qualities; and the prize of 500 francs will be deferred, with an addition of 300 francs, to the end of December, 1864.

11. All the questions shall be decided by a jury of examiners, composed of fourteen members of the Society. The following are their names:—MM. Gabriel (President of the Society), Leon Vidal (Secretary of the Society), Bremuller (Photographer), A. Guilbault, Hudelot (Cap. d'Etat Major), Joseph Jacquemet, Alexander Lefevre, Ernest Loire, Meynier (Professor of Chemistry), Alphonse de Proux, Arthur Taylor, Charles Teisseire, Thobert (Photographer), and Tissot.

## PHOTOGRAPHING THE ECLIPSE OF DEC. 31st, IN THE WEST INDIES.

BY WILLIAM TUCKER.

Eight or ten days before the 31st December, 1861, Mr. Cruther (the Government botanist) called on me, expressing a desire that I would join several other gentlemen, who were desirous of taking observations of the coming eclipse, and, if possible, photographs, at the Botanical Gardens, St. Ann's. A few days later he again called, stating that the Governor had received a communication from Mr. Hind, desiring, if possible, to have observations on the eclipse. Mr. Hind gave concise and simple instructions how to proceed, stating that the locality best suited for observation would be about Guapo, four or five miles south of the celebrated Pitch Lake, this spot being in a direct line of the central shadow.

By the request of his Excellency the Governor, a committee was appointed, consisting of Messrs. Cruger, Devenish, and Anderson; Lieutenant Le'Messieurer, R.E., and myself. The first four gentlemen to take necessary notes, observations, drawings, &c. &c., and I to btain photographs. Never having before attempted astronomical photography, I was puzzled how to effect the object, the sun depicted in the ordinary camera being too small to be useful.

On the 25th of December, at the Botanical Garden, I tried to fix the body of a $\frac{1}{4}$-plate camera to an ordinary astronomical telescope. In this I was successful, using the telescope in place of the usual lens. The method is best described in an accompanying photograph. This instrument is one of Lerebour and Secretan's, of a focal length of sixty-one centimetres. Object glass sixty-one milimetres. The field-glass had a magnifying power of 45. No eye glass was used. Having everything ready on this day, I got but a momentary peep of the sun, not sufficient for a trial. Next day the same. On Friday I had the instrument brought to my house in town. On Saturday I fortunately got one chance, and succeeded in obtaining an image. This was satisfactory, so far, and a proof that something might be done. On Sunday, the 29th, at 5 p.m., we started from Port of Spain, in the Customs' four-oared boat, which was much too small for the purpose, having to take with us provisions for three days, tents, &c. and changes of clothing. After an eight hours very painful and cramped journey of twenty-eight miles, we called in at Sanfernando (the only other town of importance) to pick up Mr. Hamilton Warner, whose astronomical knowledge we were wishful of pressing into our service. Him we roused from bed, when, unfortunately, he told us he had already made arrangements to take observations on the Sanfernando Hill, at the back of the town. Consequently we had not the pleasure of his company. We then determined to take two or three hours' rest at the only hotel in the town. At five o'clock on the morning of the 30th we resumed our voyage, at eight rounded Point La Brea, and at nine landed on the beach at Guapo, thirty miles south of Port of Spain, in a direct line, or forty by our route. Opposite the landing is the entrance to the Perseverance estate, where, leaving Mr. Cruger to superintend the disembarkation of luggage, &c. &c., we walked through a heavy, muddy road, to the manager's house, about a mile inland. Most fortunately we met that person then in the act of starting for the village of La Brea. His trip was put off, and. on learning our mission, he kindly offered the use of his dwelling, and immediately obtained eight or ten negroes and coolies to bring up the baggage, it being impossible at that season of the year to use a cart. By noon everything had safely arrived, and whilst breakfast was preparing, instruments were unpacked and adjusted, preparatory to a preliminary trial we were wishful of making. I was particularly anxious to test my instrument, chemicals, &c. to ensure the successful working on the morrow. This, like the preceding days, was dull and cloudy, having obtained but a glimpse of the sun just before he dipped below the Gulf of Persia. Our hopes for the coming day were below zero, and a successful issue very doubtful, particularly with myself. I got up several times during the night, which was fine. Mr. Cruger aroused us soon after four o'clock. Every person was now at work—some rolling puncheons for stands, others carying their instruments to the spot chosen as the observatory. By day-break all was arranged and coffee taken. On our earliest observations to eastward there was seen a dense bank of black clouds. This remained after day broke, and fears were entertained that it was the forerunner of a cloudy day. We anxiously waited the appearance of the Sun, which at 6h. 47′ rose above the cloud. It was hailed with applause. I immediatety got my instrument adjusted. and was highly gratified in obtaining a sharp image on the focussing glass. There appeared now nothing to mar our attempt, except the ominons looking clouds under the sun. Mr. Anderson, and Mr. Gardis (the manager) were appointed to assist me—Anderson to keep the sun in the centre of the field and note time, and Gardis to expose. According to Mr. Hind the first contact was to have taken place at 8h. 26′. Until the first contact I kept the sun's image in the field, and at 7h. 14′ 30″ fortunately observed the first appearance of the moon in contact. I sang out immediately on perceiving it, and in a few seconds every one was fully engaged.

Having coated and prepared a plate, at 7h. 19′ took photograph No. 1.—giving as quick an exposure as it was possible with the hand.

No. 2, taken at 7h. 28′. In this *negative* three spots appear on the face of the sun.

No. 3, taken at 7h. 36′ 20″.

No. 4, taken at 7h. 41′ 20″, immediately on the moon's contact with the two upper spots. A slight shadow is here perceptible on the lower limb of the sun.

No. 5, taken at 7h. 51′ 5″. The shadow is here considerably deeper.

No. 6, taken at 8h. 2′. In this the shadow is much sharpened, and still more perceptible.

No. 7, taken at 8h. 10′ 45″, the last taken before totality.

I now prepared a plate for taking the principal object, viz.: the total obscuration. This occurred at 8h. 26′ 25″. The scene now was appalling and grand. It appeared as if the sun was a ball of fire suddenly crushed, throwing out at different parts jets or rather rays of a bright orange colour. All nature was under its influence; the birds which but a moment before sang and chirruped around suddenly ceased. Domestic fowls had been gathering around the negro dwellings for some time before. A negress sung out from a neighbouring hut that the fowls were "going to bed." A cold chilly wind blew. The light produced resembled that of a dark room illuminated by placing a candle behind a sheet. I could see to work in my tent, it having a yellow glass window of about 6 inches aperture. These were my impressions from a momentary glance at the eclipse, around at the landscape and at the image on the focussing glass. Quickly inserting the dark slide Mr. Gardis gave the usual exposure (momentary), on applying the developing solution no image appeared, when it immediately occurred to me that from my forgetfulness it was insufficiently exposed, and, unfortunately, no time left for a second trial. A little forethought would have prevented this failure, had I taken the precautions to instruct Mr. Gardis that a longer exposure were required. The totality ended at 8h. 27′ 20″.

No. 8, taken at 8h. 34′, first after totality.

No. 9, taken at 8h. 39′ 40″. The double outline in this was caused by an accidental vibration of the camera.

No. 10, 8h. 46′ 20″, taken through the clouds which now began to obscure the sun.

No 11, 8h. 53′ 10″, taken through a cloud. In this the instrument had been moved, throwing a part of the image out of the field.

The bank of clouds which had been lying low in the horizon now moved rapidly upwards and obscured the sun, bringing with it a heavy tropical shower. I succeeded, however, during the first pioneer drops, in taking a view of our observatory, No. 11, and a group of the committee, No. 12.

During the time of observation the sun was slightly obscured by misty transparent clouds (see photographs).

Altogether we could not but be gratified at the so far successful issue of our journey. This was observable by the lively manner in which we enjoyed our *dejéuner*, Our trials were not, however, at an end. In returning to Sanfernando we were met with one of the heaviest torrents of rain that had fallen during the season. A few minutes drenched everything, and in less than twenty minutes filled the boat above our ancles with rain-water.

Fortunately we arrived in time to take advantage of the steamer, and reached Port of Spain at 10 P.M., on Tuesday, December 31, 1861.

The collodion used on this occasion had been iodized upwards of six months, using equal parts of iodide and bromide; developer—iron, acetic acid, and water.

[Mr. Tucker has kindly forwarded a complete series of the interesting photographs here described, showing the various phases of the eclipse. We shall have pleasure in exhibiting them at the next meeting of the Photographic Society.—ED.]

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### FIELD CAMERAS.

*The Focussing Screen.*—It must depend entirely upon the particular design of a field camera, whether it is possible to make the focussing screen a part of the instrument, permanently attached to it, or whether it must be of necessity a separate piece. I think it is very desirable to have the focussing screen a fixture in field cameras; indeed more so than for the studio, as the loose screen when taken out of the instrument in the field has no recognised place in which it may always be laid out of danger, as may be the custom in the glass room, but it must be laid down, often on the ground, sometimes half hidden in high grass, in places where its presence may be temporarily forgotten, and it runs a continual chance of injury from a thoughtless movement of the photographer or any bystander.

As the perfection of the photographic picture does not in any way depend upon this question, I do not think that a camera which, in other respects, may be unexceptionable in design, should be rejected because the focussing screen belonging to it must of necessity be a loose piece, but it will be found a matter of convenience to adopt the plan I have named in all cases in which it is possible.

The focussing screen of a field camera must not be hinged to the instrument, as recommended for a studio camera, in such a way that it hangs down loose while a picture is being taken, (fig. 6.) as it would be caught by the wind. It must be contrived to fold in such a manner as not to be affected in any way by the wind. There are many ways in which this can be done, which need not be described.

*The plate-slide.*—It is usual to make the plate-slides intended for dry plates to hold two plates each, and they are, from this circumstance, called double backs. This type, I believe, is universal. It has often puzzled me to explain the cause of this uniformity in one particular detail of an instrument which in every other item of its construction has shown itself a very Proteus; and in which so many patterns and devices have been introduced, sometimes with a greater claim to novelty than to improvement. I confess that up to the present I have been unable to decide the question in a manner satisfactory to myself.

A double back, in a photographic point of view, has no superiority over two single plate slides.

Two single plate slides properly made need not occupy more space than one double back. The former need not be more costly, for the most expensive part, the sliding shutter, is supplied to each half of the double back, and each half should also have its separate back shutter. The single backs would fit into a groove one half the width of that required by a double back, and, consequently, the focussing screen would be that much narrower, and the whole apparatus be so much smaller. The number of single backs would be doubled for the same quantity of plates, but they would fit into the same space. If you drop a double back you break two glasses instead of one if the same misfortune happens with a single one.

These seem to be the chief arguments *pro* and *con*, and they appear to me so nicely balanced that I am surprised one form should have been so universally adopted to the complete exclusion of the other; that at least a few cases have not occurred where, if only for novelty, which has its attraction for some, the single back was used for dry plates.

After my remark, that there was, in a photographic point of view, no superiority in one kind of back over the other, it will not be supposed that I in any way intend by these observations to recommend the single slide in preference to the double back now in universal use for dry plates. I merely note the fact I have alluded to as curious.

The two most usual forms of double back are those which are fitted into the camera from the top, in which the sliding shutter opens upwards; and those which slide in from the side in which the shutter opens sideways. The former have a flange running round the upper end; the last are without any flange.

For many reasons a flange upon the plate-holder is open to objection. All projections are liable to fracture; also, they interfere with the facility of packing the parts together in a small compass. Their use should, therefore, be dispensed with as much as possible. Even the strips of wood at the bottom of the shutter, which serve as stops to limit its movement, are for the same reasons objectionable in field cameras, and it would be better to effect their purpose in some other way. For all mechanical purposes the best outward form for a plate-holder would be a parallelopiped, having all its surfaces perfectly plane and without asperities. I think we should give our preference to those which in practice approach the nearest to this type.

The double back should consist of two similar parts, each perfect in itself. It is very much the custom to make them with a single partition between the glasses, which is buttoned down upon one cell only. I think this is very objectionable. The sensitive glass plate in the cell, which is unprotected by any cover of its own, is unnecessarily exposed to the damp and other effects of the atmosphere, which can reach it by filtering through the joints of the two halves of the slide. Also when the slide is opened, the plate which is not retained in position by any mechanical means is very likely to fall out and get broken or scratched.

Considering the very trifling addition to the thickness of the slide which is occasioned by making each half alike and properly covered in, I think it is an error to omit this precaution. Also it will be found in practice more convenient, especially when only one plate is put into a double back.

In the early days of dry plates some double backs were made without any fixed partition at all between the two plates, which were simply separated by a piece of black paper. I have four slides made in this manner belonging to my first camera, but I do not believe that any are constructed so now. It is a dangerous system and should not be employed.

Care should be taken that the cells for the plates are of very full dimensions for the glasses they are intended to hold. It should be borne in mind that it is next to impossible to cut the plates exactly to the required size; some will be a trifle larger, some a trifle smaller. To allow for this an extra $\frac{1}{16}$th of an inch should be added each way, and at least $\frac{1}{8}$th of an inch should be allowed for the thickness.

(*To be continued.*)

* Continued from page 112.

## ON THE CHEMICAL EFFECTS OF LIGHT.

BY M. H. POITEVIN.

BEFORE employing the salts of uranium as reducing agents. I had, in March, 1857, experimented upon the action of light upon the lactate of uranium, which the *Annuaire de Chemie*, of Millon and Reiset, for 1848 (p. 281), pointed out as being very sensitive, and reduced to the state of oxide from the peroxide by light. I also knew that all the yellow salts of uranium are converted into green salts by the action of light, which reduces the salts of silver and gold; but I did not then know the application that had been made in England of the nitrate of uranium to replace nitrate of iron, in the chrysotype process of Sir John Herschell.

I prepared some paper with a solution of lactate of uranium, and I exposed it to the light under a negative—a very distinct image was formed; it was of a brown colour, which disappeared upon washing it in distilled water. I employed it with the view of fixing several re-agents: it was in vain, only nitrate of silver would fix it, by blackening it; this appeared to me very curious, and also very useful for printing positives. I did not continue my experiments, being too much engrossed in photographic printing, which I was gradually improving to bring it to practical use.

Some time subsequent to this M. Niepce de Saint Victor commenced his photographic researches upon nitrate of uranium. He communicated the results to the Academy of Sciences, but I know of his labours only through what has appeared in the photographic journals, in August, 1858, and May, 1859.

M. Niepce's labours were not undertaken from a chemical point of view, as is proved by his explaining the reduction of the salts of silver and gold by the uranium salt submitted to the action of light, as produced by a storing-up of the light; thus confounding the effect with the cause.

I did not resume my experiments upon the salts of uranium until the first months of 1859. I then perfectly explained the reaction I had observed in 1857. I proved anew that the salts of the peroxide of uranium, applied upon paper, were brought by light to the state of salts of the peroxide, upon which gold and silver solutions formed a deposit of metal; and, moreover, that the ferro-cyanide of potassium formed very beautiful red positives upon paper imbued with nitrate of uranium, printed through a negative. I fixed them by a simple wash with water, pure or slightly acidulated. I also changed this red colour into violet black, by treating the proof with a weak solution of perchloride of iron, which changes one portion of the ferro-cyanide of uranium, which is red, into ferro-cyanide of iron (Prussian blue); the mixture of these two colours produces violet more or less deep. By prolonging the action of the perchloride of iron upon the proof, I finally obtained a proof in blue, which I could change at pleasure into black ink (gallate of iron), as stated above.

The operations of nitrate of uranium alone upon paper are numerous and well known, and I have nothing new to add upon the subject. I shall, therefore, speak here only of the use I have made of this salt mixed with other maximum salts, with the view of accelerating their reduction by light.

*Nitrate of Uranium and Bichromate of Potassa.*

When a solution of bichromate of potassa is added to a solution of nitrate of uranium, a pale yellow precipitate of chromate of uranium is formed, which redissolves in excess of the same nitrate. Paper coated with this mixture is yellow. It bleaches in the light at first; then it turns rose red. If printed under a screen, by afterwards treating the paper with a solution of nitrate of silver, chromate of silver is formed upon all the parts that have been influenced by light. It is the same reaction as that produced when employing alloxantine and bichromate of potassa, and the same use can be made of it; only, it must be observed that here the nitrate of uranium does not exist in the state of protoxide salt in the solarized parts, for it reduces the nitrate of silver, but only after having been decomposed by light, it returns the oxygen to the bichromate of potassa.

A solution of ferro-cyanide of potassium colours the exposed portions of the proof brown-red; but upon afterwards treating the paper with a solution of perchloride of iron, prussian blue is formed on the impressed portions.

A solution of tannin produces no apparent effect; but upon afterwards treating the paper with a solution of per chloride of iron, ink (tannate of iron) is formed only on the influenced portions.

*Nitrate of Uranium and Bichloride of Mercury.*

Paper prepared with this mixture is very sensitive to light, which reduces the bichloride into protochloride of mercury; this is blackened by solution of hyposulphite of soda or by solution of ammonia.

*Nitrate of Uranium and Perchloride of Iron.*

This mixture, applied upon paper, very quickly loses its colour in the light, it changes from yellow to white; some nitrate of protoxide of uranium is at first produced upon the solarized portions and reacts upon the perchloride, which it changes into proto-chloride. The solutions of gold and silver are reduced by the proto-chloride of iron.

Ferro-cyanide of potassium colours the non-impressed portions brown, where it forms a mixture of ferro-cyanide of iron and uranium,

The ferro-cyanide of potassium forms prussian blue on the printed portions of the proof. This reaction is very marked, and may perhaps be turned to account, for we can easily, as I have stated, convert this blue into gallate or tannate of iron.

Solutions of tannin, gallic acid, pyrogallic acid, &c., produce ink on the portions which have not received the action of light, that is, where the perchloride of iron is not reduced. This reaction is also very distinct, and the one which I have particularly endeavoured to turn to account, and upon which I have based the method of photographic printing, which I published on the 29th of May, and which is inserted in the *Bulletin de la Société Francaise de Photographie*, June, 1859.

I shall continue my experiments upon the reduction of various maximum salts of iron, in view of their application to this kind of printing, almost all of them may be employed, even the sesquioxide itself, mixed with a reducing agent; but it is the nitrate that is the most easily reduced, next to the perchloride. I shall also search for less expensive reducing agents than alloxantine and nitrate, or lactate of uranium; and I have ascertained that glycerine, oxalate of ammonia, and especially tartaric acid, can well fulfil the same purpose. I always make use of tartaric acid now. On the 28th of May, 1860, I communicated a second process of printing with gallate of iron and prussian blue, with specimens on paper and textile fabrics.

*Positives.*

The proofs obtained in this manner, by making use of a positive to print from, are always deficient in stability on the surface of the paper, which the colour even penetrates, so that the proofs look much better when viewed as transparencies; this is specially due to the quality of the paper employed. If very sharp proofs are required, collodioned paper must be employed. It is prepared as follows:—

Upon a well-cleaned glass plate pour a film of plain collodion, immerse it under water, and when the greasy aspect has disappeared, withdraw it, and pour on the surface, several times, some acidulated water; then apply the gelatined side of a sheet of paper previously moistened with perchloride of iron and tartaric acid (10 of perchloride and 3 of tartaric acid to 100 of water); when complete contact is secured, the collodion adhering to the gelatined paper is removed. This paper is very sensitive to light, and yields very clear and vigorous proofs. It was during my last experiments that I discovered the impermeability communicated to paper by the mixture of perchloride and tartaric acid: light subsequently destroys this impermeability. I immediately thought of turning this observation to account for printing either with fatty inks, or with carbon in powder, &c.; but it was especially in seeking to substitute glass for paper that I remarked the new and curious fact of hygroscopy imparted to this preparation by light—a fact which has led me to, and forms the basis of, my second method of printing in carbon and inert powders, which process I communicated on the 26th of October last.—*Bulletin de la Société de la Photographie.*

## RECOLLECTIONS OF AN AMATEUR PHOTOGRAPHER IN PORTRAITURE.

BY NOEL E. FITCH.*

A friend of mine having a relation an officer in a cavalry regiment, asked me if I would kindly take his portrait; of course I consented to do so, and took a very successful one.

* Concluded from p. 129.

The sitter was a very good one—quiet and still, with a face even in repose thoughtful and expressive; and altogether it being a very good day, the picture was liked most immensely. Fifteen impressions from this half-plate did I give, and then was asked for more. This I playfully declined to do, but forwarded the negative to my friend, with instructions as to where any number of copies could be obtained by the very simple process of paying for them. I could give you numerous instances of this sort of thing, this want of consideration towards amateurs generally, not only in photography, but in water colour drawing, and in fact in anything which may be either an amusement to some, or a source of profit to others. I once, I assure you, had a friend bring me beside himself, his wife, and three children, of the respective ages of 6, 4, and 2 years, to have their portraits taken, without asking me if *I would* take them, and specifying as regards the children, that they should be taken like the sleeping child, which I shall have the pleasure of handing round to you this evening, and which they appeared to admire very much. I declined to make the attempt absolutely, and he departed in peace with a portrait of himself and wife only.

And this reminds me, gentlemen, that if I were to give you all my recollections of children offered and declined, I should possibly detain you here longer than you would wish. How my neighbours even who can see my glass house and guess at its use, and who possess (which of course it is) the prettiest little child in the world, will politely send the muslin'd and mottled-legged little thing, with a polite request that I will be kind enough to take its portrait. How also each little one is warranted to stand or sit like a lay figure; and the black looks we have to put up with from mamma, when we politely but firmly decline to make the attempt, unless her "lively beauty" be converted into a "sleeping" one, when of course there is not much difficulty in the matter; in fact, I think every fond parent desiring to possess photographs of their children should provide themselves with one of those extraordinary little instruments with that most extraordinary name, invented by Mr. Skaife, or else patiently wait until their little ones arrive at a really "taking" age. Strangely enough too, it happens that photographers who have children of their own very seldom indeed have photographs of them; no one likes the work, and it is put off from day to day with the usual result of such a proceeding.

The absolute hard work amateurs do, and call it amusement, is readily wonderful. Not for them is the handy youth to clean glasses, clear up the room-filter baths, wash bottles, or do the numberless little offices connected with photography—not for them is an assistant to sensitize paper, print, tone, fix, and wash—no, the whole work falls single-handed on the poor amateur, who simply consents to do all of it, and bear the expense of it too, for his love of the art, and all he asks in return is some reasonablenesses and consideration at the hands of his friends, and some encouragement for his efforts. To an amateur the most tedious part of photography is the printing and toning; and I firmly believe that visitors generally imagine that having obtained "the glass," as they call it, there is nothing more to be done. I have, however, lately found the printing so tedious, that I have given the negatives to their several owners, who have them printed by a professional printer, of course very much better than I could myself do for them.

Next, as to the satisfaction usually given by us amateurs to our sitters, I don't think we have much to complain of on that account; I find most of mine, at least, easily pleased; but the part that frequently surprises me is this. It happens with me, as also with several friends of mine, that having taken one negative, there is some *very* slight defect in it which induces me to take a second, which may be, turns out infinitely superior as an artistic picture: the two negatives are printed, and a proof of each submitted for selection; almost invariably the better one is rejected, whether it is as your secretary may inform you, that the second picture is too sharp, or from an absolute incapability of appreciating that which is better, I must leave to wiser heads than mine to determine. Recently, a professional photographer, with whom I am intimately acquainted, showed me some card pictures, with which he acknowledged he was very much dissatisfied—they were certainly not up to the standard of his productions, but after hesitating for some little time, he finally sent them home, expecting of course to hear complaints of them; but, much to his surprise, received in a day or two a very good order for impressions from the same negatives.

Usually people admire the *best* and *most artistic* portraits of *their friends*; but, strange to say, are not so critical with portraits of *themselves*; in fact, they sometimes, like Narcissus, fall in love with their own reflection, and with the usual blindness of that condition, fail to see most patent defects in the picture.

Some short time since, I was spending an evening with a friend, and photography forming the subject of conversation, a gentleman present said—"he certainly admired photography; but out of the great number of portraits he had seen, he had rarely met with one representing the face with a pleasing expression. Some appeared staring, others in pain, and but very few absolutely truthful;" and in furtherance of this (although to my mind a perfect refutation) he pointed out some really beautiful productions on the walls of the room.

One portrait, however, he admitted to have seen, nay to possess, which comprised all that *he* wished, which was indeed all a photographic portrait should be, viz., truthful to nature, pleasing in expression, and graceful and easy in pose; in fact, he said he happened to have it in his pocket. I naturally asked permission to see so great a gem, to admire and imitate, to beg, borrow, or steal it, so that I might call it mine, and thus have for my model this wonderful type of all that was perfect. He consented, and as in the schoolboy tale of the "Chamelion," he produced the card, and lo! it was himself; badly taken, and as badly printed, and as to truthfulness of expression, the man had hair of that colour which cannot be represented by photography, and carried on his face a most decided smirk. I could not restrain a smile, and coldly telling him I did not think much of it, he replaced it in his pocket, and did not speak to me again the remainder of the evening. Fortunately photography stands in no need of begging admiration; it has grown from a very small seed, is growing, and will, I feel sure, continue to do so while the world lasts, more especially while it receives the august patronage it has hitherto secured.

Gentlemen, I submit for your inspection a few photographs, the best that I can do: be merciful while you strike; remember, if you please, that I am only an amateur, compelled to work at odd times, and those frequently at some distance apart. The main object I had, however, in bringing them this evening was to show you the results produced by my old faithful friend Pyro, as a developer. It is said that this is the "iron" age, and that, I suppose, has something indirectly to do with the use of that metal as a reducing agent; but, irrespective of the double process necessary in its use, I have always found that I could do everything I desired with pyrogallic acid. The whole of the portraits now before you were taken in a glass-room, with the sitter facing due south, the slides being totally opaque, and the front admitting scarcely any light at all; and, without wishing to "bore" you, I will shortly tell you my mode of taking them. The lenses are Ross's, the bath 40 grs. to 1 oz., without any addition whatever. The collodion, Ponting's negative, and the developer $1\frac{1}{2}$ grs. Pyro to the oz.; the smallest quantity of glacial acetic acid, with which to ensure a clean picture, and a little alcohol to make it flow easily. Fix by pouring saturated solution of hypo on the plate, not by immersion. From this I seldom vary, save for experiment; and as I never intensify by adding silver to the developer, but produce my negatives by one (albeit prolonged) development, I do not think I shall resort to other means. Results surpassingly beautiful have been, and are produced, with iron, but the tendency with many manipulators is to produce hard negatives with violent contrasts. I find my way simple, and to me tolerably certain, and although it may be old fashioned, it answers my purpose in all that I wish. Too much light I find a decided objection with pyrogallic acid, and it is a matter of surprise with gentlemen who have visited me to find all my light received through the top only, and even that for the most part through stippled glass. I like to see the light fall on the sitter, so as to give a gloss to the hair—it looks to me natural and familiar, for in these days of Maccassar and pomades it is always visible, either by day or artificial light. I suppose, however, it is simply a question of taste, or, perhaps, with me, a very "questionable" taste. Although the aspect of my room is certainly not the best, on account of the sun, I am almost of opinion that it produces greater roundness of feature than any other, and should certainly choose the same aspect on building another.

Before I conclude I should like to draw the attention of photographers to the great advantage of the automatic washing system; many friends who have seen my arrangement have immediately constructed one with success, and have found on testing that, with the occasional use of a sponge, the prints have been perfectly washed. The contrivance is very simple and may be made by any gentleman at the expense of a few shillings, it will last for years and is not at all likely to get out of order. I have a diagram here which will perhaps explain to you its construction;

it is simply, as you will observe, an oval wooden tub with an orifice made some two inches from the top, through this is inserted a leaden pipe of about $\frac{3}{4}$-inch bore, which is then brought to the bottom of the tub through a false and perforated bottom of zinc, the portion of the pipe immediately in connection with the outside of the orifice is then bent into two elbows, taking care that the second is slightly below the first, it is then continued any length you please. Immediately the water rises above the first and higher elbow the syphon begins to work, and rapidly empties the tub from the bottom. The false bottom is only to prevent the prints being sucked up the pipe. I am aware there is nothing new in this, but it may have escaped the notice of many gentlemen, and I wish to bear my testimony to its advantages, as all that is necessary is to place it below the tap of a cistern, in such a manner that the influx may give a rotatory motion to the prints, with the projecting limb over a drain, and regulate the supply so that it shall emty itself, say three times in the hour.

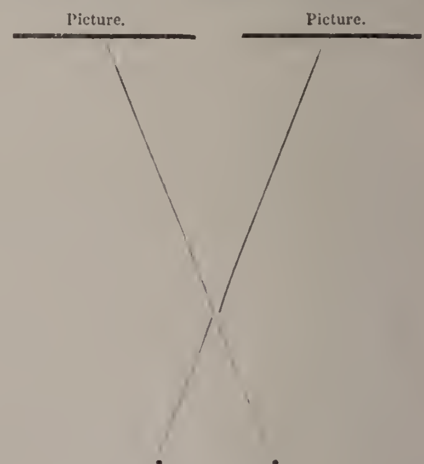
One word with respect to varnish, about which we have lately read so much. I have for a very long time used varnish prepared after a receipt of a very practical friend of mine. I can vouch for its usefulness, cheapness, and capability of standing any amount of sun-heat. Obtain from any colourman some best white hard carriage varnish, and dilute the same down with methylated alcohol. Warmth is necessary for its application, and the right proportions are soon ascertained after a few trials. Should it become cloudy on adding the alcohol, in a few days it will become absolutely limpid and may then be decanted, immediate filtration, however, having the same effect. Gentlemen, I thank you for your attention.

## ON THE STEREOSCOPIC PICTURE EXECUTED IN THE SIXTEENTH CENTURY BY JACOPO CHIMENTI.

BY SIR DAVID BREWSTER, K.H., F.R.S.

In 1859, when Dr. John Brown and his brother Dr. Alexander Crum Brown were visiting the Museum of Wica at Lille, their attention was called to two pictures of a man sitting upon a low stool, and holding in his left hand a pair of compasses, and in his right hand a line reaching the ground. These two pictures appeared to be exactly the same, as if the one had been copied from the other. They were each about *twelve* inches high and *eight and a half* broad, and were placed close to one another like the pictures in a stereoscopic slide. Dr. A. Crum Brown, on his return to England, sent me, through Principal Forbes, the following account of these two pictures, which I think was read in his presence at a former meeting of this Society.

"These two drawings," he says, "are by Jacopo Chimenti da Empoli, a painter of the Florentine school, who was born in 1554, and who died in 1640. They are drawings of the the same person from points of view slightly different. That on the right hand is from a point of view slightly to the left of that on the left hand. They are so exactly on the same scale, that by converging the optic axes I succeeded in uniting the two so as to produce *an image in relief*. They united so easily and completely, that I could not help




thinking that they had been drawn for the purpose of being looked at in that way. So far as I could judge, the difference between the pictures was greater than would be produced by a change of the position of a spectator equal to the distance between the two eyes; so that *the stereoscopic effect was somewhat exaggerated*. I think, if we had a photograph of the pictures it would be much easier to prove their stereoscopic character than merely by referring to them; and if the photographs were of such a size that they could be *transposed* and put in the stereoscope, any one could see it."

I had no sooner received this very interesting communication from Dr. Crum Brown, than I took measures for obtaining a photograph of this stereoscopic picture. I wrote to M. Delezenne, a corresponding Member of the Academy of Sciences, requesting him to have such a photograph executed at my expense. In reply to my letter, he told me that photographs were not permitted to be taken of the objects in the Museum, but that Mr. Bingham was engaged in taking photographs of them for the Prince Consort, who alone had received this privelege from the trustees of the Museum.

Upon receiving this information, I applied to the Prince Consort, through Sir Charles Phipps, for a copy of the photograph of the stereoscopic picture, and explaining the high interest which attached to it as a great fact in the history of binocular vision and the stereoscope. In answer to this application, I learned that though the Prince had not the slightest wish to confine these photographs to himself, yet His Royal Highness did not think that he had any power to give permission for additional copies to be taken, though he certainly had no objection to this being done.

When I received this letter, I was writing the article "Stereoscope" for the *Encyclopædia Britannica*, and I inserted in it the remarkable discovery made by Dr. Crum Brown. I had previously shown, in my "Treatise on the Stereoscope," that Galen had, 1500 years ago, proved that in looking at solid bodies the pictures given by each eye were dissimilar, and that with both eyes we saw these two pictures combined. In illustrating these views of Galen, Baptista Porta gives a figure, in which we not only see the principle of the stereoscope, but a virtual representation of the binocular slide by three circles, two of them indicating the right- and left-eye pictures, and the middle one the other two united by the eyes and producing the figure in relief which we actually see.

The work of Baptista Porta, containing this diagram, was published in 1593, and Jacopo Chimenti lived 47 years after its publication. It was therefore probable, as I stated, that in executing the stereoscopic picture Chimenti was illustrating the binocular diagram of the Neapolitan philosopher, and was the true inventor of the ocular stereoscope, that is, of the method of obtaining a solid representation of any object by uniting right- and left-eye pictures of it by converging the optic axes to a point nearer the observer than the pictures.

This was founded on the supposition that Chimenti's figures were truly stereoscopic; and as I knew that Dr. Crum Brown was thoroughly acquainted with the subject of binocular vision and the theory of the stereoscope, I had no doubt that he had seen a figure in perfect relief by uniting the two plane pictures of it.

Having failed in procuring a copy of these pictures, I had no means of testing the accuracy of Dr. Brown's experiment; but it appears that in June 1860, Mr. Wheatstone applied applied to Prof. Kuhlman, of Lille, and obtained from him a photograph of Chimenti's drawings. In the letter which accompanied it Prof. Kuhlmann states "that the copy has been taken of such a size as to be suitable for examination *in the stereoscope*," and he adds "that, at the first sight of it, and without the aid of any instrument, it would be seen that the two pictures were *not stereoscopic*."

The photograph, thus described, was accordingly placed in the stereoscope by Mr. Wheatstone and his friends in London, and they all found it *not to be stereoscopic*.

(*To be continued.*)

## Critical Notices.

TRAITE' POPULAIRE DE PHOTOGRAPHIE SUR COLLODION; contenant le procéde négatif et positif, le collodion sec, le stéréoscope, les epreuves positives sur papier, &c., Par D. Van Monckhoven. Paris: Leiber.

This is one of the best elementary works on photography which has yet reached our hands; popular, explicit, and complete; and above all illustrated with a series of engravings, numbering upwards of a hundred, which make clear to the uninitiated better than any amount of letterpress description, the exact character of the various manipulations to be effected.

We have delayed our notice of this excellent little work, which we received at the beginning the year, because at one time we contemplated translating and editing it for English readers, the author having kindly some months ago made application to us for that purpose. Although our own time did not permit us to undertake that duty, we have pleasure in informing our readers that it will shortly appear in an English dress, with the same copious illustrations. Messrs Horne and Thornthwaite will, we believe, publish it. We defer therefore a detailed notice for the English edition. We may add here that some original articles from M. Van Monckhoven's pen will appear in our pages shortly.

INSTANTANEOUS STEREOSCOPIC VIEWS, taken on Dr. Hill Norris's Dry Plates, by H. Sampson, Southport.

However much faith we may have in a process, we like to see tangible results. Descriptions may be very accurate, but they are always the results of other peoples' impressions. In relation to instantaneous pictures, this is especially true: when no further guide can be obtained than is supplied by a narrator's impressions, an instantaneous exposure may mean anything from a tenth of a second to one or more seconds, whilst the result which may be called a picture, is possibly nothing beyond a silhouette without detail. With results before us, there need be no mistake on the latter point, whilst as regards the former, some data is generally supplied by the amount of definition or blurring in moving figures.

We have before us something like a couple of dozen stereoscopic slides of marine views, with shipping and steamers at full speed, and street scenes, with moving figures. As the results of dry plates, they are truly marvellous, and we may state at the outset, without any derogation from their excellence, that whilst they are not equal to the best of Wilson's, England's, or Blanchard's pictures by the wet process, the majority of them equal and surpass much that is called instantaneous photography. The subjects chosen are very daring, and involve great contrasts: here a stormy sea, with shipping in the distance, with a boat landing through the surf in the immediate foreground. Here a view of the new iron pier at Southport, with a gay assemblage of not less than a hundred persons; and another "On the Shore" at Southport, with a motley crew of many scores of persons. It is somewhat singular that these views are best in which we should most readily have expected failure. The pier just referred to is one of the best exposed and best defined pictures in the series; clouds, water, figures, foreground, all being good. The scene on the shore is also very good, as are various street scenes in Liverpool. Most of the pictures have natural clouds. In some of the marine views there is under-exposure, and in some a want of instantaneity; but there is enough in all to prove that more may be done. We have no particulars as to the lens or aperture; but we are disposed to believe that something better might be effected. In the printing also, Mr. Sampson has scarcely done himself justice; the tones being too black and heavy for the subjects, a warmer tone would have relieved the appearance of under-exposure, which some of the pictures possess. On the whole, we are highly gratified by the series, as giving high promise of what may be done with instantaneous dry plates. We congratulate Dr. Hill Norris on the result, for whilst we have ourselves produced instantaneous pictures on his plates, and heard of others doing so, this is the first commercial series which we have seen issued.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting was held in the City of London College, Leadenhall Street, on the evening of Thursday, March 13th. Mr. G. Wharton Simpson in the chair.

The minutes of the previous meeting having been read, the following gentlemen were elected members of the society:—Messrs. C. T. Newcombe, T. Lloyd, T. Mills, S. Cawston, E. Buck, and F. Fitch.

The Secretary then read the address and regulations for exhibitors at the Crystal Palace, which appeared in our last.

Mr. Noel E. Fitch read a paper entitled "The Experiences of an Amateur in Portraiture," (see p. 127.) Mr. Fitch exhibited an exceedingly fine selection of his productions as an amateur in portraiture, the whole of which were distinguished by great softness and delicacy, and were much admired.

After some conversation on the specimens,

The Chairman called attention to the fact that notwithstanding the absence of all side-light in Mr. Fitch's room, which was only illuminated from the top, these pictures were full of half-tone, and free from heavy shadows under projecting features.

Mr. Sebastian Davis presumed that the sitter was effectually screened from direct vertical light by having the part immediately overhead darkened.

Mr. Fitch explained that he had two feet six inches dark at one end of the room; but that the sitter was placed flush with the front edge of the darkened part. A portion of the glass adjoining the darkened part was stippled. His usual exposure in a pretty good light, with a quarter plate lens, was about twenty seconds, using Ponting's collodion and pyrogallic acid development.

Mr. Davis remarked that he believed when Ponting's collodion was used, nothing was gained by iron development and intensifying.

Mr. Fitch said he occasionally used iron in dull weather, and he thought with advantage.

Mr. Howard wished to bear testimony to the excellence of the varnish Mr. Fitch had described. He had now used it for twelve months. He found it very easy to make and use, very hard, and free from tackiness, even in strong sunshine. It was a much better protective than any of the varnishes he had ever used without heat.

Mr. Wall said he had tried three different samples of varnish sold for protecting negatives, and found none of them good. He had recently tried that recommended by Mr. Fitch, and had found it perfectly satisfactory.

The Chairman said that the varnish mentioned by Mr. Fitch, known as white hard varnish, was a spirit varnish, made, he believed, with lac, copal, and sandarach. As a general principle, spirit varnishes requiring the aid of heat in application, afforded a better protection to the negative than any varnish which could be applied without heat. The latter class was apt to turn tacky in the heat of the sun; and the gums were generally more friable, so that the varnish was easily scratched and abraded.

Mr. Martin asked if Mr. Fitch used the same formula for the exquisite reproductions which were laid on the table.

Mr. Fitch used everything just the same, but he always placed the picture to be copied in full sunlight.

Mr. Cole asked Mr. Fitch with what the glass in his studio was stippled.

Mr. Fitch: With white lead and turpentine.

Mr. Cole asked if this had any advantage over ground glass.

Mr. Fitch said only that it was cheaper. It was apt to turn yellow, and also to scale off in winter. He had it done afresh, therefore, each spring.

Mr. Davis said that having a south aspect, he presumed all Mr. Fitch's practice was in the early part of the day.

Mr. Fitch said except in winter, when the sun was very low, the stippling shut out the light from that part of his room where he placed his sitter.

Mr. Howard remarked that whilst Mr. Fitch was an amateur he had all the appliances of a professional photographer. He also avoided the false economy of using bad materials, either in chemicals or apparatus. He thought it was wise in amateurs to take a lesson from professional photographers in this respect, who always found the best the cheapest.

Mr. Harman said in reference to the use of pyrogallic acid development, it was always better to avoid the addition of silver. He thought the length of exposure was longer with pyro than iron; and in portraiture that was a question of considerable importance in securing agreeable expressions.

The Chairman remarked that Mr. Fitch had stated that he used iron occasionally in dull weather; by which, of course, he implied that a less amount of exposure was necessary. There could be no doubt about the possibility of producing the softness and detail which characterised Mr. Fitch's pictures by means of pyrogallic development, provided sufficiently long exposure were given. The cause of pyrogallic acid negatives often having harsh contrasts arose simply from the practice of under-exposure. The great advantage of iron development consisted in the fact that it gave a softness and detail with a very much less exposure than was necessary with pyro development.

Mr. Fitch expressed a conviction that one cause why longer exposure was necessary with pyro development, was the custom of adding excess of acid. He did not adhere to any specific quantity; but always added as little as possible, just sufficient to prevent fogging.

Mr. Davis remarked that Mr. Fitch in giving a somewhat longer exposure than many professional photographers, used at the same time a much more subdued light, by which means it was comparatively easy to sit the longer time without discomfort. He had observed, moreover, that where pyrogallic acid development was used, a subdued light gave much softer pictures than a glaring light.

Mr. Fitch, in answer to a question, stated that he toned with gold prior to fixing. He first neutralized any free acid in the gold by adding carbonate of soda, and then adding a little acetate of soda, he was not particular as to the amount. He wished especially to call attention to the automatic washing trough which he used, and which he found very efficient. He gave his prints 24 hours' washing, during which time they were sponged three times, and finished with boiling water. The prints were generally washed two hours before toning, during which time they had four or five changes of water.

Mr. Harman was in the habit of washing prints before toning in three waters, for five, ten, and twenty minutes respectively. If the last water showed no milkiness, he thought that was sufficient.

Mr. Howard thought no matter what little troubles might have been found in the alkaline gold toning process, it had established its reputation for permanency. It had been in use upwards of three years, and it was an uncommon thing to see yellow fading proofs which had been subjected to its treatment.

After some further conversation, the subject dropped.

The Chairman then said in the absence of either Mr. Blanchard or Mr. Fry, the mover and seconder of the adjournment of the discussion on Mr. Davis's paper, he would call on Mr. Lane to open the question.

Mr. Farringdon Lane said he had but little to say on the subject. In his experience as an engineer, he had been struck with the fact that the manufacture of gun cotton for explosive purposes, was attended with as much or more uncertainty as its manufacture for photographic purposes. Two charges labelled as having each the same power would have entirely different effects. One would tear a rock to fragments, whilst the other would scarcely produce any result at all. One of the largest and most careful manufacturers had at the present time some hundreds of pounds of it sunk in the river, afraid to take it out of the water. If it were not for this uncertainty, it would be of immense service in tunnelling, as it gave off no sulphurous fumes as gunpowder did, which caused much loss of time, in preventing men from resuming work at once.

Mr. Harman asked if proper care were used in making the gun cotton.

Mr. Lane said he believed the greatest care was used. The firm had paid a very high price for the sole right to use it in this country.

The Chairman said he believed that it would be impossible to manufacture gun cotton, commercially, for blasting purposes, with the care which was necessary in producing it for photographic purposes. It could not for the latter purposes be made in large quantities with any success. From half an ounce to an ounce was the largest quantity which should be made at a time, if uniformity and excellence were desired.

Mr. Davis would not recommend amateurs to make more than the quantity he had recommended at one time. If a quantity were required, two lots might be going on together, but the greatest uniformity was obtained by operating on small quantities. If a large quantity were attempted, a minute or two might elapse between putting in the latter part of the cotton and the first, and a difference in character must be the result.

Some further conversation on the subject followed, in the course of which Mr. Davis explained that from a clerical error in his paper, the proportions had been mis-stated. He really used 4½ drachms of ether, and 3½ drachms of alcohol in each ounce of collodion, and in these he dissolved about 6½ grains of cotton, which was rather more than the proportion commonly used. He also showed some samples of collodion, one with the tough character made with strong acids, and another with the powdery character made with excess of water in the acids.

The Chairman pointed out a characteristic in the latter, which he stated would generally be found to be accompanied by intensity; he referred to the milky appearance. He had noticed that wherever the plain collodion was characterized by an opalescent or milky appearance, it indicated the presence of that tendency to form an organic compound with the silver, and give great intensity.

Mr. DAVIS had noticed the same characteristic, and probably the Chairman would remember that at the time Mr. Hardwich recommended his formula to the society, he (Mr. Davis) had stated that less water was desirable, both to prevent decomposition during manufacture, and for the quality of the results. Regarding the use of bromides, he thought that the quantity should be regulated by the quality of the pyroxyline. With the pyroxyline he recommended, about half a grain to the ounce was sufficient. With a pyroxyline giving greater intensity, more might be used, up perhaps to one grain.

Mr. HARMAN thought more bromide might be used with advantage where iron development was used, than with pyrogallic acid development.

Some consideration on the use of bromides alone followed, in which it was generally agreed that bromides alone gave much less sensitiveness than either iodide alone or a mixture of iodides and bromides.

Some conversation on the cause of streaks in the direction of the dip followed, in which Mr. Fitch remarked that it often occurred to him with pyrogallic acid development, but never with iron.

The usual votes of thanks terminated the proceedings.

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CHORLTON PHOTOGRAPHIC SOCIETY.*

THE ordinary meeting of this Society was held on the 13th ult., —Mr. W. Griffiths, Vice-President, in the chair.

The minutes of the previous meeting received confirmation, and a few items of the Society's private business were disposed of.

The CHAIRMAN in opening the discussion on dry collodion processes, detailed some experiments on simply washed and dried collodion plates, and said he thought that coating the sensitive film with albumen or any other substance was a step in the wrong direction, as such substances always had the effect of diminishing sensitiveness, independently of the extra amount of labour entailed in their preparation. His opinion was that their experiments ought to be directed to the addition of substances to the collodion itself: something had already been done in that way, and with sufficiently encouraging results. The perfection of a collodion film was that in which iodide of silver was intimately associated with another salt of silver, such as the nitrate, acetate, bromide, chloride, &c. It was a mistake to suppose that an organic substance *per se* increased the sensibility of iodide of silver. The effect produced by resin in collodion was simply mechanical. On dipping in the nitrate bath the resin (insoluble in water) became precipitated throughout the substance of the film in the state of a fine powder; and, in the act of that precipitation, each particle carried down with it a portion of nitrate of silver, which was retained with too much force to allow of its entire removal by the ordinary subsequent washing. Some kinds of collodion (without the addition of resin), simply washed and dried, would produce very good results, and in those cases it would be found upon investigation that a small portion of the pyroxyline composing them had, from the temperature or strength of the acids employed in its manufacture, been converted into a resinous substance, as proved by the later researches of Mr. Hardwich. These were the collodions generally preferred for dry processes, and to which the term "powdery" had been applied. Collodion of the opposite or horny character was believed by competent authorities to be without action on nitrate of silver. If *chemical action* was understood that was no doubt true; but the fact was patent to all that such a collodion simply washed and dried would produce pictures, though not always successful ones. In that case also its action must be referred to as mechanical only, retaining, though with less force, a small quantity of free nitrate of silver in its pores. Some might object to that as not possible after the thorough washing usually given to the plates; but any one might prove for himself the correctness of the statement, by stripping off the film from a glass, putting it into a test tube, with a little distilled water, and, after well boiling, filter, then test the clear liquid with a chloride, and distinct evidence would be obtained of the presence of silver. In fact he believed it to be more difficult to wash out every trace of free nitrate from a film of collodion *whilst attached to the glass*, than to remove it entirely from paper that had been dipped in it, and that would be found a matter of no small difficulty if simple washing in distilled water were resorted to. Assuming what he believed to be the fact, that iodide of silver was totally incapable of change under actinic influence without the presence, in immediate contact, of some other salt of silver, an explanation was at once afforded of many of the strange anomalies met with in working the various dry processes. Referring to iodide of silver, he said it was susceptible of change under light or not according to the manner of its formation. If it were produced by precipitation from a solution of the nitrate or other soluble salt of silver, and with excess of the silver salt, it would be darkened by light, but not so if the *precipitant* were in excess: and yet the two iodides were identically the same in their chemical constitution. The difference in their properties he accounted for in this way:—Every particle of iodide of silver precipitated from a solution in which nitrate of silver was in excess carried down with it a portion of the latter (for which it had, like most precipitates so formed, a kind of mechanical affinity); and however much it might be washed it would still retain sufficient to make it susceptible to actinic influence. The same thing occurred when iodide of potassium or other precipitant was in excess: a portion of *it* was in like manner carried down in mechanical combination, and from which it was almost impossible by washing to entirely free it. But iodide of potassium, not being a salt, like nitrate of silver, susceptible of change when exposed to light, the iodide of silver formed in that way did not darken on exposure; for it could not be expected that two stable iodides, whose affinities were both satisfied, should react on or decompose each other. The latter or insensitive iodide could be converted into the former or sensitive iodide by adding to it the smallest trace of nitrate of silver.

Mr. WARDLEY said it was generally understood that a powdery film was best adapted for dry work; nevertheless his experience led him to prefer a collodion that gave a slightly horny film. He could not say he had found powdery collodions more sensitive than such as he was in the habit of using, nor could he say the powdery kind had in his hands produced greater density of image.

Mr. HOOPER objected to the conclusions arrived at by Mr. Wardley. He had a firm preference for the so-called powdery film, and had long considered it quicker in the camera, or otherwise more sensitive to the developer, than the horny sort of film. He had never experienced any difficulty in obtaining a sufficient degree of density. The addition of resin to most collodions gave such a film as he had a partiality for in dry collodion work.

After some further discussion, the proceedings terminated.

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MANCHESTER PHOTOGRAPHIC SOCIETY.

AN ordinary monthly meeting of this society was held on Wednesday, the 5th inst., Mr. PARRY, Vice-President, in the chair.

Mr. KERSHAW presented six photographs for the society's portfolio. One of these was a copy of an engraving taken by Mr. Dallmeyer's triplet lens, and was nearly the size of the original. The margin was perfectly straight and square, and the definition in all parts was beautifully rendered.

The CHAIRMAN said that Mr. Sidebotham, who was unavoidably absent, had requested him to present a copy of the title-page of THE PHOTOGRAPHIC NEWS, very nearly the size of the original, and taken with one of Mr. Dallmeyer's triplet lenses by Mr. Wardley. This, as in the case of Mr. Kershaw's photographs, exhibited qualities rarely met with in full-sized copies.

The SECRETARY remarked that he could appreciate the difficulties of obtaining such copies as these, he having had some experience in that direction. Copies were easy enough, so long as a considerably reduced result was desired; but, when it was sought to obtain a negative approaching the original in size, then no lens but one of very superior capabilities would answer.

The CHAIRMAN said he had also been requested by Mr. Sidebotham to lay before the meeting a print he had received from Mr. Woodbury, of Batavia. The negative was taken in a stereoscopic camera with two lenses, and at two operations, so as to obtain a panoramic effect. It was quite impossible for the unassisted eye to detect the junction of the two exposures. So complete, indeed, was the union that it was considered there must be some error in the description, and that the whole had

* Our notices of the proceedings of provincial societies, when not received direct, are condensed from their official organ.

been exposed together. By the aid, however, of a powerful lens a faint line was discovered which showed there had been two exposures. He (the Chairman) had himself tried a similar thing, but with one lens. He first of all focussed for one part of the picture, then for the next after turning the camera upon its centre, making a mark to denote the point to which it was to return, after the first exposure, and he thus obtained a panoramic picture; but he had not taken the precaution to use a spirit level, and he therefore had one part of the picture higher than the other. His experiment, however, was sufficient to show that the thing could be done if the camera were arranged perfectly level.

Mr. Petschler suggested that the picture might be produced by causing the camera to turn upon a point coincident with the stop, if a single lens was used, or with a point midway between, if double lenses were employed. This he illustrated by a diagram upon the black board.

From information subsequent to the meeting, it appears that Mr. Woodbury used an ordinary binocular camera without any special arrangement. One-half of the picture was taken with one of these lenses, the other being closed, and then the other half with the second lens, the camera having been turned to a point previously registered. In focussing for the two exposures it is necessary to make the one picture slightly overlap the other, but this does not cause a line of demarcation, the light gradually softening from one image to the other.

[We may remark in connection with this subject, that some months ago Mr. Penny, of Cheltenham, sent us one of the finest prints we have ever seen from a tannin negative, which consisted of a panoramic picture produced at two operations with one stereoscopic lens, the camera being wheeled round so as to produce the right junction. It was only on the most minute examination that any appearance of a division or junction could be discovered, and the effect in the particular subject chosen was very good. It must not be forgotten, however, that the perspective is inevitably false, as the pictures must have two points of sight.—Ed. Photographic News.]

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris*, 19*th March*, 1862.

An instantaneous dry collodion is a so much coveted desideratum that the Marseilles Photographic Society, with a view of stimulating its production, have undertaken to offer a prize of 500 francs to whoever may succeed in producing it.

The satisfactory results that have already attended many efforts in this direction, induce the hope that the photographic art may be yet further enriched with improved agents and formulæ. The future of photography will be influenced in nothing more fertile in resources than by an instantaneous dry collodion.

Hitherto one of the indispensable conditions of the rapidity designated as *instantaneous* is the employment of a wet collodion. But how great the improvement, how important the advantages, if results as satisfactory and as sure can be obtained by the employment of dry collodion.

Desirous of contributing as much as possible within the sphere of its labours to the progress of the Art it endeavours to cultivate, the Photographic Society of Marseilles, at its meeting on the 31st January last, resolved to offer a prize, open to general competition, for the discovery of an instantaneous dry collodion; that is, of a collodion which, employed in the dry state, will admit of the operator obtaining a view during sunshine, of a street as full of motion as the Boulevard de Strasbourg, taken by MM. Ferrier and Soulier, which is to be taken as the standard of comparison.

The Abbé Laborde offers to the attention of chemists his proposed new chemical notation, the aim of which is to place the reactions they represent more clearly before the eye. He is fully aware of the great reserve that must be employed in attempting to modify a system now so generally adopted, but the changes he suggests are so trifling in appearance that they cannot disturb the operations of chemists, while they possess the advantage of imparting greater clearness to a great number of formulæ.

The alteration consists in writing the oxy-salts with both terms, not one after the other, but one over the other—the base below, the acid above. The following examples will show how many advantages this simple change offers.

1st. Suppose it be desired to express the mutual decomposition of two salts—sulphate of potassa and nitrate of barytes; according to the old method it will stand thus:—

$$KO, SO^3 + BaO, NO^5 = BaO, SO^3 + KO, NO^5.$$

In the new method it would stand as follows:—

$$\genfrac{}{}{0pt}{}{SO^3}{KO} + \genfrac{}{}{0pt}{}{NO^5}{BaO} = \genfrac{}{}{0pt}{}{SO^3}{BaO} + \genfrac{}{}{0pt}{}{NO^5.}{KO.}$$

a much more condensed formula, in which the eye, in following a diagonal, encounters more readily the acids and the bases which must unite together. It can also be guided by an arrow placed in the first member of the equation, and always directed from the acid to the base which will form the insoluble body, thus:—

$$\genfrac{}{}{0pt}{}{SO^3}{KO} \searrow \genfrac{}{}{0pt}{}{NO^5}{BaO}$$

From this example it will be seen that it is scarcely necessary to add the second member of the equation.

2nd. This way of representing the salts will render them easily recognizable in a formula at the first glance, and, moreover, will often permit of our adopting an arrangement which will place the nature of the binary compounds clearly before the eyes. Suppose it is desired to represent, first, the action of sulphuric acid upon carbonate of potassa; in putting the acid in the line of acids we shall have:—

$$\genfrac{}{}{0pt}{}{SO^3 + CO^2}{KO} = \genfrac{}{}{0pt}{}{SO^3 + CO^2.}{KO}$$

Second. The action of baryta upon sulphate of soda, by putting the baryta in the line of bases, we shall have:—

$$\genfrac{}{}{0pt}{}{SO^3}{BaO + NaO} = \genfrac{}{}{0pt}{}{SO^3}{BaO + NaO.}$$

The acids and the bases will occupy this place only in proportion as they are in presence of a salt and in the same member of the equation; besides, we put them on the mean line like all the compounds expressed by the ordinary notation; for example, sulphate of lead and sulphite of lead, heated together:—

$$\genfrac{}{}{0pt}{}{SO^3}{PbO} + PbS = QSO^2 + QPb.$$

Chemists are not agreed as to the manner of grouping the atoms in haloid salts; they will, therefore, be retained in the ordinary notation. As to the saline oxides, they will be represented like the oxy-salts:—

$$\genfrac{}{}{0pt}{}{Mn^2 O^3}{Mn} \quad \genfrac{}{}{0pt}{}{Fe^2 O^3}{Fe \ \ O} \ \&c.$$

Between the written expression $FeO, SO^3$, where we place the electro-negative body second, and the spoken expression, sulphate of iron, there is really a sort of contradiction, which disappears upon placing the two terms one above the other, for then there is neither first nor second.

The part water plays is not clearly indicated in the formulæ adopted, $KO + HO$, $SO^3 + HO$, to express hydrate of potassa, or hydrated sulphuric acid. As it is now recognized that water plays the part of an acid with potassa, and that of a base with sulphuric acid, the new formulæ, $\genfrac{}{}{0pt}{}{HO,}{KO} \genfrac{}{}{0pt}{}{SO^3,}{HO}$ will express it clearly.

3. A last example will exhibit many other advantages. Purposely selecting a very complex formula, that representing the action of bibasic phosphate of soda upon nitrate of silver:—

$$(NaO + HO)\ PhO^5 + 2\ (AgO, NO^5) =$$
$$= 2AgO, PhO^5 + NaO, NO^5 + HO, NO^5.$$

By the new formula we have:—

$$\genfrac{}{}{0pt}{}{PhO^5}{NaO, HO} + \genfrac{}{}{0pt}{}{NO^5}{AgO} = \genfrac{}{}{0pt}{}{PhO^5}{2AgO} + \genfrac{}{}{0pt}{}{NO^5}{NaO} + \genfrac{}{}{0pt}{}{NO^5.}{HO.}$$

The parentheses and the sign + are suppressed for the bibasic phosphate of soda, the formula of which is, nevertheless, much clearer and easier to read. The parentheses are also suppressed for the nitrate of silver, because the position of the figure 2 on the mean line allows it to be clearly seen that it multiplies both acid and base.

As to the phosphate of silver which comes afterwards, the 2 placed before AgO addresses itself evidently to the base, and without other artifice we perceive that it is not at the same time the co-efficient of the acid $PhO^5$.

These examples will suffice to show that many real advantages would be gained by adopting the change proposed, without at the same time incurring any inconvenience.

## MEALINESS IN TONING.

Sir,—If you will not think me troublesome, I would offer a few further remarks on the causes of mealiness in toning positive proofs. I believe I am correct in considering this disease of comparatively modern date; and amongst the various causes that have been stated as giving rise to it, I do not think any of your correspondents have suggested that it arises from a too free rise of *nitric acid* in the *sensitizing bath*. Recent experience brought this under my observation.

If chloride paper is floated on a bath containing excess of nitric acid, and exposed in diffused light, the action of the oxygen seems to be considerably retarded by the large amount of free acid present; and I believe similar results occur in a relative degree when a smaller amount is present. With acetic acid in this bath, it appears, according to my experience, that a larger amount of free acid present does not materially hinder reduction; and a moderate quantity, I consider, materially aids reduction, probably by the same means suggested in my last note on the action of acetate of soda—by parting with its hydrogen to the chlorine of the silver, and so acting as a reducing agent. Another proof within the general experience of photographers on the retarding influence of nitric acid, is the superior keeping qualities this acid imparts to prepared paper, which I take to be owing to the indisposition of the nitrogen to combine with further proportions of oxygen, so that the latter element acts but very slowly in its presence, unless an organic salt be also present. My conclusions are, that if acetic acid be used in the sensitizing bath, mealiness will not occur, and there will be no necessity for the use of acetate of soda in the after process; but I do not recommend a recurrence to the acetic acid, but rather the adoption of some other means to avoid the evil.—I am, sir, yours respectfully, E. E. L.

P.S.—I may add, that a strong silver bath acidified with acetic acid produces the same violet tints in the proof as when acetate of soda is used. I have some proofs, given me about three years back, in which very beautiful violet tones existed. They have all deteriorated, although kept in a portfolio, and the lights have become yellow. They were evidently toned with an alkaline bath, as the lights were very perfect when I first received them. Probably the best remedy will be to adopt the ammonia nitrate for use with albumen paper. I have tried it years back with little success; but as it appears that it can be used, I shall renew my efforts in that direction.

## ORGANIC SALTS IN COLLODION.

Dear Sir,—The introduction of a salt with an organic base into the collodion, for example, the acetate of morphine, increases the sensitiveness 6 or 8 times, I have instantaneous stereo negatives taken a month ago, possessing excellent detail; it produces the natural clouds *without instantaneous* exposure. I have taken negatives six weeks ago with 10 seconds exposure, including full detail in foreground combined with the natural clouds. thus landscapes of large dimensions can be obtained on calm days, possessing truly magnificent effects.

The muriate of morphine in the collodion, or nitrate of morphine in the bath, confers on the excited and washed plate, the property of retaining unimpaired its sensitiveness and complete negative developing qualities, and the bath is uninjured. My advertisements some weeks ago in the News, were for the application of this property, and I confess that I was disappointed in enquiries for my new bath, for I only got one application for it, and that gentleman has sent me an unqualified testimonial in its favour. As I see in the *British Journal of Photography*, that M. Jacquemet is on the road to my discovery (to my great loss), I have made my secrets known to show with certainty my prior claim to the above discoveries, I am, dear sir, yours respectfully,

Wm. Bartholomew.

(I have enclosed some experimental prints.)

[The prints enclosed satisfactorily illustrate our correspondents statements. We rather fancy, however, that some of our photographic *quidnunes* will tell him that salts with organic bases have been added to the collodion and bath before. Dr. Diamond has, for instance, added the arsenite of quinine. We are not aware, however, that these salts have ever been tried in connection with the dry processes. We are not by any means sure whether the re-examination of old experiments in the light of our present knowledge may not turn out one of the most valuable directions of research which can be undertaken.—Ed.]

## ACETATES IN TONING.

Dear Sir,—I have been experimenting lately with different acetates as a preliminary bath to toning. I give the preference to that of lead, placing the print from the frame in a bath of

| | |
|---|---|
| Plumbi acetatis ... ... ... | 2 drms. |
| Aqua distil. ... ... ... | 6 oz. |

for ten minutes; slightly rinse, and tone as usual, after which, replace in lead bath for a few minutes. This will cause all the gold on the print to precipitate, and greatly improve the tone. I may also say that this bath does not bleach much, nor does the print redden so much in the fixing. Should you think this worth place in your columns, you may insert it.—I remain, yours respectfully,

A. L. Henderson.

P.S.—An equal quantity of acetate of soda and lead may be used with equal success.

# Photographic Notes and Queries.

### Washed Collodion Plates.

Sir,—In consequence of your soliciting communications on plain dry collodion, I beg to forward you the enclosed for your inspection and comments. They were all done last summer, and are on plain glass.

No. 1, is by the tannin process unwashed; No. 2, by tannin process washed; No. 3, washed with water, and afterwards with solution of pyrogallic acid; No. 4, on washed collodion only. They were all prepared the same evening, exposed exactly the same time, one after the other, in the middle of the day, under a strong negative, by the wet process, and all developed in the same manner during the afternoon.

The stereoscopic slide is on washed collodion and on plain glass, and was printed by superposition on negative on washed collodion. The negative was almost my first experiment, and was not developed so strongly as it might have been. One picture you will perceive is better than the other, which was always the case with my lenses.

The collodion was made by myself, and worked well either by the wet or dry process.

Is there no photographer who can reproduce the cartoons of Raffaelle the original size as transparencies, back them with the necessary colours, and exhibit them in the forthcoming Exhibition, to show their adaptability for introduction into churches, &c., and give the art a lift in the estimation of the public at the same time?—Yours truly, Rheb Rd.

N.B.—The washed-collodion plates were exposed in the camera for one minute for open view; close dark subjects would require from one to three minutes: but these exposures would, of course, depend upon lenses, stops, &c.

[The specimens which accompanied this letter are highly satisfactory. No. 1, the tannin process proper has produced a rich brown, slightly foxy, just the tint given by burnt sienna. No. 2, the tannin process washed, possesses the pleasantest tone for a transparency, being of a deep chocolate tint. No. 3, washed with water and then with pyrogallic, is not a bad tone, being somewhat of a smoke colour. No. 4, simply-washed collodion, is rather cold and grey. We fear your suggestion regarding the cartoons could not be well carried out.—Ed.]

TRANSPARENT SPOTS IN DRY PLATES.

DEAR SIR,—I have been experimenting during the last two or three months on dry collodion, without preservative, with variable success; I have simply washed the plate and dried, at other times washed and chlorided, and sometimes covered with a solution of gallic acid; but through all these modifications and changes there has been one evil common, and that has been the occurrence of spots of *transparency*, or *insensitiveness*, sometimes being totally transparent, other times partly so, and in size from ½-inch diameter to a pin hole. I have used two different samples of collodion, and washed both under the tap and in trays with like results. Three weeks ago I prepared six plates, two I exposed on the fourth day, which were entirely free from this and all other faults; No. 3 I exposed on the sixteenth day after preparation, 4, 5, 6 on the seventeenth day, and all of the last four contained them more or less, these plates were washed in three changes of water in trays, and then steeped in a bath of common salt, and then washed again under the tap. I have had them in plates exposed shortly after preparation.

If you or any of the correspondents of the NEWS could suggest a cure or remedy for this evil, it would greatly oblige,

M. P. E. C.

[Can any of our readers suggest the cause and remedy of this trouble ?—Ed.]

## Talk in the Studio.

MR. BEDFORD AT THE PYRAMIDS.—We notice that Mr. Bedford is attempting instantaneous effects in his eastern tour with the Prince of Wales. The *Times* correspondent describing the visit of the royal party to the Pyramids states that the cavalcade was successfully photographed by Mr. Bedford before its return to Cairo.

STEALING NITRATE OF SILVER &c.—A plate cleaner named Williams employed by the London Stereoscopic Company was recently charged before the Lord Mayor with robbing his employers. The prosecutor, Mr. George S. Nottage, managing partner of the Company said: the prisoner had been in their service since September last. A few days ago, from information they received, they were led to believe he had been robbing them. He was called from his work and questioned on the subject, when he confessed to have stolen 13 ounces of nitrate of silver, or, he added, it might be more, belonging to them. The value of it was about 2*l*, 12s., at the ordinary retail price of 4s. an ounce. He also admitted he had robbed them of four valuable lenses, pledging them afterwards at so many different places, and giving at each a false name and address. They were worth from 12s. to 21s. apiece, but he had pawned them for a few shillings scarcely a tithe of their value. He likewise confessed to several minor thefts of chemicals used in photography. Mr. Nottage said, in reply to the Lord Mayor, their business was of a character requiring from them a certain amount of confidence in the persons about them who were always intrusted with considerable quantities of valuable chemicals. They had received a character for honesty and good conduct with the prisoner from a photographer at Woolwich, in whose service he had been, and who had since admitted he gave it with the knowledge that the prisoner had robbed him on one occasion.

MEALY PRINTS.—A correspondent says that until recently he did not know what a mealy print was; when one day, finding his exciting bath neutral, he added a few drops of acetic acid, and the next batch of prints were all mealy.

## To Correspondents.

OMEGA.—The "dirty deposit" thrown down by iron from your alkaline gold toning bath is metallic gold in fine powder. Add nitro-muriatic acid, and make it into chloride of gold in the usual way.

J. C. L.—Albumenized paper will gradually deteriorate with keeping, especially if kept in a damp place. 2. The toning bath of acetate of soda and gold may be kept a few days, and should always be kept 24 hours before using. 3. A back ground for full length standing figures, such as *cartes de visite*, should be about 6 ft. wide, and, if possible, 8 ft. high.

EGRORG YEVRAH.—Thanks for your note, which shall be inserted. The tones of the enclosed prints are both good; the warm tone is perhaps the richest, but the other would be best for general purposes.

A BEGINNER.—We cannot recommend the lenses of any especial maker in this column. The maker you name does not stand high. See our advertising columns, and if you can afford it, try a lens from one of the best English makers. Those which you describe appear to be very slow. 2. A bromo-iodized collodion may be bought ready iodized with advantage.

M. A. O., (Helensburgh.)—The Stereoscopic Exchange Club was merged some months ago into the Photographic Exchange Club, with new rules and regulations. The rules are printed in the PHOTOGRAPHIC NEWS for Oct. 18, 1861 (p. 492, vol. v.), and in the PHOTOGRAPHIC NEWS ALMANAC for this year. Your specimens would doubtless be accepted by the Committee; the figures are very good indeed. Ladies are admitted with pleasure to the privileges of the Exchange. 2 The formula for arrowroot paper was given in the PHOTOGRAPHIC NEWS, No. 105, and in the PHOTOGRAPHIC NEWS ALMANAC for 1861. 3. The iodizing solution which has become yellow may be used without disadvantage.

MC. ALLAN.—You will probably find it difficult to obtain another quarter plate lens of exactly the same focus, unless it is by an English maker. For street scenes a portrait combination would probably be better than the single lenses. When we recommended three inches as the distance between the lenses, we meant from centre to centre; not that amount between the inside edges of each lens. We cannot give you the recipe of the marine glue. It is generally sold at tool shops. Equal parts of resin, bees-wax, and pounded tiles, make a good cement for glass. The cause you mention may possibly produce mealiness.

J. M. S.—There is a slight tendency to mealiness in the print forwarded; but its chief fault, and the cause of the "dirtiness" of which you speak is want of brilliancy in the negative. The effect is suggestive of the negative having been produced in a very dull diffused light. The advantage of yellow glass over yellow paper or yellow calico arises from the tendency of the latter to fade; and although they may be cheaply renewed, that does not quite meet the difficulty. The fading is a gradual process, and long before the colour may be sufficiently gone to arouse attention to the necessity of a renewal, sufficient white light may get into the dark room to render it difficult to produce brilliant negatives with iron development.

T. FISHER.—To recover the gold remaining in alkaline toning baths, add protosulphate of iron until the whole is precipitated in a dark powder, which is metallic gold. See answer to OMEGA.

T. M. B.—The address of Mr Hawke is 53N, Union Street, Stonehouse, Devon.

WM. VAUGHAN.—Mealiness consists in a very fine irregular mottling, of reddish brown and slate coloured spots. Your print is brilliant and entirely free from it. The defect is more common with these portrait negatives than with more brilliant landscape negatives. An even expanse of middle tint, like a plain back-ground, generally shows it most.

TYRO.—We do not conceive that there can be any objection to the name of subject and photographer being placed neatly on the front of each specimen for the South London Exhibition. That at the back is for the guidance of the committee in cataloguing.

JOHN HAWKE wishes to inform a photographer at Knaresborough, who wrote to him, that he has mislaid his letter, and desires him to write again.

AN AMATEUR.—There need be no danger of fogging in using a shifting front with portrait lens on your binocular camera. Be careful that the division between the two halves of the camera is properly light tight.

R. J. E.—We do not remember that any researches have been undertaken in the direction you name. We shall be glad to hear more from you on the subject.

J. D. SANDERS VAN LOO.—We shall have pleasure in inserting your letter in our next.

S. W.—An article on enlarging appears in the PHOTOGRAPHIC NEWS ALMANAC for 1862. We will endeavour to write to you soon.

WM. TUCKER.—We are much obliged by your communication and interesting photographs. We shall have pleasure in receiving the MSS. you name, and to hear from you at all times.

E. H.—Your card pictures are not well lighted, and are deficient in half tones. That of the pony held by a groom is very good. Some of your pictures might be passed by the referees of the Exchange Club, but they are scarcely sufficiently good for the Exhibition at the Crystal Palace.

A. B. B.—It is very difficult to give any trustworthy advice as to the arrangement of any especial glass house, from merely a written description of the position and circumstances. The exercise of judgment on the spot is much more valuable. In the case you describe, so far as we can see, it will be wise to have glass on each side of the roof, and one side as far below the roof as you conveniently can.

BANDON.—See remarks above. In your case, so far as we can see, it will be wise to glaze the whole of the roof, except four or five feet immediately over the head of the sitter. Your plan seems good. You can stop out the western sun towards evening by means of blinds. White sheet glass admits the most actinic light, but is apt to sweat unless very good. We hope shortly to have some articles on glass rooms; but we can then only deal with general principles, not individual cases.

ENQUIRER.—The statement was an error, arising out of some kind of misunderstanding. Mr. Wilson has not given up the use of the triple lens for landscapes, as he states that he cannot get any single view lens to include nearly so much subject as the triple. His instantaneous and other views, including wide angle, are 7 in. by 4½ in., and are taken in the same camera he uses for stereoscopic work.

MASON v. HEATH.—We have received a long letter on this case from Mr. Mason, too late for insertion this week. We think the public interest in the subject is fully satisfied; but on the principle *audi alterem partem*, we shall insert it next week. Before doing so we shall, however, reduce it to reasonable bounds, by making some elisions of mere epithet, and giving simply statements.

W. LARCHIN, W. NURSE, B. JONES, A. MELHUISH, A NOVICE, GOLD, FOCUS, A. B., and several other correspondents, together with several articles in type, are compelled to stand over until our next.

THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 186.—March 28, 1862.

## COPYRIGHT IN PHOTOGRAPHS.

From a report givcu on another page of the proceedings in the House of Commons on Thursday evening week, it will be seen that the Bill for Amendment of the Law of Copyright in works of Fine Art is progressing much more rapidly than it did last session, aud will iu all prabability soou pass into law. This Bill, as our readers know, affords full protection to photographs, classing them in the same category as paintings and drawings, and will, if it pass in its present form, at once set at rest the question of piracy. All probability of evading the enactments of the Bill, or of involving protracted litigation are carefully provided for, as any person who shall without the consent of the owner "repeat, copy, colourably imitate, or otherwise multiply for sale, hire, exhibition or distribution," or shall cause this to be done, or shall import any such imitation or copy, or shall offer such copies for sale, shall forfeit to the proprietors of the copy £10 for each offence, and "all such repetitious, copies, and imitations, and all negatives of photographs, and other things which shall be exclusively applicable for obtaiuing such copies, shall be forfeited to the proprietor of the copyright, who shall forthwith destroy the same." The penalties are to be recoverable by summary proceedings before two justices of the peace.

Perhaps it was only to be expected—when the determined opposition on the part of art authorities to the recognition of photography as a fine art is remembered—that some hostility to the protection of photographs in such a Bill, should be manifested. Accordingly, we find Mr. Harvey Lewis objectiug that it would be "dangerous" to include photographs in the Bill. "Photography was not a fine art; but a mechanical process," he observes, but he thinks it might be "expedient" to give protection to photographs at some future period. Whether this objection be one which the honourable gentleman himself honestly entertains, or whether he has been "coached" by some narrow section of the artistic fraternity, we cannot congratulate him on the felicity with which he puts the case. In what sense it can be "dangerous" to protect photographs at present, or what is the danger apprehended, we cannot conceive; nor is it at all clear why it should be "expedient" to give protection to photographs at some future period, instead of both just and expedient to do so at once.

The Solicitor General very wisely waived the discussion of the question as to whether photographs were works of art in a technical sense, but insisted on their claim to protection on the ground that time, ability, and money, were expended in their production. This is a position we have always maintained. Whilst in no sense surrendering the claim of photography as a fine art, we do not in any sense grouud its sole claim to protection upon its art character. As a mere work of industry, it surely possesses a right to protection. All paintings or drawings are not works of art; but this fact does not in any way militate against their right to protection. The claim to protection against piracy in either books, paintings, or photographs is based upou the fact that skill and capital of some kind are necessary to produce them. The exact nature of the skill employed, it is altogether unnecessary, for the purpose in question, to determine. It may be creative power, or manipulative skill. The author of a guide book is not deprived of the copyright in his work because it is not a volume of poetry; nor should it be necessary to establish the position of photography as high art, in order to obtain for it the protection due to skill and enterprize.

The suggestion of Mr. Pope Hennessey that photographic portraits should be excluded from the Bill is based upon such an inconsequent reason, that we can only conclude that the honourable gentlemau did not know of what he was speaking. Because a less amount of capital and enterprize, it is implied, than is necessary for the production of some kind of photographs, is requisite here, therefore the amount of skill and capital that are necessary, should not be protected at all; and the more so, because it would be hard to prevent the public from obtaining copies of portraits. Mr. Hennessey surely cannot need to be told that the existence of a copyright would uot prevent the public from obtaining portraits of public men; but would simply secure to each photographer the right to supply the public with his own works; and secure to the public, photographs of reasonably good quality, in the place of the flat, fading, mealy abominations which are now pirated aud foisted on the public as originals.

We believe it is impossible to urge one tenable argument upon which the propriety of excluding photographs from the Bill can be justified; but we are by no means sure, uuless those interested in the question see that proper evidence is laid before the Committee, and that some effort is made to give strength to the promoters of the Bill, that the efforts to exclude photographs from the protection to be enacted may not be successful.

## CHIMENTI'S PICTURES.

We have been favoured by the courtesy of Dr. Carpenter, Registrar of the University of London, with an opportunity of inspecting the photographs taken from Chimenti's pictures in the Museum at Lille, which form the subject of Sir David Brewster's recent communication to the Photographic Society of Scotland. We have no wish whatever, personally, to enter into the coutroversy which that communication renews; but as with the majority of photographers the point upon which the whole question rests—the stereoscopic character of the said drawings—must depend upon the value of testimony, we feel bound to lay the results of our own examination before our readers. Sir David Brewster states that the evidence of Professor Wheatstone and his friends is of little value, because they are interested parties. As Sir David's evidence must unquestionably stand in the same category as that of Professor Wheatstone and his friends, and for like reasons possess like value, independent testimony is of more importance.

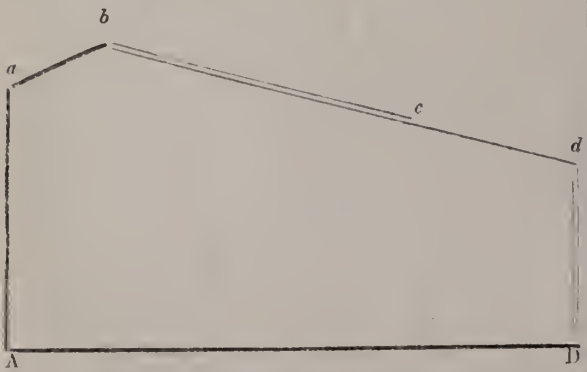
We have the facility of combining stereoscopic pictures without the stereoscope, and we have examined these pictures carefully with the aid of that instrument and without it. We have examined them in their original position by converging the optic axes so as to see the left picture with the right eye and *vice versâ*; and we have examiued them transposed, in the same manner. In the stereoscope we have inspected them both transposed and otherwise. The result of each method of examination is to lead us to the unhesitating conviction that on the one hand they were not drawn with any knowledge of stereoscopic principles, or any view to stereoscopic effect, or ou the other hand they are a complete failure. In no case is anything like an approximation to perfect stereoscopic relief produced; but in every mode of combining the pictures certain parts possess some amount of relief, whilst other parts remain flat or are pseudoscopic, presenting a generally confused effect. The result is just what might be anticipated by placing side by side any picture and a carefully drawn duplicate; the slight differences which must inevitably occur would give rise to a similarly confused effect of relief and intaglio. The action of the figure is such as would have been favourable for the production of marked stereoscopic effect; but the relief under the most favourable conditions is far inferior to that of some very simple geometrical diagrams, with which, as being drawn by hand and affording legitimate means of comparison, we have contrasted them. In truth the monoscopic relief of each single picture appears little, if any, inferior to the effect of both when combined in the stereoscope.

The pictures are in most respect facsimiles; but a closer inspection at once leads us to the conviction that one is an artist's drawing and the other a clever copy by a somewhat mechanical hand. In the drawing the first there is freedom, ease, expression, and general character, which indicate the hand of the artist; whilst in the other there is faithful copying, but a loss of character and expression; the dimensions of the copy are, moreover, slightly greater every way than those of the original.

We confine our observations strictly to the effect of the pictures before us, and do not enter into other evidence against their stereoscopic character, such as that afforded by the relation to each other of the originals, which, it is stated, require the convergence of the optic axes in a manner which, to nine persons out of ten, is impossible. We hope shortly to lay before our readers some extracts bearing, on the subject, from Dr. Carpenter's recent lecture on the stereoscope at the London Institution.

## GLASS ROOMS WITH TOP LIGHT.

Every photographer is familiar with the heavy opaque shadows under the eye-brows, nose, lips, and chin, which are produced when the sitter is illuminated with vertical light only. Yet it not unfrequently happens, especially in large towns, that a skylight is the only available means of lighting the studio, which is often so blocked in on every hand that a side light is impossible. Such persons will read with considerable interest the report of the last meeting of the South London Photographic Society, at which Mr. Fitch, an amateur of considerable ability, exhibited a series of very exquisite portraits produced in a room lighted wholly from the top, without any side light whatever. The pictures were free from any trace of the evils usually attendant upon vertical lighting: there were no black, heavy shadows under projecting features, no dirty-looking neck, nor any prematurely grey hair; all was delicate, soft, and natural. On further inquiry, it was found, however, that whilst the light was only admitted through the roof, no vertical light was permitted to fall on the sitter. The top light was cut off, the only direct light reaching the model falling at considerable angle, and producing a most satisfactory effect. In order to make the matter clearer than the report of the meeting may possibly render it, we subjoin a diagram of the room, as described by Mr. Fitch.



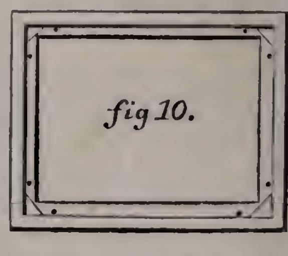

In order that the amount of light may be understood at a glance, we may remark again, that there is no side light at all, and that in the diagram the black lines represent entire absence of glass, the double thin lines represent stippled glass, and the simple thin line clear glass. The length of the room from A to D is twenty-two feet; the height at *b* twelve feet, and at *d* seven feet. From *a* to *b* is three feet, which is quite opaque; from *b* to *d* is all glass; but two-thirds of this, from *b* to *c*, are rendered semi-opaque by stippling with white lead and turpentine. The end D *d* is also rendered semi-opaque in the same manner. The only direct light which obtains admission is through about seven or eight feet of clear glass, *c* to *d*. As the aspect is direct south this will generally be very powerful. The background occupying the end of the room A *a*, the sitter being placed underneath *b*, is illuminated with a soft diffused light over head, and by a direct light at a considerable angle passing through the clear glass at *c d*. It will readily be seen that under such circumstances the direct light is nearly equivalent to a side light, and that the lower the end of the room, and more slanting the roof, the more the light will partake of this character.

Although we cannot quite go so far as Mr. Fitch, and say that with the choice of position we should build a room of this character, ignoring side light proper, there can be no doubt about its answering the purpose exceedingly well; and we may add, that it is very nearly in principle the form of the glass room used by one of our first, if not *the* first, metropolitan professional portraitist.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

Field Cameras.—*The plate-slide* (continued).—As dry plates do not run the same risk of fouling themselves by contact with wood as wet plates, which are covered with liquid nitrate of silver, some of the precautions recommended for the interior of the wet slide may be dispensed with. The interior of the cell should be thoroughly well varnished with a good dead black to exclude moisture, and also to keep the vapours of the essential oils in the wood from the plate. I find it is advantageous to prevent the plate from actually touching the cell, because in doing so it is apt to grind off little particles of the varnish, which, flying about the interior, settle upon the sensitive surface, and cause spots and pinholes. For this purpose, the inside corners of the slide should be furnished with wires, the same as in the wet slide, and two metal pins should be driven into each side at the edge of the cell for the glass to rest against (fig. 10).




By this means the plate is held perfectly insulated from the wood, both in front and at the sides, and the back also is only in contact with the metal spring which secures it in the proper position. Electro-plated copper wire is suitable for this purpose.

Dry plates of necessity undergo much handling in the course of preparation, and, notwithstanding the greatest care, the edges are liable to become contaminated with organic matter or other impurities, either from the fingers, or from their own drainings upon the filtering paper while drying; or from other causes. It is prudent, therefore, to let the front

* Continued from page 135.

of the slide project slightly over the plate to protect the edges from the light (fig. 10), as without the aid of light these slight impurities seldom produce stains under the action of the developer. I strongly recommend the adoption of this precaution as an important protection against stains upon dry plates. Many plate-slides are made in this manner, but the generality, I think, expose the whole plate to light. For a small camera, $\frac{1}{8}$th of an inch all round is sufficient, but for large plates which are more handled, and drain in larger quantities, I should advise $\frac{1}{4}$ inch all round.

The sliding shutter by which the plate is uncovered is a very important part of the plateholder, especially for out-of-door photography; and I do not think we have yet hit upon any form that, when applied to the field cameras, is quite satisfactory in all respects. The principal considerations that should affect its design are—its capability of excluding all light from the plate, excepting from the front, when it is raised; and the action of the wind upon it while a picture is being taken. The forms of shutter mostly used are those which open upwards, and lie upon the top of the camera; those which open downwards, and remain at right angles to the axis of the camera; those which open sideways, and remain stretched out at right angles to the axis of the camera; and finally, those which open sideways and folding forwards lie parallel to and against the side of the camera. I believe the first of these, which is the one most commonly used, is the best, though I am inclined to hope that we shall ultimately attain one which more completely fulfils the necessary conditions.

I do not think there is any danger of light getting improperly on to the plate with any one of the forms of shutter I have named, if carefully made; but they all of them offer the inconvenience of being considerably affected, when open, by a very small amount of wind. Those which fold down and lie against the instrument, of course, less than the others. Still, from their thinness, which gives them a certain amount of spring, even these catch every little breeze, and create a vibration which is communicated to the whole camera, and tends to destroy the sharpness of the image. My practice, to avoid this as much as possible, is, when I have raised the slide, and before I uncover the lens, to put a stone or other weight upon the shutter to keep it steady; but I should be glad if we had a shutter with which such a contrivance was unnecessary. Those shutters which do not fold down, but stand out stiff, of course are yet more easily caught by the wind, and as they are generally slight, and flexible to a certain degree, they chatter and vibrate considerably, and often very detrimentally. I speak on this point from experience, having had a camera, the slide of which opened in this manner, and I had to contrive a stay to keep it steady whenever there was the least movement in the air.

In some of the early Daguerreotype cameras, the shutters opened inwards by means of a spring or other contrivance. This method was abandoned in the idea, I believe, that the opening in this manner raised a dust in the interior, and for a long time none have been so made. I am inclined to think the plan was too lightly abandoned without a sufficient trial. If dust was the only objection, the remedy lay in the photographer's own power; he had only to keep his camera clean. A shutter opening inwards would of course be perfectly light tight, and would not in any way be affected by the wind. Such a shutter could not be adapted to many of the present designs of camera, which pack up into a small compass.

Every double back should be numbered in plain figures, one corresponding to each plate; and it will be found a convenience if a small ivory plate be let into each shutter, or some other part upon which the photographer can make in pencil a memorandum of the view taken upon the plate, recording the time of exposure, &c., which he may copy into his diary at home.

Before closing these "remarks" upon the subject of cameras, at the risk of repeating myself, I would strongly advise photographers, when they select an instrument for general field work, to let their choice be biassed less by the price, the size, the weight, or prettiness of any particular form than by its efficiency to produce good pictures with as few openings for failure as possible. Let portability and convenience be attained by ingenuity and mechanical skill, but never by the sacrifice of any necessary quality. If the price has to be studied, let cheapness be gained by moderating the ambition to a simple form, without any complication of details beyond what is strictly necessary, and to a limited number of duplicate parts.

*(To be continued.)*

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Sulphides of Arsenic.*—Passing over several metallic sulphides which possess no interest to the photographer we come to those compounds, which, owing to their colour, are used in painting. Arsenic forms several compounds with sulphur, the most important being the bi-sulphide, the ter-sulphide, and the penta-sulphide of arsenic, composed respectively of one atom of arsenic with two, three, and five atoms of sulphur.

*Bi-sulphide of Arsenic*, known also by the names of *red sulphide of arsenic, realgar, sandarach*, and *ruby arsenic*, is of frequent occurrence in nature; it is also prepared artificially by fusing arsenic with a higher sulphide. It is of an aurora-red colour inclining to brown, when in mass, and yields an orange yellow powder, which becomes red-brown whenever it is heated. It fuses easily, and is not decomposed when heated out of contact with air, volatilizing unchanged at a temperature much below a red heat. Heated in the air it burns with a blue flame, forming sulphurous and arsenious acid. Heated with nitre it deflagrates with production of a vivid light. Several brilliant pyrotechnic mixtures employed in night photography are based upon this property. The *Indian white-fire* is produced by the combustion of a mixture of 24 parts of nitre, with 7 of sulphur, and 2 of realgar. The signal light employed by the English Government is very similar to this, with the exception that a higher sulphide of arsenic is used. It is prepared by mixing nitre 7 lbs., sulphur 1 lb. 12 ozs., orpiment 8 ozs. This is said to be the best white fire known. It must be carefully borne in mind whilst experimenting with these compositions in which a poisonous metal plays so important a part, that the products of the combustion must on no account be allowed to escape into a room, but must pass to a chimney having a good draught.

*Tersulphide of Arsenic*, known also by the names of *yellow sulphide of arsenic*, and *orpiment*, is also found native. It may be prepared articially by precipitating an acid solution of arsenious acid with sulphuretted hydrogen, and also by fusing the red sulphide of arsenic with sulphur. There is a so-called orpiment prepared on the large scale by subliming arsenious acid with a small quantity of suphur. According to Guibourt this is a mixture of 6 per cent. sulphide of arsenic with 94 of arsenious acid; the latter may be extracted with boiling water. This preparation is much more poisonous than the true tersulphide, although the latter is a dangerous poison. The colour of powdered orpiment in the native state is lemon yellow; that of the artificial variety has an orange yellow colour, and turns brown whenever it is heated. It fuses easily and volatilises unchanged if access of air be prevented. The use of orpiment in the preparation of white fire has been already alluded to.

*Pentasulphide of Arsenic* is formed by decomposing arsenic acid by sulpuretted hydrogen. It is a lemon yellow powder lighter than orpiment, and without any tinge of red. It fuses less easily than sulphur, and after fusion appears darker and somewhat reddish.

Besides these definite compounds of sulphur and arsenic there are others which need not be particularly referred to here, as they are of no special interest to the photographer.

One fact connected with these bodies may, however, be worth remembering, and that is that most of the sulphur of commerce contains arsenic, in the form of per-sulphide. Arsenious acid may be fused with any excess whatever of sulphur; sulphurous acid is evolved, and a brownish yellow sulphide of arsenic formed, which, on cooling after fusion, remains soft for a long time; its powder is yellow, the brightness of the colour increasing with the quantity of arsenic. On distilling a compound of this nature, sulphur passes over, accompanied by a continually increasing quantity of arsenic, much of the ordinary sulphur of commerce is really a compound of this nature.

The sulphides of arsenic are of considerable value as pigments, owing to the brilliancy of their colour and their inalterability under unfavourable atmospheric agencies; being already saturated with sulphur, sulphuretted hydrogen can have no further action on them.

*Sulphides of Antimony.*—Like arsenic, antimony forms several compounds with sulphur, the principal being the ter- and the penta-sulphide. The *ter-sulphide of antimony* exists in two distinct modifications, the crystallized, and amorphous condition. The first is of a leaden grey colour and is the common ore antimony, it possesses but little special interest. We may, however, mention that it is used in some photogenic compositions to replace sulphide of arsenic; a good white fire may thus be made by mixing together 7 parts of nitre, 2 parts of sulphur, 1 part of the native grey sulphide of antimony, and 1 part of red lead.

*Amorphous Tersulphide of Antimony*, known also by the name of *mineral kermes*, is prepared on the large scale from the grey sulphide by a tedious process of solution in caustic or carbonated alkali, and precipitation. It is of a red colour, and is used in medicine, and also as a pigment.

*Penta-sulphide of Antimony.*—This is of a bright yellow colour, and is prepared on the large scale in several ways: either by precipitating antimonic acid in solution by sulphuretted hydrogen, or by boiling the grey sulphide with caustic alkali, and sulphur, and then precipitating by an acid.

Antimony also forms compounds with both sulphur and oxygen, called oxy-sulphides. These are of yellow or orange colours, and are sometimes, but rarely, used as pigments. Further allusions to them is unnecessary.

*Sulphide of Zinc* is produced by acting on a soluble compound of zinc with a weak acid, by sulphuretted hydrogen; a white powder is precipitated, which is the sulphide of zinc. When heated it loses combined water, and becomes of a pale yellowish colour. This compound is formed when zinc-white is exposed to an atmosphere which is contaminated with sulphuretted hydrogen. Being of the same colour as the original pigment this gas has no apparent effect on it; hence the advantage of using zinc-white, instead of white lead in painting: the latter body, as is but too well known, readily tarnishing in a sulphuretted atmosphere to a brown surface, owing to the dark colour of its sulphide. Sulphide of zinc is found native in transparent pale yellow crystals. It then goes by the name of *blende*.

*Sulphide of Cadmium.*—This is one of the most important of the metallic sulphides. It is formed by igniting oxide of cadmium with sulphur, or by precipitating a solution of a cadmium salt with sulphuretted hydrogen, or an alkaline sulphide. It is also found native. The native sulphide is of a honey yellow colour, semi-transparent when in mass, and yields an orange yellow or brick red powder, which becomes carmine red when it is heated. The artificial sulphide in the precipitated state is an orange yellow powder, which when heated to redness becomes first brownish, and then carmine red. As a pigment this sulphide is of considerable value, owing to its brilliant yellow colour, and its entire permanency in an impure atmosphere. It is usually prepared by precipitation, and its colour may be slightly varied by alterations of temperature, and employing solutions of different strengths, as well as by certain subsequent treatment which the sulphide undergoes. These details are mostly trade secrets, each manufacturer employing a slightly different process which experience has taught him to be best.

*Bisulphide of Tin.*—The only compound of tin and sulphur which is of interest to the photographer is the bisulphide of tin, known also under the name of *aurum musivum*, or *mosaic gold*. It is prepared in several ways, one of the most successful being to mix together 5 parts of protosulphide of tin, and 8 parts of corrosive sublimate. The mixture being placed in a loosely closed flask, and heated in a sand bath. A gentle heat is applied for some hours, and afterwards the heat is raised, but not quite to redness. The greater part of the mosaic gold is found at the bottom of the vessel; the smaller but purer and finer portion sublimes to the upper part of the flask. It forms gold coloured, translucent, delicate scales, or six-sided laminæ, unctuous to the touch. It is largely used in the fine arts: it does not tarnish in the air.

## APPLICATION OF PHOTOGRAPHY.

### DOVE'S NEW PHOTOMETRIC PROCESS.

A new photometric process is proposed by Professor Dove. It is extremely sensitive, and may be applied to objects which are strongly or feebly luminous, uniformly or unequally coloured, transparent or opaque. It enables the experimentalist to measure the luminous power of optical instruments, and moreover it possesses the advantage of requiring the use only of a microscope, an instrument in the possession of every physicist and naturalist.

It is well known that there are certain objects, such for instance as the *epidermis* of the *ephemera*, which viewed in the microscope appear dark upon a light ground when they are lighted from beneath, but are, on the contrary, light on a dark ground when we cover up the mirror. This is especially the case with micro-photographs. Upon lighting them from below, they show black lines upon a white ground: when the mirror is covered they appear in white lines upon a dark ground. From this it is evident, that the lines will disappear when the light falling from above, and that coming from below, are both of the same degree of intensity, or rather, have a certain determinate relation of intensity to each other when they fell under different angles. If a Nichols' polarizing prism be fixed upon the object bearer, and if the ordinary eye-piece be replaced by a Nichols' analysing prism, on turning the lathe properly, we shall again see the lines disappear. Starting from this position, the least rotary movement of the eye-piece causes the outlines which had appeared before as black, to reappear in white, which is a proof of the sensitiveness of the experiment. We also recognise that, if everything being in the position where the figures disappear, we interpose in the path of the light coming from below, a plate of glass slightly ground on the surface, the figures immediately appear light upon a dark ground, while the contrary takes place if the plate of glass is placed in the path of the light coming from above.

To compare the lights, it is evident that if the methods employed which necessitate a weakening of the more intense lights to give it an equality with the feeblest, contain an exact means of measuring the degree of weakening, we shall be able to arrive at the relation of intensities under the same conditions.

In new microscopes, the illuminating mirror can be made to move laterally by a double angular movement, and besides, the instrument can be made to pass from the vertical position through every degree of inclination to the horizontal.

To weaken the light we can employ the following means.

1st. Diminish the aperture of the object bearer. To this end we take a small rule, a slide pierced with circular holes the diameter of which diminishes as they proceed from the object bearer, and these diameters must be accurately measured.

2nd. Remove the luminous source from the object bearer. We measure the distance by means of a scale the zero of which, in the horizontal position, is the centre of the photographic image fixed upon the object bearer.

3rd. The increase of the acting luminous surface, on being inclined more and more in relation to the aperture which represents the vertical projection, the microscope being horizontal: and for the photographic image to receive parallel rays only, we must adapt a tube blackened internally to the aperture.

To measure the extent of the luminous surface, it will be sufficient to know its inclination in regard to the axis of the microscope either by placing the surface in the centre of the horizontal circle or by fixing a mirror on this surface, and examining a distant scale by means of a lens in this mirror. The same process may be applied to measure the angle of incidence if we study the intensity of the reflected light under various degrees of incidence.

If the source of light be too feeble, it may be strengthened. To this end in the vertical position of the microscope we replace the illuminating mirror by a concave mirror, and in the horizontal by a lens, if the parallelism of the incident rays be necessary, we must place the source in the focus of the lens.

M. Dove has applied his method in numerous researches. First, to the absorbing power of coloured glasses according to their thickness; we lighten the photographic proof above, by diffused daylight below, by the light reflected from the mirror, then we place the coloured glasses upon the object-bearer, modifying their thickness until there is compensation. To modify the thickness we take glasses cut with elongated corners. To study how the transmission diminishes when the thickness augments, we establish the compensation upon the greatest thickness, then by means of a shutter, modify the aperture of the object bearer for the least thickness. We can apply this method also to liquids by placing them in tubes.

We can compare diffused light by opaque bodies. In placing under the object-bearer of the horizontal microscope a sheet of white paper lighted by diffused daylight, we can regulate the upper lighting so as to produce a black image upon a white ground; by inclining the paper, the ground will become more and more brilliant. By replacing the white paper by a black sheet, or by a surface covered with lamp-black, the images appear white upon a dark ground under every inclination. It is just the reverse with coloured surfaces: in the horizontal position the images are luminous upon a dark ground; they disappear under a certain inclination, and the latter continuing to increase they reappear dark upon a luminous ground. This affords a ready means of determining which of the two coloured surfaces sends the most light: we place the one under the object bearer and incline it until the image disappears: the second is then established under the same inclination, and this latter is more lighted or darker, according as the image appears black or white: care must be taken to remove all light coming laterally.

(*To be continued.*)

## ON THE STEREOSCOPIC PICTURE EXECUTED IN THE SIXTEENTH CENTURY BY JACOPO CHIMENTI.*

BY SIR DAVID BREWSTER, K.H., F.R.S.

Copies of the photograph were also sent to Paris with the same result, as will be seen from the following extract from the *British Journal of Photography* for August 1860:—

"It will, doubtless, be in the recollection of our readers that lately an intimation was thrown out by Sir David Brewster relative to the supposed antiquity of the knowledge of stereoscopic principles, the supposition arising from the fact that an artist, named Jacopo Chimenti, who lived in the 16th century, had executed a pair of pictures, which are at present preserved in the Museum at Lille, and which, it was alleged, on being viewed in such a manner as to allow each eye to see only one of the designs, presented a stereoscopic effect. It is very unfortunate that when an announcement of any supposed fact is once made, and subsequently proved to be erroneous, it is almost impossible to correct the false impression as thoroughly as is desirable, because there must always exist many persons who read the assertion but not the contradiction, while those who see the contradiction without the previous erroneous statement can play but a very unimportant part in its rectification. Under these circumstances we consider it to be advisable to draw special attention to a paragraph in the letter of our Paris correspondent, M. Ernest Lacan, which was published in our last number, and from which we learn that, in order to settle the question satisfactorily, our countryman, Mr. Bingham, who is a resident in Paris, took photographic copies of the alleged pair of stereographs, and laid them before the members of the French Photographic Society at the July meeting.

"When placed in the stereoscope, the two pictures united perfectly, but did not present the smallest effect of relief.

"We think it is fair, therefore, to presume that, whatever may have been the object proposed by the artist in executing the two similar pictures, it was certainly not from any knowledge of the stereoscopic phenomenon, and that Sir David Brewster was in this instance wrong in his conjecture. It is but right to add that Sir David had not had ocular demonstration of the alleged fact when he threw out the suggestion."

The following is the letter of M. Ernest Lacan, the editor of *La Lumière*, above referred to:—

"The letter in which Sir David Brewster spoke of the two drawings of Chimenti existing in the Lille Museum, and presenting, according to the illustrious savant, the stereoscopic relief, has been reprinted in the *Lumière* and other special journals. We were all asking whether the invention which so greatly honours Wheatstone and Brewster really dated from the 16th century. Mr. Bingham, who has just returned from Lille, conceived the happy idea of reproducing the two designs in question, to offer them to the French Photographic Society. We all examined them with care, but no one detected in them the slightest difference. They appeared to all perfectly identical. In the stereoscope they are superposed, but without any effect of relief. For the present, then, we must be permitted to doubt that they were intended for the application Sir David attributes to them."

Upon authorities so high, Dr. Brown's observations of the stereoscopic effect of the pictures was pronounced incorrect; and though I was utterly ignorant of the existence of the photograph in England, excepting in the collection of the Prince Consort, and had never either seen it or heard of it, I have been charged by Mr. Wheatstone's friends with *dishonesty* in not having retracted the opinion which I had merely published, not as my own, but on the authority of Dr. Brown, who alone was bound to retract it, if erroneous.

This charge, and others equally false and groundless, have been publicly urged against me by Dr. W. B. Carpenter, F.R.S., Registrar to the University of London, and that, too, in language so malignant and libellous, that I shall probably be advised by my friends to seek redress in a Court of Law.

In reply to such a charge, I had no other defence than that I had not only never seen the photographs in question, but had never heard, directly nor indirectly, any other opinion about them than that of a competent judge who found them to be stereoscopic; and I added that as the evidence of Mr. Wheatstone and his friends, who were interested parties, was comparatively of little value, *I still believed that the pictures were truly stereoscopic.*

* Concluded from p. 138.

The paper on which this opinion was printed was hardly dry from the press, when I received, through the kindness of Professor Kuhlmann, the photograph which had excited so much interest, and which I now submit to the inspection of the Society. As in all stereoscopic pictures, it is difficult by a casual inspection of them to perceive any difference between the right- and left-eye picture, when they are taken at the proper angle; but when they are combined by converging the optic axes to a point between the pictures and the eye, as done by Dr. Brown, *their stereoscopic character is instantly seen.* As very few persons, however, are able to unite the pictures in this way, I had a copy of them taken by Mr. Moffat, and the pictures transposed, in order to be viewed in the stereoscope. This photograph, with the pictures transposed, is now before the Society; and I have no doubt that every person that looks at it in the stereoscope will see the figure in relief, though it is more distinct when seen by the convergency of the optic axes, as Chimenti of course intended it to be seen. As the photograph now before us has been reduced to about *one-fourth* of the original, the stereoscopic relief observed by Dr. Brown in the Museum at Lille must have been more distinct than in a reduced copy taken photographically.

It is hardly necessary to observe that a stereoscopic picture executed by the hand must be very imperfect compared with those obtained by the binocular camera. The artist fixes only certain points in his copy of the original drawing, and joins these points as skilfully as he can; but if the original is stippled, or drawn only in points, and if, with his compasses, he places these points, in his twin copy, at the proper binocular distances from the same points on the original, which may be easily calculated, the stereoscopic relief will be as perfect as if the two pictures had been taken in the binocular camera. I hope to be able to show such a stereoscopic picture to the Society, and also copies of Chimenti's drawings of the same size as the original, and with all the lines, points, and shades more distinctly separated than they can possibly be in the best reduced photograph.

Some of those persons who have not seen the stereoscopic effect of Chimenti's drawings, in consequence of *not knowing how to see it*, have been surprised at finding two perfectly similar drawings, as they believed them to be, placed side by side, and have been led to conjecture that one of them may have been a copy by a pupil of the Florentine artist. Both the figures, however, bear the name of Chimenti; and, as we have seen, the one is as essentially different from the other as the binocular views of a solid statue.

## PHOTOGRAPHY AT THE POLYTECHNIC INSTITUTION.

The Polytechnic Institution is one of the oldest favourites with the public as a place combining instruction and amusement, and has, moreover, many associations connected with photography. Recently, it has acquired a distinctive characteristic in the prominence which it gives to photographic illustration. By the aid of the magic lantern, or dissolving view apparatus on a very large scale, photographic transparencies receive the utmost possible effect. The series of photographs which are now exciting considerable attention consist of a selection from Mr. England's stereoscopic views of American scenery, published by the London Stereoscopic Company. These pictures, illuminated by the oxy-hydrogen lime light, are thrown on an immense screen, the disk covering seven hundred superficial feet, and notwithstanding this immense amplification, produce a very fine effect. The only faults we have to notice consist in a little hardness in some, and a little coldness in the tone in others.

First on the list is the Broadway, New York, an instantaneous view, giving a very good idea of that busy thoroughfare, and reminding us vividly of the day we first stood there. West Point, on the Hudson River, with its military academy, is a fine picturesque view, as is also the view of Sleepy-Hollow, rendered so famous by the legends of Washington Irving. Here we have the veritable spot where the "Headless Man," to the no small terror of the inhabitants of this dreamy region, performed his nocturnal excursions. Passing up the Hudson, we find ourselves amongst the Catskill Mountains, where Rip Van Winkle slept and dreamed. Some of the scenery here is very grand, and like the Hartz Mountains, fit dwelling place of elf and gnome. Here are the Catskill Falls, a deep gorge, with a cascade descending some hundreds of feet, dashing from rock to rock in wild confusion and turbulent beauty.

The chief attractions of this series are the superb views of Niagara. The falls in summer, with warm glowing atmosphere, soft and sunny, and in winter, when the spray is frozen into myriads of sparkling diamonds; whilst around are icicles of enormous size, hanging from the rocks, and reaching almost to the foot of the falls. The panorama from Prospect Point shows the American and Horse-shoe Falls, the figures in the foreground suggesting the vastness of the scene. This is a charming photograph, full of softness and atmosphere. The Lover's Walk, Niagara, is a well chosen view, with fine perspective, very sunny effect. Passing down the Niagara River, we get a representation of the longest suspension bridge in the world. The detail of this fairy-like structure is very fine. Here also we have the crowning work of Stephenson—the Victoria Bridge, Montreal. The St. Lawrence at Quebec, with its thousand ships, riding peacefully at anchor on the broad bosom of this mighty river, is another excellent view.

The Falls of Montmorenci, a cataract near Quebec, of two hundred feet in height, is a fine and telling picture. An ice cavern is amazingly effective and beautiful. Long icicles depending several feet from the roof glitter in dazzling rays of wondrous splendour, such subjects illustrating pre-eminently the excellence of photographic delineation.

The undoubted success of these transparencies is due as much to their photographic excellence as to the interest of the subjects. We are glad to believe that photographs must ere long largely, if not entirely, supersede the gaudy and unreal paintings which have hitherto formed the staple of views for the magic lantern.

## THE PICTURE GALLERY IN THE EXHIBITION OF 1862.*

The following description of the principles upon which the picture gallery, and we presume the photographic gallery, will be built and lighted will interest our readers:—

The chief desideratum of a picture gallery is an equally distributed light throughout, admitted in such a way as will prevent its rays being chiefly directly reflected from the surface of the picture to the eye of the visitor. A light, therefore, satisfying this condition, when the observer is standing at a convenient distance, is the only one which can be called perfect.

No one can have observed pictures lighted by ordinary windows without experiencing the unpleasant effect produced by the improper reflection of the rays, or glitter from the pictures, as it is called. It is for this reason that one is often puzzled where to find a place from which to see the whole of a large picture to advantage. This defect exists in many of the finest galleries, both in this country and on the Continent, and the result is that some pictures can scarcely be seen at all, while others can only be observed from one or two points, which are always more or less crowded, according to the merits of the subject.

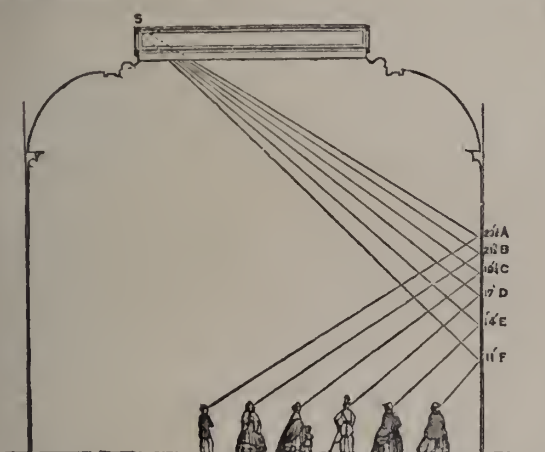
This is obviated by admitting the light at a particular angle from the roof, by means of a skylight extending along its entire length, and which in the present case measures 31 feet in width, that is, 15′ 6″ from the ridge on either side. The entire width of the opening, measured on a horizontal plane, is 29′ 2″. As will be seen by reference to the section, each room is 50 feet wide, and at a height of 32′ 9″, a cove, springing from a cornice on either side, reaches the height of the tie-bar of the principals (42′ 10″ above the floor), 12′ 4″ from the wall, thus leaving a space 25′ 4″ between the coves. In this space a transparent calico ceiling (hereafter to be replaced by ground glass) is introduced, which, however, is raised 2′ 4″ above the highest point of the cove, or 45′ 7″ from the floor. The space

* Lecture by Captain Philpotts at the Society of Arts.

between the highest point of the cove and the eave of the calico is occupied by louvres for ventilation.

These proportions will afford the gallery as much light as possible, and glitter from the surface of the pictures will be avoided. As regards the quantity of light admitted, it may be briefly stated that the opening for admission is exactly half the floor area of the gallery, the former being 25 feet wide, the latter 50. In dealing with the quantity of light, another important point must not be lost sight of, namely, the height of the opening from the floor and its consequent distance from the picture. In this gallery this is reduced to a minimum consistency with the avoidance of glitter, being only 45′ 7″ from the floor.

The following illustration will explain the question of glitter, or reflection of light, from the varnish of pictures:—Supposing a mirror to be hung against the entire surface of the wall. It will be seen, by referring to the diagram, that a ray of light from the skylight, at its extremity furthest from either wall, striking that wall at A, at a height of 23′ 3″ above the floor will, will be reflected so as to reach the eye, at E, of a beholder (say 5′ 3″ above the floor) standing 5′ on the other side of the centre of the room, or 30 feet from the mirror, and consequently all the rays striking below that point will fall below his eye, or, in other words, he will not be able to see the image of the skylight in the mirror at any point below 23′ 3″ from the floor, and, as a matter of course, there will be no glitter on the wall, or on pictures hung against it, below that point. Consequently to see pictures without glitter hung higher up, it will be necessary for the spectator to retire still further from the centre of the gallery.




Transverse Section of Picture Gallery, showing the way of admitting the the light to avoid glitter.

It will be seen from the diagram that this point, which is called the glitter point, alters with the position of the beholder. For instance, E, 5 feet from the wall, the glitter point is at F, 11 feet from the floor, while in coming closer it will descend in proportion. On the other hand, by receding to a distance of 10 feet, the wall may be seen without glitter to a height of 14 feet. Looking again to the same diagram, it will be seen that, apart from all considerations of reflection, a person desiring to see a picture at a height of 14 feet, would naturally retire 10 feet if not more from it, and the same may be said of the other heights and positions shown on the sectional diagram, so that in any position in which a person can conveniently examine a picture, he may be sure of having its surface free from glitter.

This system of lighting increases the difficulty of successfully treating the exterior of the building, for it prevents any windows being placed in the upper part of the side walls, but after the very successful application of these principles of lighting to picture galleries which have been constructed within the last few years at South Kensington, it was wisely determined to forego all other considerations, and apply the same principles to the rooms destined to receive the choicest works of art of the present age.

On ascending the stairs, the visitor enters a vestibule of similar proportions to the one below, from which he obtains one unbroken vista throughout the whole extent of the main gallery, and it is difficult to conceive a finer effect than that produced by contemplating the noble proportions of the rooms before him.

Entering the first on either side, he will find himself in a spacious hall, 325 feet long, 50 feet wide, and 43 feet high. Passing through this, he will enter one of the wing towers, which forms a room 52 feet by 45 feet, and 66 feet high; he will then enter another room 75 feet long, and of the same width and height as the first, from which he will pass into the end tower, whence he will have an uninterrupted view of the whole main gallery.

The interior decorations of these rooms will be very simple, and may be briefly described as a plain cove extending to each side of the skylight, and resting on a moulded cornice.

Arrangements for thorough ventilation, so essential to the preservation of the pictures and comfort of the visitors, are amply provided for, by admitting fresh air through apertures along the floor level, and allowing the vitiated air to escape through louvres in the skylight.

Descending to the ground floor, the same sized rooms are repeated, but as they are lighted by means of ordinary windows they will probably be devoted to other objects than those coming under the head of fine arts. The part of the picture gallery which will revert to the Society of Arts is the central hall, and the two large rooms, 325 feet long, on either side of it.

Before concluding this description of the Picture Gallery, its constructive details will be interesting. The foundations throughout are carried down to the gravel, here from 6 to 12 feet below the surface of the ground, in concrete, on which ordinary brick footings are laid. In the front wall the piers carrying the semi-circular arches are 12 feet wide, by 3′ 2″ thick, and the intervening panel having merely its own weight to support, is only 9″ work. The back wall is of rather a different construction. This is a plain wall from top to bottom, with numerous arches through it on the ground-floor; it is built for the most part hollow, with piers so placed that the weight of the floor and roof will come on them. This system of hollow walling gives the greatest strength with the least amount of material, and secures a straight face at either side. The floor of the picture gallery has been constructed of great strength, so as to bear with perfect safety the greatest load which can be brought on it. It is carried on girders 13½ by 12, resting on the side walls and intermediately supported by two cast-iron columns. These girders cross the building at central intervals of 12½ feet, and over them are laid joists 11 in. by 2½ in., two feet apart, to carry the floor-boards. A portion of this floor has been proved to 140 lbs. to the foot, which exceeds the greatest load it can have to bear when densely crowded with visitors. The walls in the picture gallery are lined throughout with wood, which is kept at a short distance from the brickwork, so as to guard against damp.

## DR. DRAPER'S INSTANTANEOUS DRY PROCESS.

An *Instantaneous* Dry Process is a startling announcement. It is of such tremendous import that there is danger of losing, for the moment, that calm philosophical temper which is so needful in the judgment upon momentous facts.

A dry process which can compete with the wet process in time of exposure, and desirable artistic effects must prevail. It would permit a division of labour which is the grand desideratum of economy in all the arts which are extensively practised. We may some day have photographic galleries when there shall be no occasion for the inconveniences of a silver bath, or collodion. When dry plates can be used for portraiture, their manufacture will become a totally distinct branch of business.

The new dry process is clearly given, and any one concerned may test its value by the actual trial. Dr. Henry Draper's exposition before the Society was satisfactory enough as far it went, but nice comparative experiments seem not yet to have been made. Let a dry and wet plate be exposed at the same time in the same light; let a dry plate be exposed and cut in half, one moiety to be developed in the usual way, and the other using hot water, &c. We have not had opportunity to make any trials ourself, since the meeting, but with Col. Pike we were shown the process by Dr. Draper. The doctor exposed a sixth dry plate, which had been prepared about fifteen months since by Col. Pike, in a Voigtlander quarter camera about one second. On development the plate proved to have been fully exposed. The exposure was upon the open street, in front of the University, with full aperture of lens, but the air was thick with a heavy snow storm. The experiment was satisfactory, but not decisive as to exact utility of the process. Before our next issue we shall probably have data enough upon which to found an ultimate judgment.

At the Society no rationale of the process was attempted; sufficient facts are perhaps not yet established on which to base one. We believe it is Dr. Draper's opinion that the heat and the water continue and exalt the first action of the light. We incline to think, however, that the hot water acts only mechanically, only in enabling the developer to penetrate more promptly; the action of the light is fully completed at the exposure, and that the density of the film may have little or no modification of the amount or nature of this action; but the density of the film has everything to do with the facility and extent of development. On our theory the development may take place just as well after the hot water treatment, when the plate is cold, and an iron developer may be used. This theory is a mere suggestion, and we leave it to stand or fall by the force of facts to be found out.—*American Journal of Photography.*

## COPYRIGHT (WORKS OF ART) BILL.

On Thursday, March 20th, the House of Commons went into Committee on this Bill.

The Solicitor-General stated that he had prepared some amendments with the view of giving effect to suggestions made by hon. members on former occasions.

Mr. C. Bentinck asked for some explanations with respect to the copyright in the copy of a picture, which it was proposed to give by this Bill. He was also anxious to know whether his hon. and learned friend (the Solicitor-General) was prepared with a clause providing for registration at Stationers'-hall, or some place else, in order that title in respect to copyright may be ascertained.

Mr. White directed the attention of the Solicitor-General to the necessity of providing, by some clause, that publishers of prints should put their names and the date of publication on those prints. For the last 10 years publishers had been much in the habit of publishing engravings without any name or date.

The Solicitor-General said it was intended to include in the Bill copies of original paintings, because any man knew that copies might be made under circumstances that would render the copying of those copies as injurious to the owner as if they were original works. As to the question of registration, it had occurred to him that that subject might be brought forward, and he had prepared two clauses providing for a registration of copyright. These he would bring up at the proper time. As to the point referred to by the hon. member for Brighton, they all knew that a practice existed among engravers of selling what were called "proofs before letters," which were without any name. He believed that every person who did that exposed himself to a great danger of losing his copyright. The case was provided for under an existing Act.

Mr. Henley put the case of an artist selling a picture, and retaining no copyright in that picture. If the artist afterwards made a duplicate original how would matters stand. They all knew that those things were often reproduced in that way, and it was difficult to determine between copies and duplicate originals. How was the second picture to stand? was there to be a copyright in it or not? He wished the hon. and learned gentleman would let all the questions under this Bill be decided by a court of record.

The Solicitor-General would consider before the bringing up of the report whether words should not be inserted to the effect that an original work being sold without copyright, no subsequent copy or repetition of the same work should be entitled to copyright.

Sir M. Ridley was glad that a system of registration was to be established. Such a system was absolutely necessary for the security of property.

Mr. H. Lewis thought it would be dangerous at present to include photographs in a Bill of this kind. Photography was not a fine art, but a mechanical process. At some future period it might be expedient to give protection to photographers.

The Solicitor-General remarked that, although, strictly and technically speaking, a photograph was not in one sense to be treated as a work of fine art, yet very considerable expense was frequently incurred in obtaining good photographs. Persons had gone to foreign countries—to the Crimea, Syria, and Egypt—for the purpose of obtaining a valuable series of photographs, and had thus entailed upon themselves a large expeniture of time, labour, and money. Was it just that the moment they returned home other persons should be allowed, by obtaining negatives from their positives, to enrich themselves at their expense? He could not consent to exclude photographs from the Bill.

Mr. Hennessy suggested that, at all events, photographic portraits should be excluded A visit to the Holy Land was not necessary for taking the portrait of the hon. and learned gentleman, and yet it would be hard to prevent the public from obtaining a copy of his likeness.

Mr. Henley inquired what was meant by "every offender shall forfeit to the persons aggrieved;" was it the man who painted, or who purchased the picture, or both?

The Solicitor-General said the words in practice sufficiently explained themselves. The person aggrieved would be the artist whose name was fraudulently used, the person on whom the fabricated work was fraudulently palmed off, or it might be both.

Mr. Henley then asked the right hon. gentleman whether he would consent to strike out those clauses giving summary jurisdiction to magistrates. It was hardly fair to throw upon them the decision of the questions which were to be determined not by reference to any Act of Parliament, but simply upon opinions given that a particular thing was painted by a particular person. The jurisdiction, moreover, was to be determined by the residence of the offender; and if the magistrate made a mistake as to his residence he was a wrongdoer from the beginning. Nothing was more difficult than to fix a man's residence, especially men of the class who would be likely to commit these offences. The hon. member for Cirencester was once questioned with regard to his residence, and replied that he resided sometimes at one place and sometimes at another, being a Lord of the Treasury. He was then asked where he slept, and he replied that he usually slept most in the House of Commons. The proper jurisdiction of the justice was to keep the peace, and had nothing to do with the settlement of disputes between artists and photographers, which were often carried on with the greatest bitterness. If a short and sharp way of settling differences were requisite, why not send the cases to the county courts?

The Solicitor-General said the clause to which the right hon. gentleman objected was taken, he believed, without alteration from two Acts *in pari materiâ*, which had not been found productive in practice of any of the inconveniences anticipated from this measure.

Mr. Henley thought the proceeding prescribed in the clause a most anomalous one. He moved the omission of the words, "summary proceeding before two or three justices."

The Solicitor-General was ready to adopt the words, "before any two justices."

The committee divided on the question that the words proposed to be left out stand part of the clause. The numbers were:—

| | |
|---|---|
| Ayes ... .. ... ... ... ... | 29 |
| Noes ... ... ... ... ... ... | 21 |
| Majority... ... ... ... | —8 |

The clause was then ordered to stand part of the Bill.

The remaining clauses were agreed to, and clauses were added,

The Solicitor-General undertaking that the Bill should be reprinted before the report was considered.

## Proceedings of Societies.

### North London Photographic Association.

The annual meeting of this Association was held in Myddelton Hall on the evening of Wednesday, March 19th, Mr. G. Shadbolt in the Chair.

The minutes of the previous meeting having been read, the following gentlemen were elected members of the Society :— Messrs. Homersham, Jones, Spicer, and Toulman.

The Secretary then read the following

#### Annual Report.

In addressing you on the Fifth Anniversary of the North London Photographic Association your Committee has little but congratulations to offer.

The success of the Association has been steady and progressive. The number of its members exceeds one hundred, and there are this evening several new names for election. The meetings have been well attended; the papers read have elicited more than ordinary interest; and the discussions have been conducted with greater freedom, ability, and energy—all tending to demonstrate the progress of our art and the social feeling pervading our Society.

The financial statement is satisfactory, showing a balance more than sufficient to defray all the liabilities of the Association.

Your Committee regrets the unavoidable delay in the distribution of the presentation photograph, but rests assured there will be ample compensation in the size and beauty of the picture; and your Committee takes this opportunity of thanking Mr. Bedford for his liberality in supplying so superior a photograph at a mere nominal cost to the Association.

Your Committee will be happy to receive contributions of unmounted photographs towards the completion of the first volume of the "Album" for circulation among the members, and begs leave to tender its best thanks to Mr. Bourne and other gentlemen who have already kindly presented specimens to the "folio."

Arrangements have been made by your Committee to provide at least one paper to be read at each meeting; and will, when practicable, announce its subject at the previous meeting, that members may come prepared to enter more largely into the discussions which invariably ensue, and which will tend to render the ordinary meetings even more attractive than at present.

The attendance of members of other Societies has been large; and your Committee will esteem it a privilege at all times to welcome those who, although not subscribers to the funds of this Association, come forward to aid by their presence and information the progress of photographic art.

Your Committee, in resigning office, is happy to state that its duties have been both light and agreeable. The readiness evinced by the members to communicate information, and the exceedingly pleasant tone pervading the discussions, have rendered the recurrence of the meetings a source of pleasure, and your Committee trusts that a state of affars so satisfactory may long be characteristic of this Association.

Treasurer in Account with the North London Photographic Association.

| Cr. | | Cr. | |
|---|---|---|---|
| Balance from last year - | £11 10 6 | Journals, Rent, Stationary, Printing, &c. - | £36 2 3 |
| Subscriptions - - - - | 50 18 6 | Balance 19th March - - | 26 6 9 |
| | £62 9 0 | | £62 9 0 |
| Balance - - - - - | £26 6 9 | March 19, 1862. | D. W. Hill. |

*We have this day examined the Treasurer's accounts, with the balance sheet, and find the same to be correct.*

W. Hislop, E. W. Foxlee. } Auditors.

After some conversation on the satisfactory state of the society's fund the report was adopted.

The Chairman called attention to a transparency exhibited by Mr. Martin, the dry plate on which it had been produced had been kept upwards of two years, having been prepared in August, 1859, and exposed in November, 1861.

The Secretary then read a letter from Mr. A. H. Wall, calling attention to the projected exhibition of the South London Society.

Mr. Hill asked if any one could state whether photographers copying engravings for their own pleasure, but not for sale, incurred any legal risk?

Mr. G. Wharton Simpson explained that the law of copyright in regard to engravings was not in a very clear or satisfactory state. The act rendered it imperative, in order to secure protection, that the name of the artist and the date of publication should be upon each print. As publishers were in the habit of issuing copies as "proofs before letters" without these essentials to protection, they really lost or at least jeopardized their copyright. This was, he believed, the legal position of the question, and therefore it would appear that photographers might without risk make such copies for their own pleasure. As to copying for the purpose of selling, he conceived that it was scarcely probable that any gentleman present would be likely to engage in piracy, on moral grounds, altogether apart from legal risk. It was possible that the new copyright now before Parliament might place the matter in a more certain and satisfactory position.

After fome further conversation on the subject the matter dropped.

The following gentlemen were elected officers of the society for the ensuing year :—

*President*—Mr. Charles Woodward, F.R.S.

*Vice-Presidents*—Messrs. G. Shadbolt and G. Dawson.

*Treasurer*—Mr. D. W. Hill.

*Committee*—Messrs. W. J. C. Moens, F. Bedford, G. Wharton Simpson, W. Hislop, T. Ross, T. A, Barber, J. Bingham, and E. W. Foxlee.

*Hon. Secretary*—John Barnett.

After the election of officers, Mr. England exhibited some of his exquisite transparencies of instantaneous and other pictures by the aid of the oxyhydrogen lime light, eliciting much admiration. During part of the exhibition an ordinary quarter-plate lens was substituted for the common lens of the lantern; a very marked improvement in illumination and definition was the result, and induced a general conviction that the effect was much superior, notwithstanding that, under the circumstances, a less amount of amplification was obtained.

The usual vote of thanks terminated the proceedings.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 26th March*, 1862.

The Madrid Academy of Sciences offers, among other prizes, one for the solution of the following :—To determine the probable errors implicated in topographical plans deduced from two photographic perspective views, taking into account all the sources of error that may possibly exist. The prize will consist of a gold medal, and the sum of 6,000 reals (£30). The papers written in Spanish, or in Latin, must be addressed to Don Aguilar y Vela, perpetual Secretary of the Academy of Sciences, Madrid.

M. Criniale has published a new series of his photographic views in the Alps; and also four immense panoramic pictures, representing the series of the summits of the two great groups of Mont Blanc and Mont Rosa. These four pictures, formed each of eight whole-plate proofs, embrace horizons of many hundredths of degrees, from 20 to 35 miles. Taken under well considered and constant theoretical conditions, they are equally important, not only to topography and geography, but also to geology. They are no less remarkable from the elevation of the point of view from whence the photographs were taken, which was sometimes over 4,000 feet above the level of the ocean. They are truly masterpieces of the art of photography, and reflect much honour upon an intrepid and skilful amateur photographer. The negatives were taken on paraffine waxed-paper.

M. Leon Foucault has devised a new heliostat which is so ingeniously constructed as to apparently solve the problem attempted by S' Gravesande, Gambey, Silbermann and many other phisicists Brought to an almost absolute degree of perfection, the new heliostat will pass from the cabinet of physics to the observatory, and serve in a new mode of observing the stars. Moreover as, it can be constructed at a trifling cost, it will soon find its way into the operating room of the photographer, where it will be employed in those processes of enlarging and reduction which open an entirely new feature to the art Daguerre and Niepce. A more complete description of the instrument must be reserved for another occasion, stating now briefly that the axis, which in the heliostat represents the axis of the world, is no longer condemned to carry, at the expense of the regularity of the instrument, a reflecting mirror. This mirror is now sustained by a vertical rod, and may assume very large dimensions; that the direction of the reflected ray is absolutely fixed in space, that the orientation is made without calculations. The new instrument is characterised by all those new and ingenious details of construction which characterise the inventions of M. Foucault generally, and particularly his regulator for the electric light, the first of its kind that has been found practically useful. The inventive genius of the philosopher has been ably seconded by the mechanician, M. Jules Duboscq, who in fact suggested improvements in the electric-light regulator, and gave it its present vertical form.

M. Brettiger suggests a very simple method of reproducing by chemical means an engraving from a steel or copper plate. Dissolve in 1,500 parts of pure water 16 parts of pure, concentrated sulphuric acid, and to 200 parts of the mixture add ½ part of iodide of cadmium. This last mixture is poured into a dish, and the engraving is immersed in it, and left till it has become thoroughly impregnated with the liquid, it is then placed upon folded sheets of white blotting-paper, on a plate of glass, and the excess of moisture removed from the engraving: it is then placed printed side downwards upon a sheet of writing or of positive paper, and placed in a press. An impression is obtained as delicate as that furnished by photographic processes. The iodide of cadmium may be replaced by iodide of potassium. The reproduction is due to the reduction of the iodine by the Franckfort black in the ink of the engraving, and the liberated iodine acts upon the starch with which the paper is sized. The engraving will give a second impression without being returned to the solution.

When the engraving has been used several times, it is only necessary to wash it in water to remove the spots that may have formed. Lithographs and ordinary printed matter cannot be reproduced by this process, on account of the nature of the printing ink, but writing ink succeeds very well.

Unfortunately, these beautiful impressions become blue all over, and are gradually effaced, even if covered with a coat of varnish.

## MR. MELHUISH'S RAPID PRINTING PROCESS.

Dear Sir,—You will, I am sure, allow me to correct a slight inaccuracy in your report of the trial Mason *v.* Heath, and as the few words attributed to me appear, from the numerous enquiries I have received, to have excited a good deal of interest, I will state in full what I really did say.

*Plaintiff's Counsel.*—You have, I believe, devoted your attention for some years to photographic printing.

*A. J. Melhuish.*—Not more than to other branches of photography.

*P. C.*—You have printed largely for the late Prince Consort, have you not?

*A. J. M.*—I have.

*P. C.*—How many copies a day could you print from one negative?

*A. J. M.*—If I printed them by the same process I used for the late Prince Consort about 200 a day, certainly not less, I think considerably more.

*P. C.*—Have you ever printed as many as that from one negative in a day?

*A. J. M.*—No; but I have printed 60 or 70 in a little more than two hours, and as each print requires but *half a minute's exposure* (not *half a second* as stated in your report), I feel no hesitation in saying that I could print 200 a day from one plate.

And now that I am writing, a word to "A Photographer" (whose name, bye the bye, I should exceedingly like to know, for I don't at all like anonymous correspondents) who is so anxious to know what this "new process of Mr. Melhuish's is." It is simply a modification of Mr. Sutton's serum process, referring to which the Editor of the *Photographic Notes* thus writes:—"We had the pleasure of looking over a portfolio of these prints (Melhuish's serum prints) at the Palace, and were gratified to observe that none of them had faded; if Mr. Melhuish would, on some future occasion, publish his experience in development printing; we are sure his communication would be much appreciated."

Your correspondent also mentions that a short time since at a meeting of the Amateur Photographic Association I stated that in consequence of the bad light "I could not print much from the negatives sent in;" this is not what I said, but supposing it were, surely those bright photographic talents for which I am bound to give "A Photographer" credit until I know his name, must be, from some cause or other, somewhat obscured, else he would at once perceive that a process which would be suitable where 40,000 *copies* were required from *one negative* might not *necessarily* be equally applicable where but a *few copies* were required from each of *two or three thousand different negatives.* So that "A Photographer's" concluding exclamation, "How can I reconcile the two statements?" was quite uncalled for, and needs no reply.—I am, my dear sir, yours very truly, A. Melhuish,

*Hon. Sec. Amateur Photographic Association,*
26, *Haymarket.*

## ORGANIC SALTS IN DRY COLLODION.

Sir,—Probably some may require more particulars of the dry process published in last week's number of the News, so I have sent these lines for their information.

For simply washed and dried plates, it is only necessary to add to a clear and good working bath of 8 ozs., one grain of muriate of morphine dissolved in a little distilled water, and then filter it; more will answer and probably less. A dry process collodion, bromo-iodized, and iron development is best. If preferred, the muriate may be put in the collodion say ¼ grain to the ounce. I prepared some collodion with the acetate of morphine for a photographer, and was greatly surprised at his report of it, he said it was not more sensitive than the same collodion minus the acetates, and on trying both at once, in the same camera, to the same view, he obtained the natural clouds in *both;* now all this is very puzzling to me; can it arise from the nitrate of morphine dissolved in the bath, so that it communicates the peculiar quality of reproducing the clouds with plain bromo-iodized collodion? his bath was acidulated with nitric acid, mine with acetic, the nitric acid, I believe, would tend to decompose the little acetate of silver in the film, and so might possibly neutralize the accelerating action, for I am constrained to believe, that to take an instantaneous street view in the middle of February, with the success I met with, even with the quickest lenses, is not usual.

I am perfectly aware that the use of organic salts of silver in collodion is of old date, and do not claim any originality in the matter, I have merely worked out the principle enunciated by Hardwich in page 226 of his manual, 6th edition. If I had the means I should like trying an organic iodide and bromide in place of, or in conjunction with, the usual ones.

I must corroborate your correspondent's experience in the production of mealiness by adding acid to the paper sensitizing bath, I can produce it directly by that means, and banish it again with an excess of alkali.—I am sir, yours &c.,

Wm. Bartholomew.

## THE ROSIN PROCESS OF HERR SAUNDERS VAN LOO.

Sir,—I have seen in your estemed Photographic News, the translation of an article placed by me October 6th 1861, in the *Cosmos*, concerning; "Dry Collodion with Rosin."

As I desire to facilitate the experiments in this way to persons practising this method, I make haste to inform you that in the article alluded to, is not expresssed plainly the kind of pyroxyline suited to this method. The specimen called "rotten" in the valuable work of Mr. Hardwich (6th edition), is the desired one.

The ordinary sorts of pyroxyline do not adhere to the glass, and give foggy pictures. I operate on glasses from the size of quarter-plate to whole-plate and larger: in the latter case the edges of the film are fixed with alcoholic varnish.

By inserting this communication in your esteemed Photographic News, and giving me in a few words the account of the reception of this letter, you will oblige, your obedient servant,

D. J. Saunders Van Loo.

# Photographic Notes and Queries.

### Photographic Exchange Club.

Dear Sir,—Will you allow me to make a suggestion as to marking the prints for the Exchange Club, which is, that the members, if working dry plates, should state whether the plates are purchased ready prepared and sensitised, or prepared throughout by themselves, as if one member procures plates ready sensitized, another may go a step further and have them printed off by a professional; a third might even have them developed for him as well. I do not wish to cast any slur on those gentlemen who may procure prepared plates, as I know that everyone cannot give the necessary time; but still, I think, the man who takes his plate of glass, cleans, prepares, exposes, develops, and prints, is deserving a little more credit than the one who is only partially a photographer, even though the result may not be so good.

If you think anything in this may be likely to offend anyone, perhaps you would be kind enough to make the suggestion, without any remarks; I only make them to show why I propose it, and most certainly should be sorry to annoy any of my fellow members.—I am, sir, yours truly,

W. Larchin.

*Waltham Cross, March 4th*, 1862.

### Hints on Cameras, &c.

Dear Sir,—I beg to offer you a few hints in connection with your "Remarks on Apparatus in connection with Photography." In reference to your first article on cameras, it must be admitted there is nothing more essential to a photographer than a good made camera, no matter how perfect his skill or his lens: too many are made for lightness and portability, without combining with these efficiency. For instance, the dark slide is made so light that it is always getting out of order; the most useful size I find in practice is nine-eighths of an inch thick, instead of three-fourths or seven-eighths as usual, or even less; with nine-eighths you have two-eighths for the dark shutter, one-eighth between the loose frame and shutter, four-eighths for the loose frames, which will appear quite unnecessary, and two-eighths for the door. But I find the central space one of the best recommendations it has; for you find it gives the quality of a swing back. You may throw the plate out of its vertical position three-eighths any way you please, by removing the loose slide and placing a strip underneath it, so as to bring every part of the picture in focus. Suppose it to be a portrait, the picture the size the lens is intended to cover, and the face to be well defined; the lower part will be slightly out of focus, in consequence of its being brought too near the plate: by placing the strip of wood under the loose frame at the top, it will bring it into perfect focus.

The next thing I wish to call your attention to, is the rack and pinion movement. From what I have seen, I must think the method as bad as the principle is good, for those shown me have the rack attached to the sliding body, and the pinions to the base board. Now if the racks are fixed in the base board, and the pinions travel with the sliding body, it would be better; but a movement I think better still is obtained by sinking two ¼-inch brass rods half in the base board, and half in the sliding body or thereabouts, so the bearing is on the rods only. You would be surprised how easy the camera is adjusted, and the focus obtained with the greatest accuracy.

To mount card pictures, I use glue that will flow free from the brush, square the print $\frac{1}{16}$ less than the card top and sides (that I think neater than $\frac{1}{8}$ each way,) glue one end of the print, and place a piece of glass on the glued part, and glue the other end: then you find the glass form a handle to adjust it with, it prevents it curling as much as it does when held in the fingers, is much cleaner, and more manageable. If you think any of the hints of any service, you are at liberty to use them at your discretion; if they are any use, I will try and give you some on other apparatus.—Your obedient servant,

W. Nurse.

*Burnham, March* 4, 1862.

[In using a rack and pinion, the rack should always be attached to the part which travels, and the pinion to the part which is fixed. Our correspondent will find this if he attempts to work it on the principle he suggests.—Ed.]

### Painting Magic Lantern Slides.

Dear Sir,—I shall feel greatly obliged if you or any of your readers can give me any information on the subject of painting slides for the magic lantern. I much wish to try my hand on colouring some photographs, but my attempts have been complete failures. I some time since purchased a book published by one of the principal artist's colourmen, in which you are instructed to use moist water colours. It is perfectly clear that the writer cannot have tried the experiment, or he would not have recommended what is an utter impossibility. My own impression is that the article used is Canada balsam, or something of that nature, but how the colours are mixed, or how laid on evenly, I am at a loss to imagine.—I remain, dear sir, yours faithfully,

B. Jones.

*Cheltenham, March 10th*, 1862.

### Wet Collodion Out of Doors.

Sir,—Every little is a help, so I address you concerning the staining of plates, owing to their being carried a distance in out-door photography, I have found that a plate being carried, say five hundred yards, exposed, brought back and developed with every care, such as draining the plate, using filtering paper, &c.; the surplus solution of silver will run on to the plate-holder and back again to the sensitive plate, carrying organic matter with it, and by so doing, causing stains, in many cases spoiling a good negative. I have been served so, and naturally I looked round for something to stop this fault; at last I thought of *sponge*, so cut in pieces about half-inch square, and placed them in the lower corners of the plate-holder, on the back of the sensitive plate, and ever since have done away with stains. Moreover, I find the plates can be carried farther without the least fear of the nitrate solution injuring the collodion film; I have carried a plate a quarter of a mile and back without the least injury to film or stain on plate, and then developed without redipping in nitrate bath; by others using these exceeding simple things they might save many a good negative.—Remaining yours respectfully,

Geo. Yevrah.

## Talk in the Studio.

Pure Nitrate of Silver.—Photographers have for so long been accustomed to the use of nitrate of silver, containing more or less of impurity, that few persons expect to make a bath which works at once, giving rich negatives, without some doctoring. We have recently received from Mr. Solomon a sample purporting to be "pure recrystalized nitrate of silver," put up in sealed tubes, each containing an ounce, which, on trial, proves everything which we could wish. On adding the proper quantity of water and iodide and filtering, the first plate produced a rich negative, free from streaks, fog, or greyness; presenting a fine creamy bloom by reflected light, and a reddish brown deposit, with sufficient intensity, by transmitted light, when developed with iron. If the same quality can always be guaranteed at the price, which is very slightly in advance of that of the common quality, it will be a decided boon to photographers. It is certainly worth a trial.

Shaping Photographs.—An ingenious aid to the cutting of *cartes* and other photographs has just been introduced by Mr. Solomon. It consists of a plate of glass on which to cut, fixed in a frame which revolves on a centre. When the glass shape is placed on the picture in the usual way, and one side cut, it is necessary to turn round the picture and shape to cut the other side, in doing which there is great danger of moving the shape or guide from its position. In the contrivance of which we are speaking, the glass plate upon which both are placed to be cut, is moved round on its centre, obviating any risk of moving the guide, and materially facilitating rapid and correct cutting. Some very excellent and nicely finished guides of all shapes, made of thick plate-glass are also provided.

Photography is Avenged.—Most of our readers will be aware that the beauty of the interior of the International Exhibition is stated to be entirely spoiled by the French department being entirely boarded up into one large box, instead of being open, so as to contribute its quota to the grand *coup d'œil*. It is stated that one important object of this boarding is to furnish a huge screen on which to hang enlarged photographs, the chief of which is the portrait of a horse, life-size. If, as photographers believe, their art has been slighted in the programme of the Exhibition, it is here avenged, and asserts its importance with sufficient force to contribute largely, although indirectly, to spoiling the whole effect of the interior.

## To Correspondents.

Sigma.—It is customary in speaking of the enlargement of photographs to refer to lineal measurement. The table in the Photographic News Almanac refers to this measurement: thus, when a picture is stated to be enlarged four times, four diameters, or sixteen areas is meant. We have not seen the drying box to which you refer; nor can we undertake to say which form of drying box is best.

J. C. W.—You will doubtless be able to obtain the materials for the manufacture of collodion from any respectable photographic chemist. The house you mention is a wholesale house. If you wish to purchase very large quantities, your best plan will be to get the addresses of various establishments from the London Directory. If you send us a card, and a stamped and addressed envelope, we will roll it as you desire. No. 39 of the Photographic News is in print.

G. E. W.—We see no reason to doubt that the agent in question would send you the genuine lens of the maker for whom he is agent. As to its quality, we can, of course, say nothing. We have often repeated in this column that cheap French lenses not unfrequently turn out pretty good; but that for absolute certainty of obtaining a thoroughly good lens, we recommend those who can afford it, to apply to first class London makers. Having purchased a lens you cannot compel the dealer to refund the money. We believe the agent in question is a respectable man, and will do his best for you; but in such cases take care to be conciliatory instead of angry in your letters.

L. L. H.—Sugar of milk is made by evaporating whey until it crystallizes. Volumes iii. and v. of the Photographic News are in print, and may be had of the publisher. The other volumes are out of print.

A Westmoreland Laker.—We have not found the difficulty you mention in using albumen containing a little free ammonia. A correspondent recently recommended the use of acetic acid for the purpose of preserving the albumen. We have not tried the plan, but it may possibly answer your purpose. Why not try a dry collodion process, say either simply washed collodion, or the tannin process, since eggs are so scarce, dear, and difficult to get fresh in your neighbourhood?

M. H.—We have seen some very fine and delicate negatives on turpentine or camphine or waxed paper; but for small work, such as you name, we do not think that any paper process will equal collodion.

H. V C.—Each of the portrait specimens sent have good qualities, but they would each, with the amount of illumination they have had, have borne a trifle longer exposure. No. 2, with a very little more exposure and a little intensifying, would have made a very good picture. The stopping out of the sky in the stereograph has the effect of making all the rest of the picture look dingy. We prefer sheeting calico stretched upon a frame and painted dark grey, either in distemper or oil flatting, for a background. A blanket, carefully stretched, and the sitter placed three or four feet at least in advance, may be used with good effect. It is important to keep the blanket well out of focus, so as to prevent the appearance of texture in the background. There is no necessity to reject a silver bath so long as it is working well: add fresh strong solution from time to time to keep up the strength and quantity. We cannot with propriety recommend the collodion of any particular maker here. The one you name has the reputation of being very good, so have Thomas's, and Burfield and Rouch's bromo-iodized collodions, and also Ponting's. A sky ought never to need intensifying in excess of the rest of the picture; where anything of the kind is attempted, the destruction of harmony in the picture is the result. A little tint in the sky is infinitely preferable to a sky of white paper. Your formulæ all appear good: facilities for a little more control over the lighting of the sitter appear to be the only want.

G. S. S.—There is a "preparation" for sizing albumenized paper photographs, prior to the use of water colours, sold by Newman, of Soho Square, which answers admirably. In strengthening a toning bath of gold and acetate of soda, you should not add simply solution of chloride of gold, but a fresh quantity of unused solution, as made at first, of gold and acetate of soda.

J. W. Whelan.—We find there is no possible chance of obtaining space now at the International Exhibition. The space already allotted is in considerable excess of that which can be actually used. You will be able to exhibit at the Crystal Palace.

A. D.—The best mode of printing-in separate skies has repeatedly been described in our pages. See an article by Mr. Fry on p. 350 of our fourth volume.

B.—The triple lens which will suit your half-plate camera, is that intended for pictures 6 in. by 5 in., and is the one used by Mr. Wilson for his 7 in. by 4½ in. landscapes. As to whether it or the single lens is best for taking views is a point on which opinions differ. Its advantages are perfect freedom from distortion, great depth of definition, and including a very wide angle. The advocates of the single lens claim for it more brilliancy. 2. The reason why some difficulty exists in procuring efficient yellow glass, arises from the fact that efficiency cannot always be determined merely by colour, and those who deal in the material do not always test it. Hence it becomes necessary for each person to test his own before using it. There is no doubt but what the material used by the first-class professional photographers you name can be purchased by any one else; but those gentlemen have to test in the first instance just the same as any one else.

A. N.—You do not state with sufficient precision the nature of the redness which spoils your dry plates when developing. Is it a red deposit of a foggy nature, or does the whole film become red and transparent? So far as we can understand your description, the evil appears to arise from decomposition in imperfectly washed, or too long kept plates. Over exposure, in certain conditions, will sometimes produce similar results; sometimes the use of citric acid in the developer will remedy such an evil. The specimen you enclose is very good; the stopped out sky is its only defect.

G. Lewis.—The time required to develop a collodio-albumen negative with plain pyrogallic acid will vary according to the temperature and the exposure. A properly exposed plate, developed with a solution at a temperature of 60° Fah., will occupy from two to five minutes. Intensify with pyro, citric acid, and silver, as recommended by Mr. Mudd. Increasing the temperature of the developer will hasten its action, but this is not necessary except where the exposure has been short.

S. R. A.—We believe Bull, Brothers, whose advertisement you will find in our pages, make solid pedestals, &c., as well as profiles. Mr. Francis, Great Russell Street, also supplies them.

One that is Uninsured.—We do not know of any assurance office which makes a speciality of photographic materials or photographic lives. Any respectable office will undertake them.

G. G.—You may prevent the sliding tube of your lens from moving so easily as to shift by the slight touch of uncapping by a variety of means; but there is no especially prescribed method. A slight bulge in the tube will do it; or the introduction of a little india rubber in solution between the tubes, or in short anything that will make them "bite" against each other. 2. The only means of preventing your lantern from getting too hot, is to reduce the size of the flame, enlarge the lantern, or increase the amount or number of the apertures at the top, so as to allow the heated air more rapidly to escape.

A. Lane.—Our pages for some time past have contained various articles on card portraits and the various formulæ most suitable, so that it is difficult to select any especial numbers as referring to that subject. The number for Feb. 7 contains a brief article, embodying some useful hints on the subject. The Photographic News Almanac for this year contains a good deal of information on the subject.

E. Parsons.—If agitating with kaolin and then filtering does not clear your bath, add a few drops of a solution of common salt, or of citric acid, and agitate. This will cause a slight precipitate, which in falling will carry with it the colouring matter. 2. We have never tried the formula you name; but we should prefer a much weaker solution. When any especial formula is supplied with a collodion, it should be regarded as an intimation that the maker considers his collodion as working best under that especial treatment, and a trial should, at least, be given.

C. Eades.—Water-glass is made by igniting fifteen parts of powdered quartz with ten parts of crude potassa and one part of charcoal, till perfect vitrification takes place. This mass is then powdered and boiled with five times its weight of water for a few hours, until it is dissolved. It can be purchased ready prepared, and it will be better to obtain it so for experimental purposes. We do not think it will be found suitable for preserving electro-plated goods. In our hands it has always become efflorescent on exposure to the atmosphere.

R. H. Mason.—Your letter is withdrawn as you request.

Excelsior, J. H. K., and some other correspondents in our next.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 187.—April 4, 1862.

## BROMIDES IN INSTANTANEOUS COLLODION.

Where theories differ, practice must decide. For a long time past the value of bromides in collodion and iron development have been gradually obtaining recognition amongst photographers. There have always been, however, some who have remained steadily faithful to their first love, and believed only in the advantages of simply iodized collodion and pyrogallic acid development. Mr. Hardwich very tardily acknowleged the value of bromides, and never recognized their accelerating agency. Mr. Sutton has recently maintained, with steady iteration, that with pure chemicals simply iodized collodion, with pyrogallic acid developer, is more sensitive than bromo-iodized collodion with iron development. For our own part, as our readers know, we have always maintained, that whilst under good conditions very fine pictures might be obtained with moderate rapidity with a simple iodide and pyrogallic development, these conditions were not always easy to secure, as depending upon causes beyond the operator's control; and were uncertain and difficult to maintain: whilst with a bromo-iodide and iron development equal, or better results, could be obtained in good conditions, without the same risk of failure when the conditions were less favourable.

Knowing Mr. Sutton to be a careful experimentalist, and a first-rate practical photographer, we oppose our own experience and conclusions to his with considerable deference, although without hesitation. As possessing far more weight, however, than the most carefully conducted experiments, we point to the practice of every photographer who has acquired any celebrity for instantaneous productions. Success in these operations can only be the result of very carefully garnered experience, gained in actual practice: and practical men, who have bread to win as well as laurels, may generally be trusted and followed in their selection of formulæ and manipulations. Mr. Wilson, of Aberdeen, Mr. Blanchard, Major Webster Gordon, Dages and Harman, Mr. Samuel Fry, and others, whose instantaneous photographs the public are familiar with, all, without exception, use highly bromized collodion, as we have from time to time explained in these pages. We can now add another name to the same list.

Mr. England, whose experience is, perhaps, more extensive and varied than that of any photographer of the day, and whose process has hitherto been unpublished, has recently communicated to us many particulars of his formulæ and operations. Mr. England's experience exceeds that of some of his compeers, inasmuch as it has been more varied, his practice having been on the Continent and in America, as well as in this country. His instantaneous street scenes of Paris, we hesitate not to say, are unrivalled for delicacy, purity, harmony, perfect instantaneity, and freedom from chalky under-exposure. His views of Niagara partake of the same characteristics, as regards softness and rapidity. Mr. England habitually uses a greater proportion of bromide in his collodion than any photographer we know. His usual collodion for instantaneous work contains three grains of bromide of cadmium and three grains of iodide of ammonium to each ounce of collodion. If the subjects present great contrast, and there is risk of producing a hard picture, he then increases the proportion of bromide to four grains, and reduces the iodide to two grains. His mode of preparing his collodion so as to be able at a moment's notice to use a sample containing any desired proportion of the iodides and bromides is very convenient. With pyroxyline made at a moderately high temperature, and five parts of ether and three of alcohol, or sometimes equal proportions, he makes a normal collodion, adding just sufficient of the cotton to give a good film. One lot of this collodion has bromide of cadmium at the rate of 24 grains to the oz. added to it; another lot has iodide of ammonium in the same proportion added. With a bottle of each of these, properly settled and decanted, and a bottle of the normal collodion, a collodion ready for use at a minute's notice with any proportion of iodides and bromides may be produced. A drachm of each, containing the iodide and the bromide, to six drachms of the normal collodion, gives the proportion generally used for instantaneous work. The advantage of having the iodide and bromide dissolved in collodion instead of in alcohol as is customary, is, that there is no difficulty or doubt about altering the thickness by dilution, and the collodion is ready for use at once, without any fear of turbidity or precipitation, which sometimes occurs when alcoholic solutions of sensitizing salts are added to collodion. Mr. England has a profound faith, based upon experience, in the action of bromides in accelerating, and in producing harmonious negatives with short exposure. Accordingly, in proportion to the amount of rapidity required, or the amount of contrast in the subjects endangering hardness, an increased proportion of bromide is added.

Mr. England excites in a bath of pure silver as nearly neutral as possible, and develops with a strong solution of iron, varying the strength of the developer with the subject and the proportion of bromide, from twenty-five grains to fifty grains to the ounce of water. He frequently obtains the desired vigour with this alone; but sometimes intensifies with pyrogallic acid and silver.

In all the formula of successful professional photographers engaged in instantaneous work, a very large proportion of bromide is present; whilst we do not know one engaged professionally in this branch of our art who uses a simple iodide and pyrogallic acid development. We may mention, as strikingly similar to Mr. England's practice, although arrived at by independent experience, and without any concert or comparison of notes, that Mr. Blanchard returned a few weeks ago from a successful trip in pursuit of instantaneous photography, in which he informed us that he used five grains of bromide to four of iodide in his collodion. We may remark that with professional photographers under such circumstances, it is not a photographic *tour de force*, secured by a chance plate, that is aimed at. This was a journey many score of miles, taken expressly, in the early part of the gloomy month of March, to secure a series of instantaneous negatives of scenes in the restless bustle and hubbub of a country fair; and notwithstanding the season and weather the pictures were obtained.

We have another word to say on iron negatives, in regard to the proper quality of which we fear there is some misapprehension amongst some of our readers, and we must add either in the mind or in the language of our good friend Mr. Sutton. He has frequently recently spoken of "the flat, veiled, iron developed negatives," as though iron negatives were necessarily of this character. "A good pyro developed negative is certainly much pleasanter to print from than a flat, fogged, grey negative, developed with iron," he says in the last *Notes*. This is unquestionably true; but it is just as true that a good iron developed negative is more pleasant to print from than a flat, fogged, grey negative, developed with pyro. A good negative is always more pleasant to print from than a bad one, no matter how either may be produced. But no one knows better than Mr. Sutton that flat, veiled, grey negatives are produced by pyrogallic acid development if impure chemicals are used, especially in the silver bath; and that these characteristics are not confined to iron development. The negatives described as "flat, fogged, and grey," when produced by iron development are by far the worst negatives in existence, for they are generally thin as well, and are useless for producing brilliant prints. A pyro developed negative, even when fogged and grey, has generally sufficient thickness of deposit to allow by skilful printing, of moderately good pictures being produced from it; but with iron development, such a negative is hoplessly bad.

But the truth is that good iron negatives have none of these characteristics. Greyness is unnecessary, and fog is fatal. If Mr. Sutton will examine the iron negatives of any successful professional photographer, he will find all the characteristics he loves to see, and which we have seen in many of his own pyro negatives. We recently had an opportunity of examining some of Mr. Vernon Heath's landscape negatives on 12 by 10 plates, produced by iron development and bromo-iodized collodion. They were amongst the most perfect we have ever seen; with a fine bloom by reflected light, and a rich red smoke colour by transmitted light; no traces of fog, but with points of bare glass in the deep shadows, presenting a certain amount of positive character when examined by reflected light. The sole difference betwixt these and pyrogallic acid negatives, being found in the fact that to get prints of equal beauty and brilliancy from each, the pyro negatives would require at least four times as long exposure in the pressure frame as the others.

First class professional photographers who, without exception almost use iron, would not dream of tolerating any fog or veil on the shadows. Let anyone who has the opportunity, examine the negatives of Mr. T. R. Williams, which are as clean and brilliant, and free from fog or flatness as photographs can be produced. We have before us at the present moment an iron negative, by the late Mr. Lacy, which is by reflected light a brilliant positive, by transmitted light, a rich red negative, giving an exquisitely soft and delicate print. Such negatives photographers should always aim to get, whatever process they use; and they must not entertain the idea for a moment that flatness, fog, and greyness are the legitimate result of iron development.

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Since the above article was in type, Mr. England has read a paper at the Photographic Society, in which he briefly described his method of working in instantaneous photography; we shall hope to give his method in his own words in an early number. He exhibited at the same time some of his instantaneous iron negatives taken as above described. If one characteristic was more striking than another it was their freedom from flatness, veil, or fog, and their clearness, delicacy, and brilliancy.

## THE CONTRACT FOR PHOTOGRAPHING IN THE INTERNATIONAL EXHIBITION OF 1862.

The following are the conditions upon which the contract for photographing in the Exhibition Building are to be based, with the additional one, elsewhere announced, but not here expressed, that the Commissioners do not bind themselves to accept the highest or any tender:—

The Commissioners for the Exhibition of 1862 undertake to grant the sole and exclusive privilege of taking photographs of and within the Exhibition Building, for a period extending from the 30th day of April, 1862, until the end of ten days after the close of the Exhibition, subject to the following conditions and regulations:—

1. The foregoing privilege gives the right of taking general views of the interior of the building and its arrangements, but does not give any right to take photographs of individual articles exhibited, without the consent, in writing, of the owners and exhibitors of such articles.

2. The photographs must be taken before 10 a.m., but Her Majesty's Commissioners reserve to themselves the right of making from time to time such rules, regulations, and conditions as to the hours within which, and the mode and places in which, the privilege may be exercised or otherwise, as they may think necessary.

3. Her Majesty's Commissioners will not provide any space or room for photographers, or for their processes of developing or preparing their plates or otherwise, all of which processes must be carried on beyond the limits of the Exhibition buildings.

4. The photographer and a limited number of assistants will be granted, during the continuance of the aforesaid privilege, free admission into the building, subject to all such byelaws or regulations as the Commissioners may from time to time make.

5. In the event of any dispute whatever arising either out of these Articles, or with respect to the true intent and meaning of them, the photographer shall agree to abide by the decision of Her Majesty's Commissioners absolutely and without appeal.

6. No sale of photographs will be permitted within the building.

A part of the tender, it would seem, is expected to consist of copies of the pictures produced, as the following form of tender is supplied:—

I hereby tender for the above privilege, and undertake to pay forthwith to Her Majesty's Commissioners the sum of £ as a consideration for the same, and to place at the disposal of the Commissioners, for the purpose of distribution, but not for sale, copies of every photograph which may taken in the building.

Signed this day of 1862.

Namo

Address

The *Times*, commenting on these conditions, observes "Many of the great photographers have anxiously looked forward to the publication of this document, and were prepared to offer considerable sums for the privilege of taking views, &c.; but the third condition of the Commissioners has, up to the present, almost entirely debarred any from making an offer, for if this rule is adhered to it would be simply impossible to take any views at all.

"Now, as it happens, there is not a single place within any moderate distance of the building which a photographer could now secure, while, even if there were fifty such, everyone at all acquainted with photography knows how futile it would be to take views in a building with a bad light, with plates brought from a distance of even a quarter of a mile or so. There is plenty of space near the eastern annexe which might be allotted to photographers without inconvenience, and, unless some such concession is made, the Commissioners are not likely to get any but a very small tender. The other conditions, to the effect that all photographs must be taken before 10 a.m., and none sold in the building, amount to nothing, as Her Majesty's Commissioners reserve to themselves the right of making, from time to time, such rules, regulations, and conditions as to the hours within which, and the mode and places in which, the privilege may be exercised or otherwise as they may think necessary."

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Cases for Cameras, &c.

The method of packing a camera for travelling or carrying it about in the field is a matter of individual taste, which every one must decide for himself, and upon which each has

* Continued from page 147.

probably his own opinion. I certainly have mine, and as it differs rather from that which appears to be generally held —judging by the cases mostly used—I think I cannot do better than add it to these "Remarks," less as a recommendation to be followed than as an observation to be taken for what it is worth.

The most ordinary ways of packing a camera for travelling are,—1st. To make the camera itself a perfect box containing all the necessary apparatus, neatly French polished, and with a handle on the top. 2nd. A leather case, with leather divisions inside, lined with baize, secured by straps and buckles, and carried by means of a leather handle or another strap.

The plan of converting the camera into a box, supposing it to be done so efficiently as to be perfectly weather-tight and strong, is extremely convenient. It is simple, light, and cheap. The working and more important parts of the camera, being inside, are protected from the weather and from injury by blows or other violence. The only suggestion I would make as an improvemet upon this type is of a sadly democratic nature. I should propose to renounce the vanities of French polish and varnish upon the outside of the "box," and substitute a good solid coat of dark paint, black or bronze. My reason is, that in the ordinary wear and tear consequent upon being much carried about, the varnish soon gets covered with scratches and scars, which for a French polished article is equivalent to being shabby and ill-looking, but a simply painted box may be hacked and scarred to a greater extent without *seeming* so bad, and at the worst a brushful of paint will suffice to restore it to its pristine beauty.

I confess I do not share in the general approbation of leather as a material for camera cases. It appears to me little suited for such a purpose. It is flexible, and affords but little protection against a fall or blow; and it must be remembered that in cameras packed in leather cases, the fragile working parts—slides, rising front, and focussing-screen—are mostly loose in the packing, and not protected by being inside the camera body or box. It is but little protrction against drenching rain, which, in addition, damages it own form sadly, and none at all agaiust damp atmosphere, by which both itself and its contents are covered with mildew. It is no protection against insects in tropical parts. It is not secured by any lock, which unsuits it for travelling separately by railway; finally, it is very expensive. I cannot find *any* recommendations to place against this array of disqualifications. True, a leather case *looks* very nice when it comes fresh from the hands of the maker, and a fair-weather photographer, journeying in his carriage, with his footman to carry his camera from it on to the ground, as I have seen, may keep it fresh and neat for a long time; but an ordinary photographer, roughing it in the usual manner, over hill and dale, through briar and brake, accepting what weather it pleases the heavens to send him, will find his leather case wofully shabby and distorted in shape, its inner partitions probably dilapidated, and its colour lost and stained at the end of a pedestrian tour. I do not mention this *pour dégoutor les autres*, but such at least is my personal experience.

I think the best travelling cover for a camera for all countries and climates is a well made tin case, of the dispatch box class, having a stout iron wire running round all the edges, lined with baize, and having separate divisions for the various loose parts, japanned black outside, or painted black, with a brass handle upon the narrowest side to carry it by.

This tin case is a little, very little, heavier than the leathern cover with all its straps and buckles, &c. It is a perfect protection against blows, rain, damp, or insects. It is closed with a lock, and it is much cheaper than a leather case.

The comparative neatness of the primitive appearance is certainly a matter of individual taste, for my part I prefer the look of the tin box. It is certain, however, that this wears better. Weather has no effect upon its appearauce, nor ordinary rough useage; if it by chance gets bossed the tinman at the corner of any village will set it right in a few minutes. Black japan looks the best at first, but good black paint is better for wear, and when it gets scratched or chipped another coat suffices to repair all damage. From the nature of the material a far better fit can be secured in all the fittings, therefore, the whole apparatus, whatever its description, can be packed into a smaller compass than in a case made of leather, with leather partitions.

It should by observed that the partitions in a tin box need not extend the whole width of the case, as in a leather one, but need only project sufficiently from either side to receive the edges of the slides and other parts. Fig. 11 shows the outside of such a box for a folding camera with the sliding front, focussing-screen, and wet plate slide. Fig. 12 gives the inside plan of one intended for a bellows camera, with the lens in position, the focussing-screen in its groove in the instrument, and divisions for four double backs.

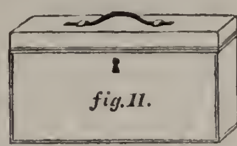

*fig.11.*

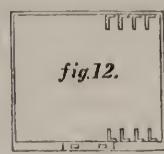

*fig.12.*

The baize lining can be fastened with glue upon the bottom and sides, but at the tops of these latter it should be strained over a strip of tin and fastened with rivets to the box. This will make a permanently good job and will prevent the lining from being torn out by constantly pulling tbe instrument in and out.

(*To be continued.*)

## Scientific Gossip.

Solvent for Cellylose — Preparation of Schweitzer's Liquid—New Blue Colour for Painting—Photography on Cellulose and Silk.

The curious discovery of Schweitzer that certain salts of copper dissolved in ammonia had the property of dissolving cellulose, silk, and several other organic substances which resist the action of ordinary solvents, has not been so much employed by the photographer as we might have been justified in supposing would be the case. Probably some of the oblivion into which this very useful solution has fallen, is due to the fact that its preparation was attended with great uncertainty, and there was considerable difficulty experienced in obtaining uniform results. To clear up some of the obscure points attending the preparation of the cupreous solvent, M. Peligot has been devoting attention to an investigation of the subject, and has now published a memoir, which leaves but little of the reaction unexplained. The ordinary liquid used to dissolve cellulose is formed by the simultaneous action of air and ammonia on copper. The process which has been found to succeed best for obtaining large quantities of this solution is to introduce finely divided copper into large flasks, together with a little concentrated solution of ammonia. The copper is best prepared by reducing sulphate of copper by metallic iron or zinc. This is thrown in the moist state round the sides of the flask, and a few minutes after the ammonia is introduced, the flask becomes heated and filled with thick white fumes, which being condensed on a cold wet body, give all the characteristic reactions of nitrite of ammonia. When the reaction seems finished, change by the aid of a bellows tbe atmosphere of the flask; repeat this operation several times at intervals, taking care to renew the surface of the metal by agitation. When the action is quite finished, invert and drain the flask, and wash it out several times with solution of ammonia. A blue liquid is obtained, which M. Peligot shows is composed of several different bodies, the principal one being a double salt of nitrite of ammonia and oxide of copper. To obtain this in large quantities, the blue liquid is to be evaporated to dryness on a water bath, the residue pulverised, and submitted to the action of boiling alcoholic ammonia. The filtered liquid on cooling deposits the salt in the form of needle-like prisms of a beautiful violet blue colour. This salt has a somewhat remarkable composition, containing

$$NO_3.CuO.NH_4O.HO.$$

A small quantity of the compound wrapped in paper and placed ou a steel anvil, detonates when struck with a hammer. It dissolves in contact with a little water, producing intense cold, and yielding a solution which possessses the curious solvent property on cellulose, &c., which is under discussion.

In his investigatiou on this compound, M. Peligot succeeded in discovering a *new* blue pigment of great beauty. The fine turquoise-blue precipitate, which is thrown down when a soluble salt of copper is decomposed by an excess of caustic potash, or soda, has often been regarded with admiration by artists; but unfortunately, chemists have not been able to prepare this body in a permanent form. It is a hydrated oxide of copper, CuO.HO, but it loses water almost immediately, and turns black even whilst it is being washed in cold water. When, however, the above-named nitrite of copper and ammonia is dissolved in a very small quantity of water, and then the solution greatly diluted, a similar turquoise-blue precipitate is obtained, having the same composition as the ordinary precipitated hydrated oxide, but possessing the property of resisting the action of boiling water, and able to bear a temperature of 212° without injury. This new blue hydrated oxide of copper, which may be ranked as a new and useful acquisition to science and the arts, absorbs atmospheric carbonic acid slowly, aud without changing colour. It is a very fiuely divided crystalline precipitate, and its beautiful colour will doubtless before long render it useful in painting, and for printing colouied stuffs and paper.

If this hydrate could only be produced under the above circumstances, its industrial uses would of course be very limited. But while studying its properties, the discoverer found several methods of preparing it from all the salts of copper soluble in water; particularly from sulphate of copper. It can in fact be obtained by treating with an alkali a salt of copper dissolved in water, to which a slight excess of ammonia has been previously mixed; also by pouring caustic potash or soda into a salt of copper mixed with an ammoniacal salt; or by adding a quantity of water to a slightly ammoniacal solution of nitrite of copper. Thus the expense of preparing this colouring matter is no obstacle. It must not be confounded with the article known as "English blue ash," this consists of carbonate of copper, the tint of which, though rather darker, is generally less pure than that of the hydrated oxide of copper.

To the photographer, however, this stable oxide of copper possesses other advantages, besides its capability of being employed as a pigment. By simply dissolving it in ammonia a liquid is obtained which is decidedly the best solvent for cellulose, and the other substances more or less soluble in Schweitzer's reagent. Concentrated ammonia dissolves from 7 to 8 per cent. of the hydrate, the solution having the deep blue colour common to all salts of copper in contact with excess of ammonia. From the case of its preparation and the many theoretical advantages which would be derived from employing pure cellulose or silk as the medium for photographic pictures, in preference to the nitro-compound, gun-cotton, there is little doubt that this solution would well repay any experimentalist for the time and trouble which he might devote to the subject. One of the advantages which this solution possesses over the old solvent formerly used is that the dissolved substance can be precipitated without alteration by the addition of an acid; whilst by operating under the same circumstances with the blue liquor, resulting from the action of air and ammonia on copper, the nitrous acid which becomes free, acts more or less energetically on the orgauic substances contained in the solution. It is, moreover, from the presence of this oxide, which is found in the liquid in simple solution in ammonia, that the liquid obtained by the direct action of air and ammonia on copper, derives the property of dissolving cellulose; for by placing this substance in contact with nitrite of copper and pure ammonia dissolved beforehand in a little water, it neither gelatinises nor disappears, as happens when we employ ether on ammouiacal solution of this oxide of copper, or the liquid named at the commencement of this article.

Soon after these solveuts were first made known to the photographers of this country in the pages of the Photographic News, we chrouicled a few attempts which had been made to employ them in photography. From these results and others which have since come to our knowledge, there can be little doubt that were the difficulties incidental to the first introduction of a new substance overcome, this cupreus solution of cellulose and silk would prove a very useful agent in the photographers' laboratory. Possibly it might never be found to have advantages which would enable it to compete with collodion, but there are several other directions in which such a solution of so ordinarily insoluble a material would be of the greatest value. Some of these applications are at present under trial, and will form the subject of another article. Others will doubtless suggest themselves to any one who experiments upon the subject. Our object at present is to draw the attention of experimenters to this neglected brauch of the art, and to induce them to take up so promising a field for investigation.

## APPLICATION OF PHOTOGRAPHY.*

### DOVE'S NEW PHOTOMETRIC PROCESS.

In the experiment with the Newton's coloured circle, we cannot obtain the intensity of a white disc, but only that resulting from the absorption of colour in particular. We may be satisfied that there is absorption with the coloured circle, by directing the photometer upon the turning circle, aud varying the inclination until there is compensation, then on turuing the circle to view the white surface under the same inclination. To measure the absorption it will suffice to place a black sector upon the white surface and gradually augment the dimensions.

If we divide a disc into 10 sections, alternately white and black, the quantity of light it sends to the eye in turning will be the same as if it were divided into 50 sections alternately white and black. But in the first case each interval acts upon the eye five times longer than in the second case and this must exercise some influence upon our appreciation of the lighting. To M. Dove it always seemed that brilliancy increased in this case until the velocity had attained a certain limit.

Itriated surfaces send more light in the direction of the striæ than perpendicularly, for in this direction shadow is produced. We may observe it upon a plate of white chalk radiated with a file or still better with plates of pearl.

For the same reason, the polish is influenced by the nature of the substance; thus a plate of brass is more brilliaut than a plate of copper.

To measure the lighting power of luminous sources, the difficulty, as is well known, is to have an invariable unity, a constant term of comparison; we employ an Argand lamp, a gas burner of known diameter, discharging gas under a constant pressure or rather of a platinum wire reddened by a current of determined intensity; but there is always some uncertainty between one experiment and another.

We place the horizontal microscope in position, then direct it alternately towards the two lights, the distance of which must be varied until the photographic proof lighted in front by the constant light, disappears. We place the two lights to be tested in the prolongation of the axis of the

* Concluded from p. 149.

microscope, by placing between the objective and the image, the light serving as unity; then mask the more distant light by a screen, next effect the compensation, then remove the tested light and the screen, and operate upon the second. This can all be done so rapidly, and in so short a space of time, that the type light will not have sensibly changed. In this manner we can measure the lighting power of the moon in its different phases; or the brilliancy of a platinum wire under the influence of currents of varying intensities; or the electric spark, or the light of Geisler's tubes. The comparison of optical instruments, with regard to the light, they transmit, is very simple. For a telescope, we know that when it is directed towards an object at an infinite distance, they emerge from the eye-piece parallel: it is sufficient to compare the lighting power of one section of this emergent luminous cylinder. To this end, we direct the telescope towards a point in the sky, then place the axis of the microscope in the prolongation of that of the telescope, the aperture of the object-bearer upon the aperture of the eye-piece: we then take the measure by removing or bringing nearer the constant type-light of the anterior portion of the photographic image. In comparing different instruments the operation is rapidly performed either under a serene or a covered sky. We operate in the same manner with a microscope. The light reflected by plane mirrors will be the same as that described for roughened surfaces. It happens that with a perfectly polished silver mirror, formed of a silvered plate of glass, there will be, at least for a certain incidence, more light reflected than from a metallic surface; that is, the light reflected by the surface of the glass will more than compensate for the loss produced by the glass covering the metallic plate.

This method is also important for studying the curved mirrors and convergent lenses employed in light-houses. M. Dove essayed to ascertain to what point the parallelism of the rays destroys the influence of distance upon the diminution of intensity. The instrument can also be employed as a diaphanometer in studying a fixed light under different atmospheric conditions. It can also be employed advantageously during eclipses of the sun.

Finally, by placing the microscope vertically in a room, the light which falls from above upon the object diminishes rapidly upon removing from the window, while that reflected by the mirror turned towards the sky remains always the same. By this method, therefore, we can ascertain if places are equally lighted, which is an advantage for photographic experiment, and is available also in medicine. We can also compare the intensity of the light of the sun at equal heights in both hemispheres. Lastly, the method has a practical application in appreciating colouring materials, the effect of which depends upon the quantity of light they reflect, and their colour. For the latter, we cannot easily make prismatic analysis with an opaque body, but this is not the case when acting by absorption. It will suffice to indicate by a given colouring matter, the luminous weakening it undergoes by the superposition of a given coloured glass, a weakening which may be measured with the aid of the photometric microscope.

M. Dove also points out the use of arragonite as a polariser. A prism of 45° must be cut, the edge of which is parallel to the faces of the prismatic crystal. With a prism of crown glass of 45° we achromatise one of the images: if the angle of this crown glass prism is 30° only, there is then a feeble colouring, which is shared by both images. In a similarly compound prism, the distance of the images is 3 : 2, in relation to a prism of Iceland spar, achromatised by a glass prism.

## DESCRIPTION OF A PROCESS FOR THE REDUCTION OF SILVER FROM ITS SOLUTIONS.

BY FRANKLIN PEALE.

It may be of service in the art to which the *American Journal of Photography* is devoted, to make its practitioners acquainted with the following process, for the recovery of silver in a metallic form, from its solutions.

The process is very extensively employed in the refinery of the Mint of the United States, where it was introduced by myself when melter and refiner of that establishment.

It is based on the well known affinities of chlorine and silver, and their ready separation by zinc and sulphuric acid. It had its origin in the laboratory of the Swedish chemist Arfwedson, and was used by Mr. P. N. Johnson, of London, in whose refinery I became familiar with its details, and was subsequently enabled to improve it very materially, by the substitution of a solution of salt, in place of the hydrochloric acid previously employed.

By adding in excess, a saturated solution of common salt to the solutions of nitrate of silver, the metal is thrown down, as an insoluble salt, the chloride of silver. The precipitate must then be carefully washed until it is entirely "sweetened," or freed from the presence of nitric acid.

Granulated zinc must then be added to the chloride, and stirred through the mass. The finer the zinc has been granulated, the more rapid will be the reduction Dilute sulphuric acid must also be added, and the whole stirred until the reduction is complete, which will be known by the entire disappearance of the white chloride, and its conversion into a grey powder. A new set of affinities takes place, with great rapidity, in this combination, and the chlorine is liberated from the silver, which takes its metallic form, as above stated, in the appearance of a grey powder.

The zinc having been added in excess, must now be removed by the addition of dilute sulphuric acid; after all action has ceased the solution of zinc must be decanted, or drawn off with a syphon, and the silver washed until "*sweet*," or free from acidulous matter, after which it may be dried by pressure or the simple application of heat in a pan over the fire, when it will be ready for melting, with the usual fluxes or re-solution with nitric acid.

This process, as you will perceive by my brief description, is rapid and easy; is not subject to loss; it will yield in the terms of trade, pure silver, of a quality from 994 to 998 thousandths fine, and is therefore well adapted to the preparation of pure nitrate of silver for the use of photographers and all others who have need of a reliable article.—*American Journal of Photography.*

## NATURE OF THE PHOTOGRAPHIC IMAGE.*

As an appendix to our notice of the recent researches on the composition of the photographic image, it will be of interest to our readers to note how near some of the early experimentalists on this subject were in arriving at the correct solution of this difficult problem.

As long ago as 1777 the illustrious Swedish chemist, Scheele, turned his attention to the action of the differently coloured rays of light upon silver compounds, and in a very rare treatise † he anticipated, by nearly three quarters of a century, the results and deductions of later times. The following account of one of his experiments is of sufficient interest to be worth transcribing at length:—

"I precipitated a solution of silver by sal-ammoniac; then I edulcorated and dried the precipitate, and exposed it to the beams of the sun for the space of two weeks, when the surface of the white paper grew black, after which I stirred the powder, and repeated the same several times. Hereupon I poured some caustic spirit of sal-ammoniac on this, in all appearance, black powder, and set it by for digestion. This menstruum dissolved a quantity of *luna cornua* (chloride of silver), though some black powder remained undissolved. The powder having been washed, was for the greater part dissolved by a pure acid of nitre, which by the operation acquired volatility. This solution I precipitated again by means of sal-ammoniac into horn silver. Hence it follows that the blackness which the *luna cornua* acquires from the sun's light *is silver by reduction*."

Again, Scheele writes:—

"I mixed so much of distilled water with well edulcorated horn silver as would just cover this powder. The half of this

* From the *London Review*: given as an appendix to a *résumé* of Mr. Malone's paper on that subject.

† Scheele, Traité de l'Air et du Feu.

mixture I poured into a white crystal phial, exposed it to the beams of the sun, and shook it several time each day; the other half I set by in a dark place. After having exposed the one mixture during the space of two weeks, I filtered the water standing over the *luna cornua*, grown already black; I let some of this water fall by drops in a solution of silver, which was immediately precipitated into horn silver."

From these extracts it will be seen that Scheele, as early as 1777, showed that the action of light upon chloride of silver was to separate a black powder from it; by digesting this in ammonia, the excess of undecomposed chloride of silver was dissolved away from the black powder, which was shown to be metallic silver, by its dissolving in nitric acid, with evolution of red vapours, and formation of ordinary nitrate of silver. He also showed that when pure chloride of silver was decomposed by light, under water, chlorine was given off, which could be detected in the supernatant liquid by the usual tests.

The matter since appears to have attracted little attention from philosophers until it was taken up by Robert Hunt, one of the earliest and most diligent workers on the subject of the chemical action of light, and an experimentalist, to whom photographers will always owe a debt of gratitude, for the valuable light he has thrown upon these obscure phenomena. In the first edition of his "Researches on Light," published in 1844, are given his first experiments on this subject. A long series of experiments were subsequently published by him in the *Philosophical Magazine*, and at the meetings of the British Association. These were all collected together, and their results given at pp. 79–80 of the second edition of his "Researches," published in 1854. He here states that many experiments were tried in order to ascertain the condition of the chloride of silver, after it had been darkened by exposure to light, but he only gives the details of the most satisfactory. He prepared pure chloride of silver with great care, and then, after it was perfectly washed, dried it.

"Five grains of this were put into a long test-tube full of distilled water, and placed in the sunshine to darken, the powder being frequently moved, that every part might be acted upon by the sun's rays. It was found, even after an exposure of a few minutes, that the water contained chloride; it became opaque on the addition of nitrate of silver, and this very gradually increased as the chloride darkened. The darkening process was continued for several hours, after which the solution was filtered to free it from chloride of silver, and nitrate of silver added to the silver solution; this precipitated chloride of silver, which, when connected, dried, and weighed, gave 1·4 grains on one occasion, 1·0 grain on another, and 1·5 grains on a third trial."

Mr. Hunt states that "it is evident from this that chlorine is liberated during the process of darkening."

Experiments were next tried in which the chloride of silver was formed on the surface of paper, to ascertain the effect of organic matter in modifying the action of light; the result being stated that "we have hence very satisfactory proof that metallic silver is eventually formed on the surface of the chloridated photographic papers, and that the under sensitive surface is preserved in the condition of a *subchloride of silver* by the opacity of the superficial coat."

From other experiments, Mr. Hunt states that he is inclined to believe that "the first action of the solar ray is to liberate one half of the combined chlorine, which is very readily, moisture being present, replaced by oxygen. By the continued action of the exciting cause the oxide is decomposed, and metallic silver, in a state of fine division, is formed over the surface."

An experiment is subsequently given to prove that oxygen is absorbed by the decomposing chloride.

It will be of interest to compare the results obtained by Spiller with the above experiments of Scheele and Hunt. In a paper published in the *Philosophical Magazine* for March, 1860, the first-named gentleman sums up his results in the form of three propositions:—

"1st. That chloride of silver, when decomposed by light, is separated into its elements.

"2nd. That this change does not usually extend to the whole bulk of the material operated upon, on account of the opacity of the darkened product mechanically protecting a certain portion of unaltered chloride of silver from the action of the light.

"3rd. That the degree and rapidity of reduction is influenced by the state of division of the particles, and by the presence of agents capable of absorbing the chlorine when liberated from its combination with silver."

These are stated to be in conformity with the previous results obtained by Dr. Guthrie, MM. Girard and Davanne, and generally also with those of M. Van Monkhoven, and to a certain extent opposed to the views advanced by Messrs. Hadow, Hardwich, Llewellyn, and Maskelyne in their joint report upon this subject, recently presented to the meeting of the British Association.

This subject appears to be one of considerable interest, judging from the correspondence which has reached us on the subject; but, notwithstanding the assistance with which we have been favoured by many correspondents, and our own inquiries into the matter, we are unable to find that the clear and satisfactory explanation given by Spiller, referred to in our previous article, has been *de facto* anticipated by any previous writer. As a fitting sequence to the above extracts, we will quote the entire paragraph in which Spiller's views are stated:—

"Passing in review the results obtained in the foregoing experiments, it will probably be considered that the weight of evidence tends to show that *the metal* is the ordinary product of the chemical action of light upon chloride of silver; and that the principal difficulty which has stood in the way of accepting this conclusion has, in great measure, to be accounted for by the often varying shades of colour presented by the reduced metal, and more especially the transition observed at the moment of removing the unaltered portion of material by the application of the fixing agent. If, in these several stages, the change in physical condition be considered in its proper connection, and due allowance be made for the very important influence known to be exercised over the light-reflecting capacity of these minutely divided particles by very slight modifications in their state of aggregation (quite irrespective of change in chemical constitution), there will then be no longer any difficulty in referring these results, with others of the same class—*e.g.*, the several varieties of gold prepared and examined by Professor Faraday,*—to a series, all of which are capable of similar explanations.

## AMMONIA NITRATE FOR ALBUMENIZED PAPER.†

I have noticed in the *Journal* some remarks regarding what is called an ammonia-nitrate process for albumen paper. I do not think there has been any such yet, if it is possible to use one. Some two years ago I made some albumen prints from view negatives by a so-called ammonia-nitrate process, suggested in your journal at that time.

That process was an ammonia-nitrate solution of sixty or more grains to the ounce in the ordinary manner, then making it strongly acid with nitric acid, silvering the paper in the ordinary way with a fillet of cotton; and after printing, before toning, carefully removing all the acid by soaking in carbonate of soda water. The theory was, I believe, that the acid coagulated the albumen before the ammonia could act, thus preserving the surface intact. I have one print of a view in North Carolina, made there in June, 1860, by that process, which will compare favourably with any we make now; but I do not think the ammonia improved the quality, for I think it did not play any part in the production. I think that coagulating the albumen before or rapidly at the time of silvering is an advantage, and the means by which it can be done at least cost and trouble, is the best.

Your correspondent recommends alcohol; I have been using ether for five or six months for the same purpose, with the same

* "Dr. Faraday showed that the *red* gold precipitated from solution by phosphorous became *violet* merely by the addition of chloride of sodium.—Notices of the meetings of the Royal Institution, June 13, 1856.—J. S."

† From the *American Journal of Photography*.

effect. The solution remains perfectly transparent after any amount of use, and the prints tone easier. My formula might be stated thus:—

| | |
|---|---|
| Water ... ... ... ... ... | 6 ounces |
| Silver ... ... ... ... ... | 1 ounce |
| Ammonia ... ... ... ... | 6 to 8 drops |
| Ether ... ... ... ... ... | 1 ounce. |

Filter and use.

If, in using, the proportion of alkalinity becomes greater, it should be removed with acid. The solution should always be so alkaline that it will turn reddened litmus blue, and *not much more.* It may be well to have a sufficient excess to remove any acidity in the paper, as there sometimes is, but further than the certainty of preventing the presence of the least trace of acid, the ammonia has no use; and the ether gives its greatest benefit by keeping the solution from discolouring. Possibly also it gives a better surface by coagulating it so quickly as to preserve it fine and smooth, instead of being honey-combed by partially dissolving, precisely like the difference between smooth glassy frozen ice, and the same ice after a surface thaw dulling its smooth brightness with millions of minute watery holes.

# Photographic Tourist.

## PHOTOGRAPHIC PENCILLINGS OF AN EASTERN TOUR.*

One of my next pictures—they are all before me in a goodly album—was that of high Olympus, rising grandly above a range of hills,—with water, and a strip of cultivated land, running into it, by way of foreground;—its snowy summit barely visible amidst the veiling clouds, and its majesty and beauty as impressive now as when it entranced the gaze of rare old Homer. I found the best time for this view to be when the sun was rather low towards the west, the white summit being at all other times so nearly invisible as to be quite lost in a photograph. I also photographed the Sultan's palace and the Seraglio; some various groups of Turkish ladies, whom I found assembled on the banks of the sweet waters one Friday (this I did with some fear of interruption, I must confess), when a kind of half pic-nic, half fair, seemed to be under weigh; and, of course, as many of the principal mosques as I could. A minaret or two also figure in my collection—a street scene from Pera—and a very singular contrivance which the fishermen here adopt, and which, when I used to see it in engravings of eastern scenes, puzzled me not a little to account for. Upon lofty piles, rising some thirty feet or more above the water, you see a rude little building, somewhat like a sentry-box, from which projects a long pole, seldom a straight one, whence ropes hang pendant in the water, and droop as they are passed over pullies into the box where the proprietor is ensconced. To these ropes the net is attached, and lowered into the water, which being very clear, enables the fishermen to see when any number of fish are over the net, to suddenly haul it up, and so effect a capture. These singular looking water-watch-boxes appeared so picturesque in the engravings above mentioned, that I used almost to regard them as clever contrivances, due chiefly to the imagination of the artist; but here they are in productions admitting of no such liberties, but looking as picturesque and novel as ever. To resume, I have photographs of some remains of the old wall of Constantine, in a picturesque state of dilapidation, consisting of a strong triple wall, towers, fosse, and gates; of a bird's-eye view, taken from a house-roof on the hill above Pera, which includes in its three pieces the three cities Stamboul, Pera, and Galata, and the Propontis and Golden Horn; of the old Hippodrome's neglected remains, so pathetically associated in our school-boy recollections with the great Belisarius in the height of triumphant fortune, and again with that poor old broken-hearted warrior when, forgotten and neglected, he begged from the meanest of his once worshipping army a scrap of refuse food. Nothing hardly remains there now but a shattered obelisk, and it is probable that in photographs, and in the bronze horses removed from here to decorate St. Mark's, at Venice, will soon be found the only relics of a spot so interesting to the historical student.

This account of my visit to Constantinople, however, must draw to a close, as I have other, and perhaps more interesting adventures to narrate, and places to describe, and I shall now, therefore, only add such information as may prove valuable to my photographic successors, and then push on.

The hotels and *cafés* are numerous enough, but in the name of all that's cleanly choose carefully. One of the best in repute is Mysseries, in Pera, recommended by Murray, although you will not receive a very favourable impression from its exterior. As to eating and drinking, good meat is scarce, good eggs are plentiful, vegetables are scarce and inferior, the famous sweetmeats deserve their excellent repute (although you will scarcely patronize these to the extent the Turks do), and good rice is not wanting. The strong coffee, sour milk and sugar and served up in little filagree nutshells half filled with grounds, require some practice to sip without a grimace; the not less well-known "Kobobs," consisting of fried spiced meat on skewers are not amiss, nor is the lemonade or sherbet. As although the natives have a great horror of absolute thieving, they will not hesitate to cheat, be on your guard in dealing with them. There is some advantage in bringing out gold with you, it being in demand and more valuable there than at home, and you will find also that in notes twenty-five piastres* are equivalent to twenty in silver. The natives won't make these things known to you so I do. I do not know that I need add any further information, so will here for the present conclude. M. H—n.

* Continued from page 130.

## NEGATIVES FOR ENLARGEMENT BY THE SOLAR CAMERA AND OTHER MEANS.

BY AUGUSTE TESTELIN.

Negatives for the production of enlarged photographs should possess certain qualities which do not usually characterise negatives intended for printing directly on paper. An amount of delicacy, purity, and transparency is required for the production of good enlargements, which rarely characterises, and indeed is unnecessary, in negatives for direct printing.

The chief characteristic of a negative suitable for enlargement is its transparency, which should be such that through its densest parts, the lightest traces of a delicate design may be distinguished.

The image, when examined by reflection, ought to be very brilliant, and even if slightly veiled in the lightest tints, should be clear from the numerous metallic spots which are easily remarked in those negatives which have been developed slowly. The transparent parts, should be very clear, while the most opaque portions do not bury the slightest details,

It is necessary to light the model very carefully, in order to preserve as much as possible a perfect resemblance, and too avoid too strong shadows, which always give hard proofs of a disagreeable aspect.

The best negatives are often those which are produced under a clear sky; but in such case the light should not fall directly on the sitter: it should be filtered through some light material drawn across the roof, and spread above the head of the sitter. Very little direct side light should be admitted.

The lighting, in order to produce the most favourable result, should be disposed to give effect to certain salient points of the figure; and, to avoid the exaggeration which might arise through this means, there should be placed near the model, and on the side opposite to that from which

* The value of a piastre is about 2½d English.

the light comes, a blue screen, stretched upon a frame, which will soften the shadows considerably.

The indications here given are but general, but the desired result may be easily obtained by slight modifications; and, to give an example, we should say that a *carte de visite* negative, in which the pupil of the eye and the eyelids are well defined, the hair well detailed, the dress well rendered, the general tone pure and transparent, with little vigorous points giving relief to the figure—such a negative, we would say, is susceptible of furnishing a magnificent enlarged proof on a sheet of paper 22½ by 17½, or even 32 by 24 inches.

It is absolutely necessary to use thin glasses, white and as free from blemish as possible. Common glass will not do, on account of the distortion which it causes in the image. The negatives should not be varnished; but they should be carefully washed and dried very evenly.

We cannot give in this article the details of the process, but have nevertheless thought that it would be useful to indicate the principal characteristics which should belong to this class of negatives. We will conclude by recommending our readers not to attempt the production of large negatives with lenses of short focus; for in all cases the negative to be enlarged should not be larger than 4 or 5 inches square, and should be taken with a whole-plate lens.—*Bulletin Belge de la Photographie.*

## DR. DRAPER'S TANNIN AND HOT WATER PROCESS.

BY CHARLES WAGER HULL.*

The development of tannin plates by the process suggested by Dr. Henry Draper at the February meeting of the Photographic Society has led to results in my hands always hoped for, but hardly anticipated. Beyond all manner of doubt tannin plates are, by this process, *as quick* working as any wet collodion plates that have ever come under my observation. This assertion is a fact *beyond all dispute.* How much quicker I leave each experimenter to judge for himself, proposing only to state in general terms what has been done, rather than ask what cannot be done.

Four tannin plates, alike in every respect, were exposed as rapidly as possible after each other, on the same subject. The light though good, was not brilliant, no clouds or other troubles interfered during exposure; thus all was fair in this important part of the experiment.

Number one was exposed two minutes; number two, one minute; number three, ten seconds; number four, six seconds. All were developed with the same pyro solution, namely, three grains pyro to one ounce of water, and filtered (fresh mixed). The solution of silver and citric acid, of course, was varied, and always should be when using hot water. The hotter the water the more citric acid and less silver, or the developer becomes turbid.

Number one and number two were developed in the usual way, first well soaked in ordinary water, as it runs from the tap. The proportion of citric acid and silver was sixty of the first named to twenty of the latter.

Numbers three and four were treated first to a dose of water 135° until the film was well soaked. During this part of the operation the developing glass warmed by filling with some of the same hot water as had been poured upon the plate. The plate was next drained, on the hand, the developing glass emptied of its hot water, and sufficient of the three grain pyro solution put in for the plate, by this means the developer was raised in temperature to about eighty degrees. It was then flowed on the plate, without the addition of any acid or silver, and a faint image at once appeared, there being for this first addition of developer enough silver always remaining on the sides of the glass. It may be well to remark in this place that if silver is added at first at all freely, a universal reduction at once takes place, which is ruinous.

The image, as stated, was faint, but all was there. The developer was poured back at once to the glass, and the plate was treated to a dose of the same hot water, until fairly heated up again. The developer was now added, a couple of drops of silver and acid solution, being of the proportion of twenty grains of silver to 120 grains of citric acid; with this the picture became stronger, but not strong enough; it was again poured off, more hot water used, a little more silver added to the developer, and so on, making in all some five or six applications of hot water, by which time the plate had gained all the strength which was needed. In these experiments a portrait or combination lens was used, with a one-quarter inch diaphragm.

The writer's conclusions are, that number one was properly timed, and proved a good negative with cold water development.

Number two was under-exposed, not worked in the shadows.

Number three was thin and grey, and the shadows were lacking in clearness, indicating over-exposure.

Number four was all that need be asked for intensity, half-tone, &c.

On the exhibition of these negatives at the meeting of the Society, last evening, these conclusions were fully agreed to you are well aware.

It is here easily seen that the assertion first made, that tannin plates by this process are at least as quick as wet ones is fully substantiated, the time being reduced from one hundred and twenty seconds to six seconds, or the one-twentieth of the old time; again, tannin requiring one hundred and twenty seconds wet, on the same subject, would require only twenty seconds, which, when compared with hot water tannin, is found to require three times as long; thus we have dry plates which require only one-third the wet exposure.

The beautiful cloud picture, made with instantaneous drop on tannin plate, by Mr. Augustus Wetmore, jun., is again a proof that tannin is as rapid as the wet.

Much has been said of late in your journal about "fossils" and mastodons" in photography, by some who practise the wet process only, and can't be coaxed into trying the dry, all of which is very well as a joke, but not desirable when discussing points of practical as well as scientific value.

When a writer of any process, good or bad, has prepared a dozen or two plates, and carefully exposed and developed the same by formulas which in other hands are good, then he may be allowed to speak and state his troubles, but to do so on some assumed theory, and no practice, is rather much in an art which can only progress by statement of facts, and not by assertion of fancies.

The assertion that I think my way of working much better than the way you say you work, and then resting satisfied, will leave the one asserting so far behind those who made the experiment, that he will be hard to find, buried as he will be beneath the rubbish of old formulas, good enough for special purposes, but not good enough for all.

Tannin process doubtless has its faults—what process is beyond improvement? It, however, is not troubled with any difficulties which do not in some degree beset the wet—its chief one being solarization; certainly the wet is not free from this.

In certainty of working it is better than the wet, in detail it is fully its equal, in vigour its superior. In ease and comfort there is no comparison, as all know who have worked both.

* *American Journal of Photography.*

## PHOTO-PAPYROGRAPHY.

In the annual report just presented by Colonel Sir Henry James, it is stated that a method has recently been discovered of producing a negative impression on paper, from which a single copy of a deed or other document can be printed on parchment in permanent ink, avoiding the necessity of transferring the negative copies to zinc or stone before printing. Sir H. James calls this art photo-papyrography. It will be useful where a single copy of a document, or only two or three copies are wanted. Examples of it have been placed in the libraries of the Houses of Lords and Commons. Photo-zincography is more and more proving its value; and a facsimile of "Domesday Book" will be published county by county, or at least wherever any gentleman will guarantee to pay for fifty copies of any county. The art of photo-zincography, which has been discovered and applied for the purpose of making the detailed topographical plans of the kingdom, has thus led to the production of the facsimile of the most ancient survey and terrier of the kingdom, a document such as no other country in the world possesses. The publication of the edition of 1783 is said to have cost the Government £38,000; the types were destroyed by a fire in 1800, and copies are so expensive and so rare, that few can either buy or even refer to one. But now, through this simple and inexpensive process, and by publishing in parts, any one can purchase the portion relating to the county in which he is more particularly interested, generally for 8s. or 10s., and the Government will not be put to any cost whatever. Authentic copies would be made of such documents as are required to be deposited in the public Record-office, and it is said that this would probably save an expenditure of £10,000 a-year. The process is about to be introduced in India and in Canada. A proposition is under consideration for sending a photographer to Simancas, in Spain, to copy some of the despatches in cypher deposited in the Royal archives there, and which are supposed to relate to important events, some time before and after the reign of Elizabeth.

## Proceedings of Societies.

### London Photographic Society.

The usual monthly meeting of the Photographic Society was held on the evening of Tuesday, April 1st. J. Glaisher, Esq., F.R.S., in the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman said that at the last meeting of the society it had been intimated that any gentleman who obtained information as to a suitable place for an exhibition of photographs, was desired to communicate with the secretary. No information on the subject had reached the secretary. The matter had been again discussed in council, and a determination had been come to that a committee should be appointed, to make enquiries and report. This committee was to consist of Messrs. Claudet, Vernon Heath, and Shadbolt.

Lieut.-Col. Stuart Wortley and Horatio Nelson King were elected members of the society.

A series of photographs of the eclipse of Dec. 31st, by Mr. Tucker, of Trinidad, taken at Guapo,* were exhibited by Mr. G. Wharton Simpson.

Dr. Diamond, the Secretary, said it had been suggested that this society should take some active steps in petitioning the House of Commons in the interest of photography, so as to strengthen the hands of the promoters of the new Copyright Bill. He had written to the Chief Baron on the subject, and had subsequently seen him. The Chief Baron thought that the end would be better served by a personal interview with the Solicitor General, who had charge of the Bill; he accordingly saw him, and explained to him fully the claims of photography in connection with the Bill. It appeared that many photographers had written to the Solicitor General, intimating that photographers did not desire that their art should be included in the protection of the intended Act. These gentlemen, it appeared, were those who lived by pirating the works of others. Members were probably aware that the Bill had been read a third time, and had passed the House of Commons the previous evening.

Mr. England then read an interesting paper on dry plates, with a few remarks on instantaneous wet plates. The dry process he preferred was the tannin, with a modification of his own, by which he had been able to secure a rapidity equal to that of ordinary wet collodion, with pyrogallic acid development. The chief peculiarity of this process consisted in the use of a very large proportion of bromide in the collodion, and in the use of honey with the tannin, the preservative solution containing 15 grains of each to an ounce of water. Plates so prepared would keep six months without deterioration. We hope to give Mr. England's paper in its entirety in an early number.

During the reading of this paper, a number of the exquisite instantaneous negatives of Paris were handed round for the inspection of members. They were especially distinguished by delicacy, purity, and freedom from fog. The dark slide used in obtaining instantaneous exposures was also shown. Instead of having a shutter attached to the lens, Mr. England prefers to have it attached to the dark slide. It consists of a guillotine, having a longitudinal slot the whole breadth of the plates, which on passing over the plate as the guillotine descends, gives the exposure. The width, or rather depth, of the slot can be adjusted at will, an aperture of about one inch being the least which could with advantage be used. A number of Mr. England's very perfect instantaneous views of Paris were laid on the table, and received much admiration.

Mr. Shadbolt thought the shutter exhibited was a considerable improvement on those usually employed for obtaining instantaneous exposures, inasmuch as it did not cut off the rays from a portion of the lens; but allowed the full action of the whole of the lens all the time. He remembered that Mr. Kibble, who was the first to take instantaneous pictures on dry plates, had a somewhat similar motion, but it moved in a lateral direction, being carried along by india-rubber springs, and he always liked the motion of the shutter to be in the opposite direction to that of objects in motion in the subject to be taken, so that they might receive the shortest possible exposure. Most of the members present were, doubtless, aware that Dr. Draper had been making use of tannin plates in America for instantaneous purposes. Perhaps American ideas of instantaneous exposures were not quite so precise as those in this country; but, at any rate, it would appear that pictures had been obtained with an exposure of a very few seconds. The method employed for shortening the exposure was the use of heat in developing. Probably, if heat were used in conjunction with plates prepared by Mr. England's method, very great rapidity would be obtained. The effect of the honey would, doubtless, be to keep open the pores in the film of collodion, which, as Dr. Hill Norris had shown, was an important element in rapidity.

Mr. England had tried heat in developing his plates, and had found that it caused the film to crack and leave the plate, which an edging of varnish did not in that case prevent. If it were not for that he had no doubt but that the exposure might be considerably shortened.

The Chairman thought that the discovery of an instantaneous dry process would be one of the greatest achievements yet effected in photography, and hopeless as such a thing had at one time appeared, recent events seemed to render it by no means impossible. He felt sure the meeting would readily express their thanks to Mr. England for his contributions in that direction, and for his interesting paper. Thanks were carried by acclamation.

Mr. Shadbolt said he had been requested by Dr. Carpenter to bring before the attention of the meeting a photographic copy of Chimenti's pictures, regarding which the recent discussion with Sir David Brewster had occurred. He regretted that there was not a stereoscope present; but he might state that he had himself carefully examined the pictures both with a stereoscope and without, and although in that instrument they did appear to present a certain amount of relief, they certainly did not appear to him to have been drawn by any one acquainted with the principles of binocular vision. Some parts only had relief, whilst others were either pseudoscopic or simply confused. The perpendicular lines did not coincide any more than the lateral lines, and many parts showed discrepancy altogether inconsistent with stereoscopic principles. Even if they had been much more perfect than they were, it did not prove that they were drawn with any knowledge of stereoscopic principles, for as Dr. Carpenter had pointed out, they might have been drawn from the same model simultaneously by two persons differently stationed, and thus getting different points of view.

Mr. England said when he was at Lille he had seen the originals. They appeared to him to have been one traced from the other, the slight alterations in drawing seeming to arise from not carefully following the traced outline in colouring. He had the power of viewing stereoscopic pictures stereoscopically without an instrument. These pictures in the original did not appear to him to be stereoscopic.

Professor Macdonald said he was present at Edinburgh when Sir David Brewster brought forward his paper. He had obtained a copy of the photographs of this picture, which he had not yet separated, so as to examine them in the stereoscope. He suggested as a reason why some persons appeared to see these pictures stereoscopically, whilst others failed to do so, that there was a great deal of difference in the physical organization of different persons, and that some persons from organization had great difficulty in obtaining the effect of stereoscopicity.

The Chairman said as regarded the two eyes of some persons each having a different focus, that was really the rule, and

* See Photographic News, p. 133, vol. v., March 21st, 1862.

the contrary the exception. In most cases persons had the power of accomodating their eyes to the stereoscope notwithstanding. Where the difference between the force of the two eyes was so great as not to permit this, a stereoscope with adjusting eye-pieces should be used.

Mr. Shadbolt said that the remark of Professor Macdonald would have had force as an explanation, if the persons who failed to see the stereoscopicity of these pictures failed in the same way with stereoscopic pictures generally; but where the failure only referred to these pictures, and not to others, the want must be in the pictures and not in the individual.

The Chairman announced that the Council had been taking into consideration means of giving increased interest to the meetings of the Society. As one method, it was suggested that members generally be invited to bring, from time to time, specimens of any interesting photographs they might have produced, or had access to. It was proposed to provide stereoscopes by which slides might be examined if brought as he suggested. He trusted members generally would feel that they could all in some way contribute to the interest of the meetings, and that by so doing all would be gainers.

It was then announced that the subject for the next meeting would be a paper "On Enlarging Photographs" by Mr. Vernon Heath.

It was also announced that the Soirée of the Society would be held in the large hall of King's College on the 25th inst.

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### Amateur Photographic Association.

A Committee Meeting was held on Thursday, the 20th ult., at 26, Haymarket, to select the prize pictures for the season 1861-2, Sir Thomas Maryon Wilson in the chair.

The minutes of the last meeting having been read and confirmed, and the principles upon which the prizes were to be awarded discussed, a certain number of the pictures, selected by the various members of the Committee as entitled to competition, were laid upon the table.

#### AWARD OF THE PRIZES.

Class A.—Nos.
- $\frac{113}{1}$. *On the Teith, near Callander*, by W. Church, jun.
- $\frac{78}{13}$. *Hoar Frost: a Park Scene*, by the Earl of Caithness.
- $\frac{53}{13}$. *Corfu, from the Island of Vido*, by Major* J. D. Shakspeare.

Instead of the Twelve Guinea Medal, three smaller ones, of the value of Four Guineas each, to the respective producers of the above named works.

Class B.—No. $\frac{14}{13}$. *On the Banks of the Severn, near Winterdyne*, by Major Gresley.

#### The Seven Guinea Medal.

Class C.—No. $\frac{120}{11}$. *Fishing Party on the Coquet, Cumberland*, by Henry St. Vincent Ames.

#### The Five Guinea Medal.

Class D.—No. $\frac{58}{235}$. *Floral Festoons in Nature's Garden*, by G. S. Penney.

#### The Three Guinea Medal.

Besides that by Major Gresley, on which a prize has already been conferred, the one numbered $\frac{14}{7}$ is, perhaps, if possible, even more artistic in selection of subject, but not quite so perfect in execution. $\frac{14}{2}$ and $\frac{14}{4}$ are also particularly worthy of commendation; and indeed the whole of this gentleman's contributions display the work of a true artist.

Mr. A. C. Ainslie's, No. $\frac{100}{7}$, is very artistically rendered, exhibiting a field-gate in the shade of a handsome tree; and scarcely less so are *The Gate of Corfe Church*, Somerset, $\frac{100}{4}$; *The Grove at Barton Grange* $\frac{100}{1}$; and *The Waterwheel at Corfe*, $\frac{100}{6}$.

Mr. W. Prideaux's *Fishing House*, $\frac{179}{4}$, is a photographic gem.

Mr. E. Edward's *Cleft in the Rock*, near Aucher Church, Derby, $\frac{92}{23}$, elicited much admiration; as also his *Cloisters at Netley Abbey*, $\frac{82}{6}$, and many of his views in the *Isle of Wight*.

Captain Plaiffin's *Arab Girl Sitting by the Wayside*, $\frac{185}{10}$, is a highly interesting figure subject, admirably treated; and his landscapes, $\frac{184}{2}$ and $\frac{184}{3}$, are deserving of especial notice.

Mr. C. R. Grice's *Market Woman at Aix la Chapelle*, $\frac{114}{14}$, is a good companion to Captain Plaiffin's *Arab Girl*. These belong to a class of subjects that offers much scope for photographic illustration.

Lieut. J. A. Papillon's Chinese illustrations are unusually interesting—some, exhibiting the garden scenes, pre-eminently so.

Lieut.-Colonel Verschoyle has contributed many valuable negatives. *The Cheddar Cliffs*, $\frac{110}{39}$, and *Pier at Lynmouth*, $\frac{119}{46}$, are excellent.

Mr. Ebbage's *Kenilworth*, $\frac{18}{2}$, and scenes at and near Warwick.

The Earl of Caithness's *Avenue at Weston*, $\frac{78}{37}$.

Mr. D, C. Brown's *Scenes at Warkworth*, $\frac{61}{7}$, and $\frac{63}{2}$.

Mr. H. Whitfield's *Vale of Neath*, $\frac{60}{7}$ and $\frac{60}{8}$.

Mr. J. A. C. Branfill's *Pont Aberglaslyn*, $\frac{166}{2}$, *and Pass of Llanberis*, $\frac{166}{3}$.

All the above pictures elicited much admiration, as well as many of the subjects by Major Russell, and medical ones by Dr. Budd. The stereographic subjects are also many of them considered very fine.

In conclusion, the Committee congratulates the members upon the discovery and utilization of so many valuable negatives, of which but an insignificant fraction is indicated in the above list.

* Now Lieut.-Col. Shakspeare, we believe.—Ed.

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## Correspondence.

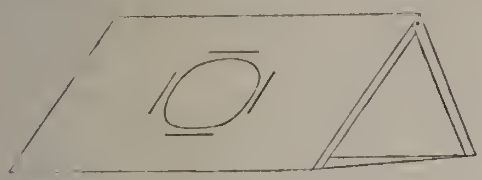
### PAINTING SLIDES FOR THE MAGIC LANTERN.

Sir—In answer to your correspondent who inquires about the preparation of the colours used in painting magic lantern slides, I give the following information. He is quite right in supposing the vehicle to be Canada balsam. The colours used are gamboge, asphaltum, burnt sienna, crimson lake, (in drops) and chinese blue; and sometimes vegetable black for vigorous touches. The various tints are got by a mixture of the above. The mode of preparation is as follows: first take gamboge one ounce and beat into small pieces, put them into a bottle containing two ounces of alcohol and set in a warm place to dissolve the colouring matter or the gamboge: this will take about two days. It must be well shaken from time to time to assist the solution. The supernatant liquor to be poured off the sediment on to a warm slab of glass or marble; the warmth being necessary to assist the evaporation of the alcohol. The colour should be kept in the centre of the slab with a palette knife: it will soon appear thick and opaque. A little Canada balsam must now be added and well worked in, and as soon as the alcohol is all out, the colour will resume its former transparency, and have a thicker consistency; if a little be tried on a glass it will show the color to be a rich yellow.

Next prepare the asphaltum: it is to be dissolved in turpentine and allowed to settle. A little of the liquor may be poured off and mixed at once with the balsam. The other colours, crimson lake, burnt sienna, and chinese blue, are to be ground on the slab in the order written; as the blue is very bad to clean off, it must be done last. The colours are to be reduced to a fine powder on the slab, and a little turpentine added with which the colour must be ground as fine as possible. It may be ascertained how they are going on by taking a little on a brush with some balsam and turpentine, and drying it on a piece of glass. It will take an hour, at least, to grind a piece about the size of a bean, unless you have a large slab and muller, which must be of either ground-glass or marble. The quantity used, however, in each picture is so small that little colour will cover a large number of pictures.

In painting, it is usual to lay on the sky pretty freely with a soft sable brush, a black one is best, and as soon as ready, in order to remove the marks of the brush, it must be dabbed with the end of the finger covered with a piece of kid glove. This requires practice to do well; its object is to give that grain which will be noticed in well painted views. Clouds must be wiped out with a piece of cork. With respect to the balsam, it is sold of qualities so different at different places, that I can only leave it to the judgment of your readers as to how thin it is to be made. I may remark, by the way, that success is only to be obtained by patience and careful working. If I resided near your correspondent I should be happy to give verbal instructions and a little practical aid, but that cannot be.

Now for the easel:—it should be either a thin board or



a piece of millboard with a hole cut in it the shape of the picture, just leaving a margin all round; pieces of wood should be glued on to keep the glass in its place, as it will be better sloped. To the sides of the board, two pieces of wood, by way of legs, are to be fastened on with pins, as in the diagram, turn this to the light, and place a piece of white paper on the table to reflect the light through the view.

The colours are best kept in little pots that have covers, such as I have seen used for lip-salve. A little water should be put over to keep them from drying when not in use. As much as wanted to be taken out for use on to a piece of glass with white paper under. Should your readers require further information I will do my best to reply.—I am yours truly, R. A. L.

## PAINTING MAGIC LANTERN SLIDES.

Dear Mr. Editor,—Having practised painting magic lantern slides, both for sale and exhibition, and frequently given lessons in the art, allow me to offer Mr. B. Jones the information he requires, I must premise that Mr. Jones must not hope to succeed to any degree of perfection, unless he has had some artistic practice, and thereby gained some knowledge of colour; if he has followed the department of miniature painting so much the better, as slide painting requires very neat handling, highly effective colouring, and exceedingly correct outline, as they have to bear being highly magnified, when every blemish becomes exaggerated and faults in outline appear extremely ridiculous. Mr. Jones is wrong in his conclusions, as regards the use of water colours; many of the best painters of slides use none other. As Mr. Jones merely wishes to colour photographs, he will find his task mere play compared with painting a slide from the outline to completion.

Supposing, then, he has a transparent positive on glass from a fully exposed negative—a landscape will be the most likely for him to succeed with—it must be varnished with a very hard varnish, such as turpentine will not easily act upon. He must contrive for himself a glass easel, under which, and lying flat on the table (while the easel with its glass plate stands in the usual position), must be placed a sheet of white paper, so that while he works he can see what progress he is making; he must also sit facing the light, which, if matters are properly arranged, will strike on the white paper, and be reflected through the picture he is painting. He must use colours ground very fine. Tube colours will do if not mixed too thin; they must be re-ground with mastic varnish just before use; those colours only which are transparent are of service; highly rectified turpentine, or camphine, is used as a vehicle. A clean rag must be added for wiping the fingers. Having everything in readiness and placed in proper position, the picture being on the easel he must begin with the sky, which we will suppose to be that of a fine day near sunset. Let him take a very little of the prussian blue on the tip of the second finger of the right hand, and dab the sky over about half way down, not caring for trees, buildings, or anything that may run into it but working all over it. Having by dabbing with the finger obtained a fine and even layer of colour, wipe the finger dry on the rag, and soften the blue upwards so that the top part is the colour wanted, but fading from that to tan glass: take then (the finger being wiped clean), some madder carmine and dab it on so as to blend it with the blue producing a gradation from blue to faint rose. Wipe the finger clean and with a little indian yellow blend into the rose so as produce a golden horizon. When all is done satisfactorily, with a paper stump wipe off the colour where not wanted; proceed to tint the other parts of the picture with sable pencils, never putting more colour than will appear clean and even, but strengthen the colours again and again if required, letting the picture dry between each coat, being very careful not to move the colour already laid, finish by scraping the highest lights out with the point of a penknife, then varnish. Be very careful to avoid dust, as every speck will show. When exhibited, there are many tricks of manipulation, but to enter into the whole process from beginning to end, would be subject sufficient for more than one article; the information now given, will I am sure enable Mr. Jones with a little perseverance, to paint a landscape respectably. Beautiful dioramic effects may be obtained by various appliances with a little ingenuity.—I am dear sir, yours truly, T. P. E.

[We have a letter on this subject from Mr. Gulliver, which will appear in our next. Another correspondent states that Cox's "Photographic Tourist" contains some information on the subject; and we may add, that an excellent work, giving detailed instructions for painting glass, is published by the Messrs. Rowney at a shilling.—Ed.]

## SALTS OF MORPHIA FOR DRY PLATES.

Sir,—I hope you will permit me to extricate myself from the voluminous correspondence I have received, and still receive, by stating in the next number of the News that I must decline answering letters *privately*, for it involves the use of so much time. To dry plate photographers the best formula for the morphined plates is this, add the muriate of morphine to the bath, this precipitates muriate or chloride of silver, which is then filtered out, and nitrate of morphine remains in solution, excite the plates in it, using a bromo-iodized dry collodion, expose when fresh from the bath, or wash away all nitrate of silver, and then expose before drying, or dry first and then expose, there is not very great variation in the sensitiveness either way.

The acetate of morphine I have used in the collodion only, it may be excited in the bath containing the nitrate of morphine, or the usual solution, and if there is to be any accelerating power the plates should be exposed fresh from the bath.

For the dry plates, plain pyrogallic acid and water development is productive of results, afterwards intensify with pyro, citric acid, and silver, these remarks hold good for the same plates washed and exposed before drying.

The keeping qualities of the plate must be good, there being nothing but iodide and bromide of silver, and the pyroxyline to decompose.—I am, sir, yours respectfully,

Wm. Bartholomew.

The Fine Art Copyright Bill.—The Bill for amending the law of copyright, as relating to works of fine art, was read a third time and passed the House of Commons on Monday evening last.

## Talk in the Studio.

Proposed Office for the International Sale of Photographs.—We have received from M. Edmond Potonié, of 6, Alderstrasse, Berlin, the prospectus of a projected office for the international sale of photographs. The object is to facilitate the distribution throughout the Continent of the best works of the best artists, and it is proposed to publish a universal catalogue of all photographs which are intended for the means of international sale. Depôts will be established in large cities. Photographers interested in the matter are requested to communicate with the gentleman above-named.

The late Prince Consort.—We have received from Mr. Wood, of Edinburgh, a lithographic portrait of His Royal Highness, the late Prince Consort, which, to photographers, possesses great interest as a rare illustration of the perfection with which the characteristics of a photograph may be reproduced in an artist's drawing on a lithographic stone. The portrait before us is from Rejlander's photograph of the Prince already noticed in these pages, and renders in an admirable manner all the photographic minutiæ with some superadded qualities within the power of the draughtsman, but not always under the control of the photographer. The portrait is very striking as a likeness, and very perfect as a specimen of lithographic art. Messrs. Schenk and Macfarlane, of Edinburgh, are the photographers; and Mr. Wood, of the same city, the publisher. We understand that the same gentleman is about to publish an enlarged lithograph of Rejlander's "John the Baptist."

The Power of Photography.—Photozincography is certainly a stupendous word, but its stupendousness is well suited to the art of which it is the verbal exponent. If photography works wonders, photozincography, in the matter of multiplying ancient manuscripts, works nothing short of miracles. If the bards of old Greece were astonished at the daring inventions of the men of their day, how would they marvel were they but conscious, as they lie peradventure beside their nectar, *ἑκὰς ἀνδρῶν ἀλφηστάων*, of the audacity of our age, which, not content with making the steam its bond-servant and the lightning its messenger, borrows the very rays of the orb "that. with surpassing glory crowned," looked from its "sole dominion like the God" of the new-born world, to produce us *à discretion* the long-forgotten records of ancient men and ancient times! The men of our day are bolder than Prometheus: he filched but a reedful of fire for mortals (*ναρθηκοπλήρωτον δὲ θηρῶμαι πυρὸς πηγὴν κλοπαίαν*), they press into their service the blessed sun itself. And he makes an unexceptionable servant. He is always up in the morning at the right time; he is always accurate; he is never weary; he never gossips; he is never impertinent; and though he may be said to drink a good deal, his beverage is principally water. He occasionally looks sulky, too, and sometimes appears to be absent, but it is only in appearance; he is always at his post, but nebulous enemies surround him and impede his action.—*The Critic.*

## To Correspondents.

J. E. B.—Many of the lenses by the maker you name are very good. Use your aceto-nitrate bath a little more acid; wash carefully to remove all free silver; add a little more citric acid to your developer, and develop more slowly. The use of a very powdery collodion, especially if over-iodized, will sometimes cause the whole of the image to be dissolved. Painting any portion of your glass with white lead will keep out a great deal of light. If you wish merely to keep eyes out of the room, there is a method of treating the glass with Epsom salts, which will effect this without stopping out much light. Your positives are pretty good; but some of the negatives would have been better for longer exposure. Avoid white backgrounds for portraiture. Some formulæ for varnishes have recently been published in the News. Those who have used that recently given by Mr. Fitch speak very highly of it. You can doubtless buy the white varnish at an oil shop. We apprehend that albumenized paper may be sent rolled and open at the ends, by book post. We cannot say with any certainty where you can get it certainly of good quality. We have recently seen fine samples, both from Sandford, Marion, and Bourquin. Your dry plate negative would apparently have been better for longer exposure or slower development. You need not apologize for troubling us. We shall always have pleasure in helping you to the best of our ability, so far as it is possible to do so in this column.

G. A.—Mr. Hannaford's or Mr. Bartholomew's modification of the Fothergill process consists in adding nitrate of silver to the albumen solution containing ammonia. The object is, primarily, to gain a more even coating of albumenite of silver; and secondly, to increase the sensitiveness. The proportions recommended are: the white of an egg, three ounces of water, and 12 minims of strong ammonia. To this, nitrate of silver is added, drop by drop: a precipitate is first caused, which is then redissolved by the ammonia. As soon as the precipitate ceases to be dissolved, stop. See Mr. Hannaford's paper on the subject at the South London Society on p. 183 of our fifth volume.

E. F.—We cannot give you definite information on the commercial value of stereo negatives. It entirely depends on the interest of the subject, and the excellence of the quality. We can only repeat our former advice; write to the various publishing houses, and send specimens. If they do not answer you, it is simply an indication that your subjects are not in demand. The fixing of diaphragms into compound lenses is the work of an optician; your own ingenuity may supply them for a temporary purpose.

A.—There is no secret in getting an even background, except careful and skilful manipulation. We can only conjecture which part of your manipulation is at fault from the specimen enclosed; but it seems probable that after washing away the iron. you applied pyro and silver at once to the plate, which not flowing evenly and taking kindly at once to the surface, deposited the silver in patches upon those parts it was first in perfect contact with. To avoid this, apply the pyro solution at first without silver, and pour it on and off once or twice, until it flows evenly; then return to the developing cup, and add a little silver; mix thoroughly, and apply again, when the deposit will be even and regular. With the exception of the uneven background, the photographic qualities of your specimen are very good. A little more grace might have been secured in the pose; the head is too much thrown back.

Juvenile.—There are many contrivances for rapid washing; but we have not seen any which it would have been wise to patent. We cannot, of course, say whether your plan is worth patenting, as we are in entire ignorance of its character. Not one photographic patent in ten pays its expenses. How do you assure yourself that the hypo is quite gone?

No. 35.—We should not recommend the addition of a third lens to a double combination for the purpose of shortening the focus. To have such an addition made by a first rate optician would be more costly than the result would probably be worth; and if done at random, or by an incompetent person, would be useless. We do not know who did this work for Mr. Archer; and from what we have heard of the results, we should not think it any particular gain to learn.

Non Success.—A creamy film in the bath depends on several causes: the character and quantity of the pyroxyline, the strength of the silver bath, and the quantity of iodides. &c. One of the likely means to secure it and obtain more intensity at the same time, is the addition of a little more pyroxyline to the collodion. A low temperature will sometimes keep the film of iodide of silver thin and blue.

One in Trouble.—If the use of kaolin, citric acid, or a chloride fail to clear your silver bath, the best plan will be to precipitate the silver in this and make a new one.

Col. Alb.—It is not desirable to dilute the albumen solution so largely as you propose. 2. Authorities differ as to the drying of collodio-albumen plates, in their first stage, in daylight. Mr. Wardley, an excellent authority, says emphatically that it injures the brilliancy of the negative. Where there is doubt on the subject follow the safest course.

S. B.—The solution of gallic acid for final application to Fothergill dry plates may be used in a dipping bath. It may be kept if closely corked and a little camphor added; but we should prefer to use it fresh. Careful manipulation is the only mode of preventing markings from the irregular flow of the albumen. Or if the whole of the free silver have been previously removed, such marks will not be so likely to occur.

Gold.—To precipitate the gold in your old toning baths add protosulphate of iron. This will throw down the gold in a dark powder.

A. B.—The proximate cause of the cracks in your varnish is probably damp. Imperfect washing after fixing, or the use of a bad varnish would aid the result. 2. About an ounce of acetate of soda to a pint of water; immerse the prints about ten minutes.

Focus.—Your letter has been mislaid. If you will write again we will answer by post to save delay.

A Novice.—There are several excellent instruction books published. One of the most recent and best is that by Mr. C. Jabez Hughes. Common earthenware dishes will do for printing solutions, but take care to keep each always to its own purpose.

J. H. Redin.—Mr. Fitch gives the recipe at the close of his paper. It is simply "white hard varnish" purchased at an oil shop, and diluted with methylated spirit to a proper consistency.

Excelsior.—The faults in your prints arise from the negatives as much as from the printing. No. 1 is from a poor under-exposed negative. No. 2 the negative is better but thin, and the positive is overprinted and over-toned. The quicker paper is dried after sensitizing the better, but it should not be done in even a subdued white light. It will not be injured by exciting at night and printing and toning next day. 2. The smaller the circle an arc of which your Latimer Clark camera travels, the greater the apparent amount of relief in the combined images, but at the same time the smaller more toy-like and unnatural the effect. The greater the circle, and the less convergence, the better and truer the effect. Of course the adjustment must be made with some reference to the position of the pictures on the plate.

F. G.—Other things being equal, it is possible to take equally good pictures on either wet or dry collodion plates. There is no necessity for dry plate pictures to be either coarse, spotty, or hard. Proper exposure and careful development, especially the latter, are the most important points.

Wm. Gillett.—You will find an article on the construction of glass rooms on p. 73 of our third volume.

A. Tyro.—Your prints were imperfectly fixed. Either the hypo was too weak or the prints did not remain in long enough. The first action which takes place on putting the prints in hypo is the formation of hyposulphite of silver, which is next dissolved by the excess of hyposulphite of soda. If the solution is not strong enough, or the prints are not left in long enough, the hyposulphite of silver is not dissolved, and becomes decomposed in the course of washing, producing the dirty, brown, speckled effects your prints show.

J. H.—A portrait combination with lenses of 12 inches diameter, and 60 inches focus, by a first class maker, would cost from £80 to £100, or possibly much more, so far as we can conjecture. The length of room required would entirely depend on the size of the figures you require to produce.

Gravity.—The use of a specific gravity bottle is to ascertain the strength of the fluids, by their relation in weight to a similar bulk of water. You will find the principles and mode of use explained on p. 248 of our third volume.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 188.—*April* 11, 1862.

## TO ASCERTAIN THE EQUIVALENT FOCUS OF A COMBINATION OF LENSES.

The question is frequently asked: What is the simplest and best method of ascertaining the equivalent focus of a combination of lenses? Photographers are rarely familiar with the exact equivalent foci of the various lenses with which they are working. It has happened that amongst opticians the custom has obtained—more to meet the exigencies of the camera maker, than with any intention to mislead photographers—of stating the focus as measured from the back lens to the ground glass, which is, of course, always shorter, by an amount varying with the construction of the lens, than the real or equivalent focus. In answer to the above question a formula apparently very definite, has usually been supplied, and the querist has been directed to take a single lens, say a spectacle eye, and having as carefully as possible ascertained its focus, compare the size of the image formed by it on the ground glass of a camera, with the size of the image formed of the same object at the same distance, by the compound lens which is the subject of the enquiry, and then compute the length of the unknown focus by the relation between the respective images and the known focus. The rule has been stated thus: divide the known focal length of the single lens by the fraction representing the linear dimensions of the image formed by the single lens and the combination. Thus; let the focal length of the single lens equal 12 inches, and the images formed by it and the combination be as 3 to 2; then $12 \div \frac{3}{2} = 8$ inches, the equivalent focus of the combination required. Or to put the matter more popularly, proceed thus: suppose the focus of the single lens to be twelve inches, and the image formed be three inches in height; suppose also the height of the image of the compound lens under the same circumstances be two inches; then as three are to twelve so are two to eight: eight inches then would be the required focus of the combination. Now, although this is a very simple, and at first sight appears a very correct mode of going about the business; yet it is troublesome, and involves some sources of error; the standard of comparison—the focus of the spectacle eye—being an uncertain thing. Another method, which renders necessary a series of processes with a telescope—which, by the way, not every photographer possesses—is still more troublesome and complicated, and involves, therefore, still more sources of error. To avoid all this trouble, it has been sometimes recommended to get an approximate idea of the equivalent focus by computing it from the central stop, or from a point midway between the front and back lens. This method involves too much of assumption, and is altogether too much of the character of guess work, to be of any scientific value.

Happily there is, however, a much simpler method than any of these, and more free than any of them from sources of error. Let the querist proceed as follows:—take a map, an engraving, or sheet of letter-press, and fasten it flat against a well-lighted wall; now mark distinctly off a portion, say three inches. Proceed to draw out the camera and focus the subject accurately, taking care that the image is the exact size of the original, which will be ascertained clearly by observing that the three inches marked off in the original measure exactly those dimensions on the ground-glass. As most of our readers know, the camera is now extended just double the equivalent focus of the lens. But the question arises, from what part of the lens to the ground-glass shall we measure? This is just the point where the plan we are describing simplifies the matter; *now remove the lens altogether*, and measure the distance, from the object focussed, to the ground-glass; *one-fourth of that distance will be the equivalent focus of the combination of lenses, no matter what their construction.*

To illustrate: we have just tried this method upon a Dallmeyer's No. 1 triple achromatic lens in our possession, No. 2282. Extending the camera and focussing an engraving, carefully adjusting the length of the camera until the engraving and its image were exactly the same size, and the image perfectly sharp, we then removed the lens and measured the total distance between the engraving and the ground-glass: this we found to be $31\frac{6}{10}$ inches. Dividing this by 4 we obtain $7\frac{9}{10}$ inches, which is the equivalent focus of the lens in question. We may incidentally observe that measuring from the central stop to the ground-glass, we also found that in this instance the distance was as nearly as possible the same as the equivalent focus.

This plan is so simple in practice, and so correct in result, that our readers will have no trouble in future in ascertaining the exact focal length of any lens in their possession.

Regarding another interesting question associated with this, the method of ascertaining the extent of angle included, by the relation between the area of definition and the equivalent focus, it is not so easy to state the matter in a simple and popular form for the unscientific reader. But as it has become of late a favourite practice of the advocates of various lenses, to state that they include an angle of 60°, that statement may be very easily tested. If the diameter of a circle of perfect or satisfactory definition be equal to the equivalent focus of the lens, then it includes 60° in a circular picture; but as most views are cut into the form of a parallelogram, the extent of definition on the horizontal line should equal the equivalent focus of the lens, in order to include an angle of 60° as popularly understood.

## PHOTOGRAPHY IN AMERICA.

We have much pleasure in announcing that we shall in future be able to keep our readers very definitely informed of the progress of photography in America. We have derived, from time to time, much information which has been interesting and instructive from the pages of the American journals and from various transatlantic correspondents. We hope in future to supply that information in a more systematic form by direct correspondence with F. F. Thompson, Esq., Secretary of the American Photographic Society, and principal of a banking-house in New York. We append his introductory note, from which it will be seen that amateur photography is rapidly on the ascendant in the States, and that the dry collodion processes, which, until recently, received but little attention, are receiving considerable attention with very successful results:—

"2, *Wall Street, New York, March*, 20, 1862.

"Dear Sir,—Being one of your American subscribers, and having benefited much by reading your News, I think it would be a small return for me to send you whatever I can which may be of use to you.

"The number of amateurs in our country is rapidly increasing, and in time we expect to be as numerous as you are in the motherland, and even more so, for the American temper grasps fashion quickly, and a fashion here develops into "the rage." We have already organized "The Amateur Photographic Exchange Club," an informal association of very little machinery, but of very smooth workings, as your readers will see by the brief rules appended.

"Rules of the Amateur Photographic Exchange Club.

"1.—None but amateurs in the art shall be recognized as members, and the number shall not exceed forty.

"2.—No member shall forward for exchange any work not his own.

"3.—Every member shall forward each other member on or before the 15th of January, March, May, July, September, and November, at least one stereoscopic print, a copy of which has not been sent before, or its equivalent, mounted and finished.

"Every member shall keep a book account with each other member, charging each print sent, and crediting all received. Should any members desire to exchange with any others oftener than bi-monthly, they can do so by agreement.

"5.—Any one failing to send one print bi-monthly, shall be struck off the book of the party he fails to send to, unless satisfactory reason is given for his default.

"6.—All photographs must be properly labelled with a descriptive name, the name of the artist, and the date of the printing, and they must be guaranteed not to fade for two years; and if toned by experimental process, must be marked 'Experiment.'

"7.—Two unmounted prints shall be equivalent to one mounted and finished of the same size. Two card or quarter-plate pictures shall be equivalent to one stereoscopic, and two stereoscopic to one whole plate. Three paper stereographs shall be equivalent to one on glass.

The simplicity constitutes the success of the club. It has been in operation six months, and many hundred photographs of all sizes have changed hands.

"The dry processes have been adopted by almost all the pleasure-working fraternity, although two of our best artists, Coleman Sellers and Robert Shriver, still adhere to the old system of a tent, two assistants, wagon, water buckets 'and a' that, and a' that.' But we will convert even them this season, as there is proposed a grand photographic tour over the late battle fields, and when they, wet with perspiration, each one with a baggage-van, toil beside us dry, with camera and a dozen pictures under one arm, then we shall see 'a change come o'er the spirit of their dream.'

"The main reason of the slow introduction of dry plates here is universal use of iron developer, and consequent ignorance of the usage of pyrogallic.* Our galleries now use the sulph. pottass. to intensify negatives altogether, the finer results of pyro and silver being seldom if ever sought for.

"The hot water development of tannin plates is now the subject of the day with us. I presume you have ere this the particulars of the working of it. Portraits have been taken under a skylight on tannin dry plates in the usual wet collodion time, and developed by this process with perfect success; but as yet there is no unanimity of opinion about the certainty of success, but we fully agree that it is (in American slang) '*a big thing.*'

"Pardon me for writing you such a long letter in the start, for the ladies say the first call must always be a short one, and I'll promise to do better hereafter.—Yours respectfully, F. F. Thompson."

"*G. Wharton Simpson, Esq., Editor*
Photographic News, *London.*"

## ALCOLENE, OR COLLODION WITHOUT ETHER.

Every one who has experimented much in the manufacture of collodion is familiar with the fact that on adding absolute alcohol to pyroxyline made at a high temperature, the latter has become glutinous and has partially dissolved. Mr. Sutton has recently made some interesting experiments for utilizing the solution thus obtained, and for fixing the conditions under which it is produced. We extract from two recent numbers of the *Notes* his description of the characteristics and manufacture of the preparation which he has styled "Alcolene."

"Alcolene is a somewhat thick fluid, resembling a warm solution of starch. It is perfectly colourless when iodized with the usual potassium iodizer, and would probably remain without colour for any length of time. But in making this remark we must be understood to allude to the common iodide of potassium which gives a colourless alcoholic solution. The pure iodide, free from carbonate, is yellow, and this gives of course a yellow tint to the alcoholic solution, and therefore to the iodized Alcolene.

"When a glass plate is coated with Alcolene it flows upon the surface exactly like boiled oil, and as it sets slowly it may be run backwards and forwards over the same place without leaving the marks called curtains, which occur so frequently with common collodion containing a large per centage of ether. The best way of coating a plate seems to be to let the whole body of fluid, after the plate has been covered, flow back again over the plate, and then pour it off from the corner to which it was first allowed to run. Unless this is done, that is to say if the plate is coated in the usual way, there will be found a number of fine parallel diagonal lines in the film produced by the draining towards the bottom corner, and which cannot be got rid of by the ordinary mode of rocking the plate.

"The film requires at this season about three minutes to set, and may then be immersed in the nitrate bath. Strange to say, it exhibits the same greasy lines as a common collodion film when put into the bath, but these disappear in the usual way when the iodide of silver has been completely formed. It is an erroneous supposition, therefore, that these greasy lines proceed from the ether in the film. In order to make sure that ether had nothing to do with them we made a new bath, and the lines occurred in the same way as with an old bath. The greasy lines upon the film when it is first put into the nitrate bath proceed therefore from the repulsion which exists between pyroxyline and water; and this explains the occurrence of the lines a second time on putting a plate fresh from the nitrate bath in a bath of distilled water. This is a new fact which it has been interesting to establish. And another fact may be mentioned here, before we forget it, viz., that the yellow colour which iodide of potassium imparts to collodion is entirely due to the ether which the collodion contains; because Alcolene iodized with potassium is colourless, but takes the well-known yellow colour of iodized collodion as soon as ether is added to it.

"The excited film has a beautiful, even, delicate appearance, and is not what is called creamy; its characteristic quality being freedom from all kinds of markings, curtains, and irregularities. In fact there is no collodion gives so faultless a film as Alcolene. The nearest approach to it is that given by collodion with alcohol largely in excess of the ether.

"The exposure in the camera is the same as with the best samples of common collodion. There is, however, this remarkable property with alcolene, that the negative does not become reddened and solarized in the overexposed parts. We have given to one-half of a plate exposed in a stereoscopic camera, sufficient exposure to bring out all the details of the deepest shadows and greens, and to the other half of the same plate four times that exposure, without solarizing any part of the negative, or producing any difference in the density of the two pictures. The subject was a whitewashed house in full sunshine, with a background of dark rocks and evergreens in shadow; and difficult as such subjects are, the negative was soft and even, and quite clean in the transparent parts. It seems, therefore, that you cannot on the one hand easily solarize a negative upon alcolene, or on the other hand for it by over-exposure. These may turn out to be valuable properties of this compound, whether used alone, or added to other collodion.

"When the iodizer contains the usual quantity of water the developer flows freely upon the film; but when the iodizer contains no water, as in the case of iodide of cadmium dissolved in absolute alcohol, the developer will not flow at all, but shrinks from the film like water from a greasy surface.

"The cadmium iodizer does not gelatinize alcolene, and when it is made with alcohol of the proper strength (·820), the compound works well.

"With respect to the strength and adhesiveness of the film. It might be supposed that such a substance as alcolene would adhere tightly to the glass, like starch, or gum arabic, but the contrary is the case. The film is very tender and skinny, and care must be taken in the final washing, or the negative will be torn and destroyed. There is, however, a very simple remedy for this evil, viz., instead of drying and polishing the plates, as usual, to coat them, while wet, with albumen, and then apply the alcolene to the albumenized plate, when dry. We have taken some capital negatives in this way, and they may be washed with considerable violence under the pump, without injuring the film.

* In a recent conversation with a photographer who had just returned from the States, he informed us that pyrogallic acid was not kept by dealers in New York. He had to try photographic house after photographic house, without success, and finally got it at an establishment where rare photographic chemicals were kept.—Ed.

"The character of negatives taken with alcolene is remarkable softness and delicacy, and they scarcely acquire the necessary density without a drop or two of silver in the developer. This is a kind of negative greatly to be preferred to one in which density is too easily obtained.

"A variety of uses for collodion without ether will no doubt occur to our readers. For instance, in hot climates where common collodion actually boils upon the plate, or sets so quickly as to be unmanageable, alcolene will be the right thing to use. Or where good ether cannot be procured, or if it is dangerous in the transport, alcolene will again be serviceable. We cannot at present recommend it as a complete substitute for collodion, on the faith of a few experiments, because that would be getting on a great deal to fast, and overlooking some qualities, which may be considered defects, but it does not certainly seem to us that the total exclusion of ether from collodion may, for many purposes, and in many cases, prove to be a great gain.

"Some of our readers are probably aware that an excited collodion film, fresh from the nitrate bath, may be preserved for a long time by pouring plain collodion upon it. The second film of collodion does not adhere to the first, and the nitrate of silver imprisoned between the two films cannot lose its moisture, and by becoming concentrated attack the iodide of silver in the first film. Now plain alcolene, thinned with an equal quantity of alcohol, may be used in the same way as a preservative to a wet plate.

"To make Alcolene, proceed thus:—

"Take a slop-bason, capable of holding about a pint. Make it perfectly clean and dry, and put into it, first 4 ounces of oil of vitriol, s.g. 1·83, and next 3¼ ounces of nitric acid, s.g. 1·400. Stir the acids well together with a glass rod, and while the mixture is still at its highest temperature, put the bason into a pie dish, and pour into the latter as much boiling water as will be nearly but not quite enough to cause the bason to float. The temperature of the mixed acids will now be about 175°. Put the whole affair up a chimney, up which the fumes of the acid can escape; and immediately begin to put in cotton wool which has been previously pulled out into thin flat tufts. The best plan is for an assistant to put in the cotton wool a tuft at a time, while you immerse it in the liquid, and stir it about with a couple of glass rods. The cotton wool should be the best corded and bleached kind, such as is sold by surgical instrument makers, at about three shillings per pound. Put in as much as you can easily manipulate in the liquid, and leave it in five minutes, counting from the time of putting in the last tuft. Then remove the bason from the pie dish, drain off the acids quickly into a waste acid bottle, and upset the pyroxyline into a pail of clean water, in which rouse it about with the glass rods for a few seconds and then change the water, and repeat this thorough washing several times. Lastly, leave the pyroxyline to soak all night in water, and the following day wash it well again in several changes of water, and spread it out upon a table, or window sill, to dry spontaneously. When dry it will be ready to be dissolved in the alcohol.

"The success of the operation depends chiefly upon using acids of the exact strength indicated, for if they are too weak, the cotton will dissolve in the acid mixture, and if too strong it will not dissolve in the alcohol. The pyroxyline is also very short and powdery, and unless much care is taken a great deal of it will be lost in the washing waters. The best plan will be to procure the acids of the proper strength, and the same that we always use in making alcolene, from Mr. Baily, of Wolverhampton, who will supply the right thing.

"When the pyroxyline is dry, dissolve it by adding to absolute alcohol, s.g. ·805, about as much as the liquid will cover. Shake the bottle well, and in a few minutes the whole will dissolve to a rather thick solution. Iodize by adding any of the usual iodides or bromides dissolved in alcohol, s.g. ·820, in the usual proportion; that is, one part of iodizer to three parts of plain alcolene, one ounce of which will contain about four grains of the iodide employed. The following day it will be ready for use, and when iodized may probably be preserved for a very long time without deterioration.

"We have given these minute and familiar directions for making alcolene, chiefly for the benefit of those readers who live in those places where good ether and good collodion are not always to be got, or where the heat of the climate renders the use of common collodion open to many difficulties and objections. This journal will reach many such readers months before they could procure alcolene from England, and even if they have never before made their own collodion, our directions, if implicitly followed, will yield a good result. It seems probable that alcolene may have many important uses, and we know of no practical objection to it, which may not be easily overcome by the means stated in the last number. We do not, however, recommend it as a substitute for collodion under ordinary circumstances, but simply as a valuable addition to common collodion which is working badly, either from excess of ether, or from the too skinny character of the pyroxyline. We omitted in the former article to state a good quality of alcolene, viz., that although made with very weak acids, the film is entirely transparent, and free from opalescence."

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Camera Stands.

The principal qualities requisite in a camera stand for the studio are, steadiness, and an easy action of the mechanical parts for raising and lowering the table. There are many designs to be had which perfectly fulfil these conditions.

From its nature this piece of apparatus is almost of necessity somewhat clumsy in appearance when made of wood, as is generally the case, because weight is required to produce the desired firmness, steadiness might be obtained with a lighter section of material by spreading out the base, as is effected with the field tripod stand, but this would be inconvenient in the glass-room, as it would take up too much valuable space.

All studio camera stands should have, besides the principal vertical movement, two other movements by which the camera may be tilted in either direction; but these last should only be used upon very rare and exceptional occasions, excepting for the purpose of placing the camera upon a horizontal level when the floor of the studio chances to be inclined in any direction, and renders a correction in this manner necessary. Generally speaking, portraits are taken with a camera not furnished with a swing-back, and therefore the instrument must be placed perfectly level in order to secure a true and undistorted image of the object placed opposite to it. A neglect of this principle is one of the causes of the want of success some people experience as a rule in getting satisfactory and characteristic likenesses of their sitters; it is also the source of sloping floors, tumble-down walls, and ricketty furniture. In short, it produces a distorted and not a true copy of the object. I have been surprised sometimes to see in publications, where one would not have expected to find such advice, directions given to cock the camera up or down and point the lens at a specified part of the sitter's body in order to get all parts in focus. The picture resulting from such a proceeding, however, well in focus, will inevitably be a misrepresentation of the subject. If an object cannot be brought entirely into proper focus when the camera is strictly level, it is a sign that the powers of the lens are being too highly taxed, and the proper remedy is either to increase the distance between the lens and the object, or to employ a smaller diaphragm.

To facilitate placing the camera perfectly level, it is useful to have a circular spirit level let into the table of the camera stand, below the general surface, so that the camera may be placed over it without touching. This will be found a very useful addition, and quite worth the extra two or three shillings that it costs.

A tray or shelf should be contrived upon each side of the stand, somewhere below the table, one for the focussing-screen, the other for the plate-slide. It will be found very convenient to have regular places in which to deposit them, and where they are ready to hand. The plate-slide has always to be placed somewhere while the focus is being finally adjusted; it must not be laid flat upon table

* Continued from page 159.

or chair, as the drained nitrate should not be encouraged to flow over the plate again, and if stood, as it often is, upon the ground, leaning up against the camera stand, it is very liable to be knocked over, a fate which also not unfrequently happens to the focussing-screen, when this latter is separate from the camera. The trays should, of course, be of a proper form to hold the plate-slide in a nearly vertical position.

The portable tripod stand for field use is admirably suited to its work, and it is difficult to imagine any great improvement being made upon it. Care should be taken to select a triangle top suitable in size to the camera it has to support, as, if the former be too small, it is difficult to secure the perfect firmness of the instrument.

As this triangle cannot conveniently be made to hold a spirit level, it is very advisable, for the reasons given above, if the photographer does not use a camera with a swing back, to carry in the pocket a small circular spirit level, and to place it upon the top of the stand before screwing on the camera, or upon the camera itself when fixed, to enable it to be adjusted quite level before taking the picture. The fall of the country is very apt to deceive the eye. Attention to this is more particularly necessary when working with a binocular camera.

(*To be continued.*)

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Sulphides* (continued).—*Sulphide of lead.*—This sulphide is of importance to the photographer in a negative sense, as it is a body to be avoided rather than used; a knowledge of its properties may, however, on that account be very useful. It occurs native in the form of galena, a beautiful mineral of a metallic lustre, and breaking readily into cubes. From its pretty sparkling appearance, it is much used at the present time for ornamenting ladies' head-dresses, &c. Lead and sulphur have a great affinity for each other, and as there is almost always sulphuretted hydrogen in the atmosphere of large towns, compounds of lead are certain to absorb sulphur and tarnish. This is strikingly seen on the fronts of houses which are painted with white lead. At intervals along a street coloured in this way, there is occasionally an appearance as if a gigantic brush dipped in mud had been dabbed over the painted surface. This discolouration may usually be traced to the presence of a neighbouring gully hole, and the streets which mostly suffer in this way are those in which the sewers are imperfect. The same discolouration is met with in photographic miniatures, in which white lead is one of the colours used. Owing to the annoyance caused by this, the employment of lead compounds for this purpose is ceasing in great measure; the permanent zinc white taking the place of white lead. As explained above, sulphide of lead in the native state has a metallic lustre; when formed artificially by the action of sulphuretted hydrogen on a surface of white lead, it takes various shades of slate colour or brown, according to the depth of tarnish, but seldom appearing black. When precipitated from solutions by hydrosulphuric acid or an alkaline sulphide, it appears as a brown black powder.

There are several sulphides of iron, only the most interesting of which however need be noticed.

*Protosulphide of iron* is prepared on the large scale in several ways. One of the most instructive modes of making it may be met with in most books of chemical experiments. If a poker be heated red hot in the fire, and a roll of sulphur pressed against the hot end, the two will unite and form this sulphide, which being readily fusible, falls in drops, giving an appearance as if the iron were melting. Sulphide of iron is of great value in the laboratory as a source for hydrosulphuric acid. When acted on by dilute sulphuric or hydrochloric acid, it evolves this gas in a state of considerable purity, and is thus of daily employment for chemical purposes. According to Braconnot, the black mud at the bottom of drains contains hydrated sulphide of iron, probably formed by the putrefaction of organic substance in contact with the ferric oxide of earthy matters, and to this it owes its black colour and peculiar smell. Hence when exposed to the air it loses its odour and colour, and afterwards resembles ordinary vegetable mould. With acids it evolves abundance of sulphuretted hydrogen. The black colour of the soil in cesspools, pits, ponds, and morasses, and of the earth under the pavements of the streets, is likewise due to the presence of this sulphide of iron; the ready decomposition of which is the chief cause of the presence of sulphuretted hydrogen in the atmosphere.

Another sulphide of iron which possesses some interest is the bisulphide. This, from its yellow colour, has been frequently mistaken for gold; and we have even heard of considerable sums of money being sunk in mining work, when a very slight knowledge of chemistry would have shown the managers that the only yellow body they had a chance of getting was iron pyrites, as this sulphide is called. The distinctions between this mineral and gold are numerous, and of ready application. In the first place, a touch with a penknife shows that gold scales are soft and easily indented, whereas iron pyrites is hard and brittle. Again, if the two are sprinkled on a red hot shovel, the gold will be unaltered, whilst the sulphide of iron forms sulphurous acid, easily recognised by its powerful odour. If nitric acid be poured over gold, no action takes place; but if the yellow body be iron pyrites, a strong action, with evolution of red fumes, is at once produced. Gold also is about four times as heavy, bulk for bulk, as iron pyrites; so that to a person with very slight chemical knowledge, the mistaking of the one for the other would be simply impossible.

*Sulphide of Mercury*, or *Cinnabar*, is largely used as a pigment; it is one of those valuable colours which is unaffected by a sulphuretted atmosphere, being already saturated with sulphur. Cinnabar is also a very frequent ore of mercury. It is of a very beautiful red colour, the shade varying from deep carmine to yellowish red, according to the mode of preparation. When gently heated over a lamp it becomes brownish; at 250° C., quite brown, and at a higher temperature black; but if the heat has not been strong enough to cause it to volatilise, it recovers its fine scarlet colour on cooling. When strongly heated in the air it burns with a blue flame, yielding sulphurous acid and metallic mercury. Cinnabar is frequently adulterated with brick-dust, oxide of iron, red-lead, and dragon's blood. *Brick-dust* may be detected by heating the cinnabar in an iron spoon, the sulphide of mercury going off whilst the brick-dust is left behind. *Oxide of iron* may be detected in the same way; or it may be dissolved out by boiling hydrochloric acid, and then precipitated in the filtered liquid by addition of ammonia, or converted into prussian blue by nearly neutralising with ammonia and then adding acetate of soda and ferro-cyanide of potassium. *Red-lead* may be detected also by heating the substance, being left behind in the form of a fused protoxide. On boiling the cinnabar with hydrochloric acid it yields chloride of lead with evolution of chlorine. *Dragon's blood* may be detected by the empyreumatic odour which it gives on the application of heat; it also communicates a red colour to alcohol. One of the most curious modes of formation of cinnabar is that discovered by Martius. He places the ingredients for the formation of cinnabar in bottles closed with corks, and packs them in a box which is fastened to the upper beam of a saw-mill. In 24 to 36 hours, at ordinary temperatures, the most beautiful cinnabar is produced; it is afterwards washed and dried. This method not only has the advantage of dispensing with the labour of trituration, but it likewise prevents the hitherto unexplained passage of the cinnabar into the brown state, which is so liable to take place on the application of heat. The ingredients employed vary slightly, according to different modes of preparation. In general they consist of metallic mercury with flowers of sulphur and potash ley, or a solution of pentasulphide of potassium. It may also be prepared by sublimation. In this way the beautiful Chinese cinnabar is prepared. I part of sulphur and 4 parts of mercury are sublimed in an earthen vessel, to which an iron cover, kept constantly moist, is luted. In twenty-four hours the vessel is allowed to cool and is broken; the purer portion of the cinnabar is powdered up and sifted into water, and the fine sediment afterwards collected apart and dried. This cinnabar inclines to carmine colour, and is very expensive, lately, however, means have been found to imitate it in Europe by subliming common cinnabar with sulphide of antimony and then treating the product with solution of liver of sulphur.

## ON SULPHATE OF IRON AS A DEVELOPING AGENT.

BY M. ADOLPHE MARTIN.

Many photographers now employ sulphate of iron as a developing agent for collodion negatives, because they prefer it to pyrogallic acid; nevertheless the latter is preferable in many circumstances. In studying the production of photographic pictures by the aid of sulphate of iron—in order to avoid the reduction that frequently occurs in the surface of the solution, and settles upon the film, from which it is impossible to remove it—I have been led to employ acetic ether, which sufficiently retards the appearance of the image, to avoid this reduction, and also the lines arising from the solution being poured on to the film in sufficient quantity. I have already communicated the result to the French Photographic Society.

But there remains another difficulty to be overcome. The sulphate of iron yields *grey* negatives which acquire sufficient intensity in the high lights only on condition of a little opacity. This is due to the crystalline state under which the reduced silver is found; and the crystals are larger and better formed in proportion as the sulphate of iron bath is more or less acid. This state of the silver does very well for direct positives but not for negatives.

I have thought by eliminating the free sulphuric acid and substituting for it an equivalent quantity of acetic acid, we might entirely avoid this inconvenience and secure to the developing solution the acidity required for it, so that the proof should not become stained by a reduction taking place in the interior of the solution.

I have arrived at the composition of the following developing solution, which is, perhaps, a little complicated, but which has during four months given me and others who have adopted it, the best results, and who have urged me to make it public.

Dissolve 100 parts of sulphate of iron in 500 parts of water; and if the liquid be not perfectly clear, filter it. Pour into it 25 parts of a very clear solution of acetate of lead, of the strength of 10 per cent, a precipitate is formed which must be allowed to subside. The liquid is then filtered, and 25 parts of acetic acid added; lastly, 450 parts of water containing 5 parts of acetic ether, and 5 parts of commercial nitric ether, is added to the above.

The liquid resulting from these mixtures may be preserved for a considerable length of time in well stoppered bottles.

The reaction is easily understood; by double decomposition sulphate of lead and acetate of iron are formed, which meeting with the free sulphuric acid, give rise to sulphate of iron again and free acetic acid.

The proportion of 10 per cent of sulphate of iron, answers very well in the circumstances under which I work, but it may be modified to suit the wishes of the operator.

## ON THE ACTION OF IODINE IN THE SILVER BATH.

BY M. L'ABBE' LABORDE.

I learn from the Society's *Bulletin* that Messrs. Girard and Thouret have obtained results entirely different from those published in my note upon the action of iodine in the silver bath.

I have therefore repeated my experiments, and again proved the accuracy of all that I have advanced, so long as I maintain things in the same condition. I could not attribute to the impurities of the iodides dissolved in the nitrate of silver the neutrality it maintained, notwithstanding the presence of iodine; for I have always prepared the iodide of silver by precipitating it from a mixture of nitrate of silver and iodide of potassium, and washing it in several waters before saturating the silver bath with it.* I then directed my attention to the solution of silver, which, as will be shown, exhibits a peculiar composition.

Before undertaking this research, I found it much easier to prepare a solution of ordinary nitrate of silver, saturating it with iodide, and after proving its neutrality, to introduce the iodine. I repeated this experiment several times, and like MM. Girard and Thouret, I recognized that in these conditions the silver bath quickly becomes acid, notwithstanding that it is saturated with iodine.

As the effect of the iodine depends upon the solution I employ, I shall endeavour to omit nothing while describing its preparation. Those who have justly reproached me with being too laconic, will pardon me any superfluous details, and not forget that my aim is to prepare a silver bath capable of giving an impressionable film of the greatest possible sensitiveness.

I dissolve some pieces of silver coin in nitric acid, and I then precipitate the silver by pure copper, such as the plates formed by the galvanoplastic process for daguerreotype purposes. After simply decanting the nitrate of copper, I throw a little hydrochloric acid upon the silver powder, and allow it to act for about an hour, and then wash it in several waters. I next dissolve the silver powder in nitric acid, introducing small portions of the metal at a time in order to avoid too great liberation of gas, and when the cold acid will dissolve no more, I gently warm it, and continue adding the silver powder so long as it is dissolved. The solution is evaporated to dryness; but I never fuse the nitrate of silver: this operation has too many objections. In this way I obtain a very acid salt, 140 grains of which I dissolve in 1,000 grains of water. I neutralize it by freshly precipitated carbonate of silver, added in slight excess; and I saturate this solution with iodide of silver, prepared in the way described above. I then add 1,000 grains of water, and filter. The method I have already advised for saturating the silver bath with iodide must be followed step by step. If the water it must finally contain be added in advance, it will never take up the quantity of iodide it ought to dissolve, even when we add iodide in excess. In fact, if we add a small quantity of water to a concentrated solution of silver, and which we believe is saturated because the iodide was added in excess, a yellowish cloud is formed, which is immediately redissolved; this fully proves that the solution was not saturated, since after having diminished its capacity for saturation by the water added, it is still capable of dissolving the iodide of silver thus presented to it in a state of minute division. Upon adding a further quantity of water, the weakened nitrate of silver finally rejects what it can no longer dissolve. The silver bath I employ, well saturated with iodide, contains then a feeble proportion of carbonate of silver, for this salt is slightly soluble in water. The part played by the carbonate of silver is easily understood: it neutralizes the acid in proportion as it is produced by the influence of the iodine; but when its action is exhausted, the solution quickly becomes acid. We must then seek another cause.

I have never employed iodine except in such silver baths as have already been in use, and which gave foggy negatives; for in practical photography, so long as a silver bath yields proofs entirely satisfactory, we should avoid "doctoring" it. I make use of a collodion iodized with iodide of cadmium;

* We must remark on this head that the iodide of potassium of commerce is always alkaline, and frequently contains as much as three per cent. of carbonate of potassa.—(A. Girard.)

and to increase its sensitiveness, I add a little nitrate of potassa to it. I have always filtered the alcoholic solution of this iodide before adding it to the collodion—not to separate any oxy-iodide from it, the presence of which I did not suspect prior to the recent communications of M. Martin —but because it is always a good precaution. It is true that by not employing absolute alcohol, I should have dissolved in part this oxy-iodide, and put in action the causes noted by M. Girard, as to verify them upon proofs was not an easy thing to do. I thought of nitrate of cadmium, which is found in large proportion in old silver baths, as every proof leaves a proportion equivalent to the iodide of silver it removes from it. To distinguish its special action I have dissolved it in a solution of silver, saturated with iodide, the acidity of which quickly manifested itself under the influence of the iodine; the presence of the nitrate of cadmium had retarded the acid reaction to such a degree that many days elapsed before it became very evident. I have obtained in a lesser degree the same effect from the acetate of silver dissolved in the bath. I made this second experiment because the ether introduced into the silver bath may acidify it in contact with the air, and transform the carbonate of silver into acetate.

I believe therefore that I am able to attribute to the carbonate of silver and to the nitrate of cadmium the neutrality which appears to persist in the argentiferous solution, notwithstanding the presence of iodine.

Iodide of potassium and iodide of ammonium do not communicate to the silver bath the same properties, for the nitrates are inactive. The nitrite of silver also has no action in this direction. I have been able to satisfy myself of it, as the collodion contained a little nitrite of potassa.

In these experiments we must take into account the secondary actions which I pointed out in my first note: thus, when fragments of iodine float about for a long time, or form bubbles of air in the bath, we perceive them quickly surrounded with the yellow iodide and produce a sensible acidity. To remove these causes foreign to the principal fact, we may at first throw very little of the silver solution upon the iodine, moisten it completely by agitating it, and replace this liquid by that we desire to test.

We must also beware of a fact which I believe it will be useful to note:—When the acidity of the silver bath is very feeble, and we proceed to test it with litmus paper, we must note its action at the very first moments; for after a short time the nitrate of silver forms with the colouring matter of the litmus a greenish-blue lake, which entirely masks the acid reaction; and if, as often happens under other circumstances, we wait, in order to give the acidity time to manifest itself more clearly, this blue tint acts upon the colour of the paper, and tends us to believe in an alkaline reaction, when in reality it is acid.

If it be desired to explain the apparent inaction of the iodine amid the circumstances above mentioned, we may say that it envelopes itself in an invisible film of iodide, which the nitrate of silver saturated in advance, can no longer dissolve, or even penetrate, except with extreme slowness in in presence of nitrate of cadmium: resembling in this respect, nearly, the passivity of iron in nitric acid when covered with an invisible film of oxide, which protects it from all ulterior action.

We may comprehend more easily the impotence of nitrate of silver, if we consider that it is in some measure saturated with iodide in a bath often used, because every operation weakens the nitrate of silver, without however, precipitating the iodide. It is true that it is replaced by nitrate of cadmium, but we may satisfy ourselves by direct experiment that the nitrate of cadmium, does not dissolve iodide of silver. It is recognised now, that, that to obtain a negative, the impressioned film must necessarily present itself to the to the developing agent with a tendency to acidity; a tendency which it will have derived either from the free iodide of the collodion, or from the silver bath. This acidity may be feeble enough to escape chemical tests, and still suffice to consolidate the purity of the whites, with the the maximum of sensitiveness. This is not the only case in which extremely delicate causes produce a new order of things in photography. We know, for example, the injurious action of hydrocarbon vapours: the quantity of these vapours acting at a given moment upon the sensitized film is so minute, that no reagent in chemistry can manifest its presence, while in photography, in the eyes of the enthusiastic photographer, it reveals itself by a failure. The slow and progressive action of iodine, in the conditions under which I employed it, has appeared to me excellent to produce this simple tendency to acidity, which I have often called apparent neutrality. We may perhaps, apply it to other baths, by diminishing the dose, and suspending its action when it is sufficient.

In all this we clearly perceive the nitric acid at work: but, the thing I cannot now explain, if the nitric acid be added directly, in homeopathic dose, it does not produce the same effects.

Since the efficacy of the iodine depends upon the nature of the silver bath, I ought to have spoken of it in my first note. I candidly confess that the method of preparing this solution, has become so much a habit with me, that it never occurred to me to mention it even to myself. I should then probably have tried the ordinary solution, and this would have led me to the completion of my communication.

I thank M. M. Girard and Thouret for making known the result of their experiments, and thus warned those whom I had temporarily set upon a wrong road.

## ON WASHING NEGATIVES TAKEN BY THE LINSEED OIL PROCESS.

BY M. L'ABBE' LABORDE.

Having the intention of resuming my experiments upon linseed oil employed as a sensitive varnish, I beg to refer to a note I addressed to the French Photographic Society on this subject, in August 1858. I concluded this by asking the co-operation of all those photographers who are stimulated by a new agent, to make researches; and in order to put them on the way which alone I believe will lead to success, I was careful to fully explain, in what the real obstacle consists. This very obstacle has been surmounted in a very ingenious manner by M. Fargier, in another process. I congratulate him upon it, as his success seems to justify my observations, and if I take the liberty of introducing them here, it is in order to be able to apply them to the linseed oil process, as I understand it, without being accused of plagiarism.

I copy them verbatim, as follows:

"I must point out the principal defect in this linseed oil process; the light tones of the negative disappear in the positive, when we pour upon the former ether, in order to remove the non-impressed parts; but yet they exist before this part of the operation; for upon breathing on the proof, after removing it from the negative, we may perceive all the details of the picture faintly. Upon this subject I shall make a remark equally important for the linseed oil process, as for the Bitumen of Judea process; in the sensitive film, however thin it may be, we must distinguish two surfaces; the one external, the other internal, applied to the very substance that supports it. The insolubility produced by the light, commences upon the external surface, because it is in contact with the air, which favours this action; in the parts most lighted, it penetrates little by little, until the inner surface becomes equally insoluble; but under the semi-transparent portions of the negative, it stops at the external surface, or penetrates it more or less, so that the interior surface retains nearly its original solubility. The ether afterwards spread upon a film thus modified, first dissolves the parts which were entirely sheltered from light; then, without dissolving them entirely, it little by little removes, in some measure, the parts feebly impressed, because, fixed upon the external surface, they rest upon a basis which has retained its solubility."

## THE TANNIN PROCESS — TRANSPARENCIES — INSTANTANEOUS PHOTOGRAPHY.

BY WILLIAM ENGLAND.*

As it is most desirable that everything coming under the observation or practice of the photographer tending to the advancement and development of the art should be made known, I venture to occupy your time with a few remarks. An additional inducement to me to ask your attention, is the interest you manifested in the pictures which I had the honour of exhibiting before you at the last meeting of this society. It is to the method by which those pictures were produced that I propose to call your attention. I do not pretend that I have much to say with which many gentlemen present are unacquainted, neither can I lay claim to much that is original, therefore it is chiefly to the details of manipulation I shall confine my observations.

The process I adopt is that known as "Major Russell's Tannin Process." I have tried many others, but have not been successful. Taupenot's gives impressions too hard and strong in the lights, faults which the utmost care in developing has not overcome. The same, too, may be said of the Fothergill process, so far as my experience proves, besides the many difficulties of manipulation; such, for instance, as washing the plate too much or too little, and the unevenness of development, due no doubt, to the albumen coating being porous in some places and horny in others, causing the print when finished to present a very patchy appearance. I do not say that all these faults are to be placed to these processes. Probably by very long practice they may be overcome, and good results obtained; but I really believe that the simplicity of the tannin process places it at the head of all other methods, and that with it finer results may be obtained, not only as transparencies for the lantern or stereoscope, to which it is so well adapted by the soft and beautifully warm tones produced, but also in the production of negatives.

Much has been said and written upon the long exposure required for tannin plates, and the great inconvenience of the film leaving the glass during development. In answer to the first objection, I may say that with a slight modification, to which I shall presently refer, and the choice of a suitable collodion, I have been able to reduce the time of exposure to the average length given to wet collodion developed with pyrogallic acid; and I have no doubt that were it possible to prepare a solution of iron, or some other equally energetic developer, suitable for developing tannin plates, pictures might be produced absolutely instantaneously. As to the film leaving the plate, I at first found some difficulty, particularly with very new collodion. I could not make up mind to albumenize or gelatinize my glasses, as recommended by some operators, previous to coating with collodion, not only on account of the time it occupies, but also the difficulty of getting a plate so prepared free from spots and dust. I can now, after considerable practice, prepare them in large sizes, and then cut to steroscopic without injury to the delicate film, by which means a saving of time is effected.

The collodion most suitable, so far as my experience enables me to speak, is prepared in the following manner:—To 5 parts of ether and 3 of alcohol, add sufficient pyroxyline to give a tolerably thick film. So soon as well settled, decant into another bottle, and measure off two portions of 10 drachms each: to one add 40 grains of bromide of cadmium, and to the other 30 grains of iodide of ammonium; shake till dissolved, and put by to settle. When thoroughly settled, add 1 drachm of each to 6 parts of plain collodion. I have tried various methods of iodizing, and prefer this mode to any other, not only on account of its being more free from spots, but also that immediately after iodizing it is in as good a condition for working as the usual collodion after being iodized some days.

During a great number of experiments in trying to increase the sensitiveness of dry plates, I found that the addition of honey had a remarkable accelerating effect, and by rendering the film less horny assists materially the development of the image. I am quite aware that the use of honey in photography is not new. We all remember the charming productions of Mr. Llewellyn and Mr. Maxwell Lyte; but honey used simply or in combination with acid, as in the oxymel process, leaves the plates tacky and liable to injury from dust. This is not the case by using it in the proportions I shall presently recommend in combination with tannin. By following this method, and using collodion prepared as before-mentioned, the time of exposure for stereoscopic pictures in a good light would average not more than from ten to fifteen seconds.

After cleaning and coating the glass, sensitize in a 40-grain bath, and wash in a second bath of distilled water, to which has been added 30 or 40 drops of acetic acid. The plate may remain in the latter while a second is being prepared. The plate is then thoroughly washed under a tap, and coated with the tannin solution composed of 15 grains of tannin and 15 grains of honey to the ounce of water. It is then ready to be placed in the box to dry.

I may here remark on the great care necessary to avoid stains. If possible, a silver dipper should be used, being more convenient to hold the plate in washing. When necessary to handle the plate, do so with a piece of blotting-paper; also, in coating the plate with tannin, lay a piece between the plate and fingers.

The drying box I find convenient has three shelves, and up one side is fixed a tin tube, under which a spirit-lamp may be placed.

After the necessary number of plates has been placed in the box, it should not be opened till they are perfectly dry, otherwise a stain will appear across the plate where the action of drying has been checked by the admission of cold air to the box. Daguerreotypists will readily understand this from the difficulties they may have experienced in drying off Daguerreotype plates, particularly the larger sizes.

To prevent the film leaving the glass, an excellent plan is to pass a sable pencil, previously dipped in a solution of white wax and benzole, round the edge of the plate to the extent, say of one-eighth of an inch. This, for the purpose, is far superior to spirit varnish. The plates may then be stowed away ready for use, and, if properly prepared, will keep six months.

On removal from the camera, place the plate in a bath prepared with 10 grains of nitrate of silver and 5 drops of acetic acid to the ounce of water, allowing it to remain about one minute. By the adoption of this plan for dry plates, the action of the developer is almost as rapid as in the wet process. Afterwards develop with the usual 3-grain solution of pyrogallic acid. The development is so similar to wet collodion that I need not remark further than that no fear need be entertained of the film breaking up, the edges being kept perfectly dry and tight by the wax border.

The second subject of my paper is the printing of transparencies. The mode of preparing the dry plates is much the same, except that for this purpose old collodion must be used. If of a dark red so much the better; otherwise in printing from a strong negative it is impossible to get an impression clean and well-defined, on account of the tendency of new collodion to solarize and present a weak and foggy impression: better tones will also be obtained by reducing the coating solution to 10 grains of tannin and 5 grains of honey to the ounce of water; the developer should likewise contain citric instead of acetic acid, as recommended by Major Russell; and unless a considerable amount of silver is added, the print is sure to be red or reddish brown, instead or purple. Pictures for the lantern should be thin, very clean, and well defined; not developed so deeply as those for the stereoscope.

I will conclude by making a few remarks upon instantaneous photography; and here I may say that a very large amount of patience is necessary, and that failures are very plentiful—bad light, the absence of the sun at the identical moment the plate is most sensitive, the variations in the quality of the chemical agents employed, and, above all, the difficulties that attend the nitrate bath, which will sometimes unaccountably persist in giving foggy impressions. Again, we get beautifully clear plates, but with very little impression beyond the high lights. Now all this is very disagreeable; but such is the case at present, and will continue to be, I fear, until we have a dry process sufficiently sensitive. Where time of exposure is no object, of course we do not meet with these troubles.

The collodion used in taking the negatives of the impressions I have the honour of placing before you, was prepared in precisely the same way as before-mentioned, except that in iodizing, I use 3 grains of bromide of cadmium, and the same amount of iodide of ammonium, to each ounce of collodion.

I am an advocate for the liberal use of bromides, having experienced their beneficial effects, particularly in photographing objects presenting violent contrasts of lights and shades. Under

* Read at a meeting of the Photographic Society on Tuesday evening, April 1.

such circumstances I should use the bromide considerably in excess of the iodides.

The nitrate bath should be of the strength of 40 grains, saturated with iodide of potassium, and perfectly neutral.

I need scarcely remark that the utmost care is necessary in the preparation of the bath, also in the selection of nitrate of silver, which should be pure recrystallized, otherwise the amount of acid to prevent the plate fogging will materially injure the sensitiveness. We do not experience this so much in ordinary working, where the time of exposing the plate is not limited. With every caution in preserving the bath from injury, I have never been able, in working instantaneously, to use it more than five or six days; after that its sensitizing properties diminish rapidly, but it is still very good for general purposes. Another important point, too, is to expose the plate within a very short time after its removal from the nitrate bath, or it will lose much of its sensitiveness. Here is one great cause of its failure, as oftentimes the sun disappears behind a cloud just as the plate is no ready. There is no remedy but to try again.

A word or two may here be said upon the form of lens best adapted for rapid working. For street views and public buildings, I find it a great advantage to be provided with three sets of double achromatic of the respective focal lengths of 5½, 4½, and 3½ inches. By this means one is enabled to enlarge or reduce the image to the size suited to the plate. I prefer using the first-named, being with that enabled to use a larger stop; but in copying architectural subjects in crowded localities, want of space oftentimes compels one to resort to a lens of shorter focus, and consequently a smaller stop. In all cases it may not be convenient to be so liberally provided. To those not having at command a variety, I would recommend a lens of 4½-inch focus as being the one most useful. Cannot some of our best opticians construct for us a lens which would enable us to vary the size of our picture where distance, or rather the want of distance, confines us to one spot? What, for instance, displays worse taste than copying a public building, leaving out foreground and sky? and yet the operator is sometimes reduced to this or leave out altogether.

I have made many experiments in the mode of exposing the plate, in placing the shutter in front of the lens; also immediately behind it; and lastly, near to the plate, which answers perfectly. I have found, by using the drop in front of the lens, a want of definition in the corners of the negatives. I mentioned this fact some time since to my friend Mr. Dallmeyer, and should be pleased to hear if he has devoted any attention to the subject. By placing the shutter on the dark slide, and having a contrivance to lessen the size of the slot, we can get different lengths of exposure, which is sometimes an advantage, although, of course, it is advisable in all cases to give the shortest amount of exposure the sensitiveness of the plate will allow, otherwise moving objects will not be well defined.

The developer I generally use is proto-sulphate of iron, 2 oz.; water 1 pint; acetic acid, the least possible amount, which I determine according to the temperature, varying from 4 to 8 drachms. Should too much be added, it is not so easy to develop objects in the shade. After the impression is fully developed, strengthen with pyrogallic acid.

I have now, gentlemen, given you the details of my mode of operating, and should I not have made myself sufficiently understood, I shall be happy to answer any question. In conclusion, I beg to thank you for your patient attention, and to assure you that I shall be pleased if what I have said should elicit further information from the members present.

## PHOTOGRAPHIC MICROGRAPHY.

BY A. L. NEYT.*

The study, so full of attraction and mystery, of the infinitely minute in creation, by the microscope, has induced me to seek some practical method as a substitute for drawing,s designed by the hand, or by the aid of the camera lucida, a mode of reproduction at the same time more rapid and more exact. Until the present time, micrographists are constrained to design their own drawings, and, if they wish to publish, entrust to engravers who are strangers to the science, the retracing of these designs. In this way important details are often neglected or falsified; for it is very difficult to an artist, and even to some scientific observers, to avoid following their own views or fancy in rendering those parts which the microscope has not perfectly resolved. It thus happens that new discoveries often give rise to discussions, and, as it is at times difficult to preserve an object more than a few hours, it becomes impossible to submit it to other observers, in order to decide the matter more positively. I have thought that photography could remove these obstacles, by furnishing a means, rapid and faithful, of reproducing the observations made by the microscope.

At the period when I commenced my researches, I was ignorant of the fact that M. Bertsch, of Paris, who has rendered much service to science, had already produced several photographic proofs of microscopic objects. An English photographer, and also another in Munich, have been equally engaged in these experiments; but no one has up to the present moment reproduced living animalcules, such as *infusoria*, and it is upon this branch of the science that I have directed my efforts. I send you herewith some examples of my labours.

The apparatus of which I have made use is the heliographic microscope of M. Bertsch, constructed by M. Hartnack, a worthy successor of the celebrated Oberhaeuser, his uncle. This instrument is very perfect, as well in its mechanical as its optical arrangements.

The general appearance is similar to an ordinary solar microscope. The mirror with parallatic movement, serving to reflect the solar rays in a constant direction, is replaced by a large prism, which gives a complete reflection, and offers less resistance to the wind. The stability is thus very great. The achromatic condensing lens is 2¾ inches in diameter. The focus is provided with three converging lenses, which may be used either alone or simultaneously, according to the power of the object-glasses employed.

I have attached to this, two diverging lenses, completory to the focus of the condensing lens, in order to obtain a beam of parallel light in cases where I use lenses of large field, such as are necessary to obtain great sharpness. The apparatus is achromatised in such a way as to make the foci yellow and violet rays correspond, these latter being the actinic rays. In ordinary apparatus, as is known, it is the yellow and red rays which are united; but in this case, too much heat would be developed on the object to be reproduced; besides which, we should have a visual focus which would not coincide with the chemical focus, and this would give rise to an almost insurmountable difficulty in focussing, an operation already more than sufficiently delicate. The microscope constructed by Hartnack transmits all the rays horizontally; we are obliged, therefore, to work on a vertical plane, which is very troublesome when operating on liquids, which is necessary in the reproduction of *infusoria*.

The little glass which covers the object is retained, it is true, by the drop of water; but, if it be a little too heavy, the whole of it glides insensibly from its position, and delays the work. If this do not happen, another obstacle presents itself: the water has a tendency to form near the edges of the thin covering glass a greater depth than at the centre. The animalcules seek refuge incessantly in this greater depth of water, finding here greater liberty, and they are, consequently, always going out of the field of the apparatus. To obviate this inconvenience, I have brought the plate of the instrument into a horizontal position, interposing under the focus an illuminating prism, and then *immediately* above the object-glass a second prism (this is of quartz, and as small as possible), which sends the rays in a horizontal direction. In this way the difficulties detailed above may be removed, and, for the rest, all remains in the same condition as before. The loss of light arising from the interposition of two prisms is nearly *nil*.

Directly under the object is placed a graduated series of diaphragms. I have added to these at the point where the rays leave the instrument, when I use it horizontally or in the

* *Bulletin Belge de la Photographie.*

dark chamber (if I have it bent), compensating prisms. I throw the image on the focussing-glass of an ordinary camera without a bottom, and I focus. This done, it remains to regulate the focus. By varying the position which it occupies, a greater or less intensity of light may be obtained. When the focus is brought exactly on the object, the image of the sun is formed at the same time upon the screen or ground-glass. By throwing the focus a little behind, a blue point appears in the centre of the field, which, however, disappears in the enlargement. The adjustment of the lenses should be arrested when this point spreads itself over the whole surface of the image, as this is the light possessing the most actinic power. The remainder of the operation consists in receiving the image on the sensitive glass, in the same way as taking an ordinary portrait or view, the microscope in this instance acting as the object-glass. While I am uncovering the sensitized glass in the camera I intercept the light by means of a yellow-coloured glass, taking great care that the room is well shaded from light. I then withdraw the yellow glass rapidly, in order that every part of the picture shall be equally exposed. The length of exposure varies with the enlargement employed. In good sunlight a linear enlargement of twelve hundred times may be obtained in seven or eight seconds at the most. Those of about three hundred times require but the fraction of a second. I, in this case, replace the yellow glass by a shutter, in which the duration of the exposure is regulated by a little wing similar to that which is applied to the striking of a clock.

The process which I regard as the most suitable for the purpose is the wet collodion process. The remainder of the operations are in every respect similar to the ordinary well-known methods of operating. In the reproduction of *infusoria* a great difficulty presents itself—namely, their very rapid movements among themselves, the effect of which is increased by the enlargement. However rapid the operation may be, it is still too long to seize the vibratory motion of these *ciliæ*. To kill them by poison is not quick enough, and deforms some of them. In order to attain the object in view I have recourse to the electric spark or to a galvanic current. I attach to the stage the two poles of a Daniell's battery, or of a small induction coil in such a way that the poles shall be in contact with the drop of water. The circuit is interrupted near the source of the current which I have near my hand. I follow the movements of the *infusoria* on the glass by means of the yellow glass. When I consider the position favourable, I complete the current by simple contact. The animalcule is killed as with a thunder-stroke in the place I have chosen. With a little practice this operation becomes simple and easy.

When it is desired to reproduce objects of a yellow or brown colour, which colour does not give the actinic rays, I avail myself of a small polarising apparatus, which I introduce under the object at the point of the focus. In this manner I can modify the tint generally, and render it more photogenic.

The application of photography to the reproduction of microscopic observations may be made, I think, to render great service to science, by allowing the possibility of supplying the public at a low price with engravings of microscopic investigations, these plates having hitherto been of a very high price. It will be possible also to furnish impressions of these plates on copper, engraved by the ingenious process of M. Chas. Nègre. These plates will possess incontestable accuracy, and a delicacy to which the hand of man could never attain, and would be producible at a price which will be much reduced when compared to that of engravings.

## THE *SATURDAY REVIEW* ON PHOTOGRAPHY.

The *Saturday Review*, always severe, often inconsistent, and seldom just, has recently indulged in one of those atrabilious outbursts for which it has acquired a certain notoriety. Photography in this instance is the subject of its spleen. The article to which we refer is headed "Fashion," and contains incidental flings at petticoats and preaching, crinolines and sermons; but the fashion at which it rails in "good set terms" is photography. It will amuse our readers if nothing more; here is a sample :—

"Photography, again, is a fashion that perhaps may last longer than all the nuisances it entails might lead one to expect. It certainly brings nuisances with it that may make the most patient man wish the sun had never been put to this horrible purpose. Sitting to a photographer is not quite so bad as going to a dentist, but it is something near it. In the first place, the leading photographers make appointments or grant a sitting as if they were high Government officials giving away clerks' places to troublesome but deserving people. Then the photographer himself is a trial. Probably he finds his sitters bores, and he would make a much less lucrative thing of it if he allowed the sitter and the sitter's friends to interfere. Still it is a nuisance for a lady to be carried off from her husband or other male person in charge, and be treated by a smirking fifth-rate artist for half an hour as something between a convict and a baby. In the case, more especially, of young girls, we must add that this system of separate sittings is something much worse than a nuisance, and ought to be resolutely put down. Then the eminent photographer who thinks himself sure of his business is the most audacious of men. There is nothing he will not say to put down criticism and inquiry. A lady went lately to be taken with a little girl. The money was paid, and in about a week or ten days the thing was pronounced to be ready. The lady was all very well, and so was the upper part of the little girl's figure, but below the petticoat she shaded off into two faint wavy columns like the reflection of trees in water. Remonstrance was made, and the eminent photographer had the assurance to say that artists had now given up putting in legs. Then a quiet, unoffending man is sometimes overwhelmed with what seems to him the joke and mockery of the attitude in which, under the eminent photographer's directions, he is offered to his friends. A gentleman of a solid, humdrum appearance, with only that sort of romance about him which women cannot detect, was recently persuaded to sit. He sat, and the eminent photographer did his best. But it was a failure, and two or three more sittings came off in vain. At last the eminent photographer expressed himself much pleased. By the judicious introduction of a background, and a few objects being placed so as to break the stiffness, success had been achieved; and this is what the photograph presented. The unfortunate man was standing with his back to the Lago di Garda. He was placed on the top of a grand marble staircase, near a splendid balustrade. In one hand he held a very new borrowed silk umbrella, and he was supported on the other side by a friend's hat. It is bad enough to be depicted in this way, but the mere being depicted is a very small portion of the whole business. After the photographs are sent home comes the worry for them. There is some sort of pleasure in giving them to very near relatives and very dear friends. We all like to fancy that there are a chosen few who really care to have a likeness of us, although it does represent us bareheaded, and surveying a new hat on the banks of an Italian lake. But the demand for photographs is not limited to relations or friends. It is scarcely limited to acquaintances. Anyone who has ever seen you, or has seen anybody that has seen you, or knows anyone that says he has seen a person who thought that he had seen you, considers himself entitled to ask you for your photograph, and to make you pay eighteen-pence in order to comply with the demand. There is no compliment in it. The claimant does not care about you or your likeness in the least. But he or she has a photograph book, and, as it must be filled, you are invited to act as padding to that volume, and to fill a vacant space between Prince Max of Hesse Darmstadt and the amiable owner's third brother, as he appears in the comic costume of a navvie. It is not even grown-up people only who ask in this preposterous way for photographs. Children and babies have got their photograph books, and say that they really must have your likeness. They protest they will not know what to do with their miserable young lives unless you consent to pay the eighteen-pence for them, and figure in their collection. This is terrible. People who are not accustomed to them do not generally much care for infants in arms, but those precious darlings will rise in estimation now. They may have an awkward habit of bending suddenly in the back, as if they were made of soft leather, but at any rato thoy cannot possibly ask for your photograph.

"We do not for a moment dream that the fashion of photograph collecting will die out. In tho first place, tho gain of having cheap portraits of friends is so great that there is a solid advantage in photographs which would countorbalance a great many nuisances of a very serious sort. And then the collections when mado are very useful. They supply a fund of talk to people who have nothing to say. Everyono can find something to remark about a collection of photographs. Either they do not know the people represented in it, or they do know them, or they wonder whether they know them. Then, if they know them, they can say they are like or unlike; or they can pay adroit compliments, and make acceptable remarks on the photographs most cherished by the collector; or they can gratify a little quiet malice, and say that they never could havo believed so very unfavourable a likeness is a true one, and yet every one knows tho sun must bo right. It is this fund of easy small-talk which will be the real foundation of the permanent success of photography as a fashion. It might easily have happened that photograph books would have shared the fato of albums. Thirty years ago, young ladies used to keep albums, and people used to be decoyed or frightened into writing in them. Authors of all sizes and degrees of reputation were entreated to add their mite. Charles Lamb's letters, for example, are full of references to the albums he had been writing in. But the weak point of albums was that, where they were not occupied by magnificent water-colour representations of perfectly round roses in tho fullest bloom, they were too intellectual. People in an ordinary drawing-room think there is a sort of plot to find them out if any demand is made on their intellect; and to write verses, or even to copy correctly a piece of poetry out of a standard author, is dangerous and embarrassing. It is true that writers in albums were occasionally allowed to get off by writing out in their best hand one of the poorest and best-known riddles they could recollect, such as "Why is Athens like the wick of a candle?" but even this is precarious, for the answer has to be remembered and understood. In photographs all is plain sailing. All that has to be done is to make gossiping remarks about other people, and this is a duty to which the most timid intellects feel competent.

"Photographs are, then, a fashion; but it is possible they may be what, considering tho mutability of human things, deserves to be called a permanent fashion, because they tend to supply a want that will always bo felt. It is the same with ladies' novels, and other records of the inner life and language of young women. This species of composition is a fashion of the day. Half a century ago the dear creatures either had no self-inquiring, dreamy life-shadowings, or else they kept them locked up. Now printers can hardly print fast enough to keep pace with all the outpourings of lady novelists. The supply is like that of an Artesian well—it is perennial and ever-flowing. We venture to say that if anyone offered a small prize for a tale of woman's feelings, there would be at least five thousand competitors. It is a fashion that we do not take much interest in; but we admit that it gives something that was wanted. Most women have a latent gush in them; and if the gush does not flow out in marriage, it gladly finds vent in print. As long as there are single women with unrequited feelings, or married women who can make this sort of production pay, and as long as printing is cheap, so long will the lady's novel last. Perhaps it will improve, but anyhow it will go on. There are other fashions, as to which it is more difficult to guess whether they will last or not. Morning calls, for example, seemed a deep-rooted habit of English society, and yet they are almost a thing of the past. Will sermons go too? * * * will the ordinary half-hour cut and dry discourse, in which neither the preacher nor the congregation pretend to take the slighest interest, go on in England? Very likely it may; for it serves somo objects, though not very high ones. And if it is objected that we cannot believe our posterity will always stand what does not please or profit them, the answer is, that we stand the sermon, and we stand being submerged under confluent waves of crinoline at dinner, and we stand audacious children squeezing out our photographs from us. And if we can stand all this, why should not others? There must be some burdens that are always borne, and some fashions that do not pass away."

## Proceedings of Societies.

### American Photographical Society.

The regular meeting of this society was held at the New York University, on tho evening of March 10th, President Draper in the chair.

After some local business of minor importance, Professors O. N. Rood and Edwin Emerson, of the Troy University, were elected honorary members.

President Draper suggested that communications on Electrotypography be invited and received by tho society, to be preceded of course by Photographic matters.

On motion it was so resolved.

Professor Seely made a few remarks on iridium, used as a strengthener of negatives, and showed two negatives so treated.

Mr. Rutherford spoke against tho propriety of producing any metallic deposit on the surface of a negative, as there must be a deposit also formed at the edges of the fine lines, thus destroying the sharpness to a degree. To change the subject, he asked for information about tho *hot water accelerator* for tannin plates.

Mr. Hull had tried the hot water development with great success. He exhibited three tannin negatives of the same subject, and taken at the same timo. One exposed one and a half minutes, and developed cold in the usual manner; the second after ten seconds exposure, and tho third after six seconds exposure were developed by tho hot water treatment. The six seconds negative was the best of all.

Colonel Pike had taken some instantaneous pictures on tannin plates, using an instantaneous shutter on his camera and developing hot. He showed a remarkably clear and bright street view taken in this way. He also exhibited to the society his shutter and mode of working it, by which he could regulate tho exposure to the fiftieth part of one second. He always left a trace of nitrate of silver in his tannin plates, *a la* Fothergill, and found the sensitiveness very much increased, but the keeping qualities of the plate were deteriorated. He also added sugar or rock candy to his tannin solution, as it increased the density.

Mr. Thompson had obtained an instantaneous picture on a fresh tannin plate, using a pair of short focus Ross' view lens quarter of an inch diaphragm. The negative was very clear, tho time on a church clock half a mile distant being distinctly visible under a lens.

In answer to a question, Colonel Pike said he used albumen to coat the glass with in preference to gelatine, as recommended by Major Russell. He found the latter had a harsh effect on the picture.

Mr. Hull opposed albumen or any other coating for the glass before collodionizing. He exhibited a number of prints from negatives without any film between the glass and collodion. The best way is to simply run an edge of albumen with a camel-hair pencil, around the plate. This would effectually hold the film in developing and washing. He found that there was less action of light where the albumen had been used than in the centre of the plate. He found that pictures on these plates would keep a month or more between exposure and development.

Mr. Wetmore showed the Society a card portrait taken on a tannin dry plate, under a ground-glass sky-light, with one minute's exposure. The negative was developed with hot water treating, and the resulting print from it was very clear and distinct, even in the deepest shadows of tho drapery. He also passed around an instantaneous cloud picture on the same kind of plate.

Professor Joy called attention to Professor Emerson's improvement in the stereoscope, as manufactured by Messrs. Anthony. It consists, as we see by the one now under inspection, of a mechanical contrivance to move both lenses apart or together simultaneously while looking through them, thus enabling any person to "catch" the stereoscopic effect with ease. Pictures five inches in diameter, mounted as stereographs, could be viewed without pain to the eyes.

Mr. Thompson had had one made by Mr. Anthony with whole lenses, which he considered an improvement on the half cut lenses now used. Professor Emerson's improvement was endorsed by all who had seen it.

A number of fine calotype negatives and photographs of large size were presented to the Society's Museum by several gentlemen, and were much commented upon and admired by the members present.

On motion, adjourned to the second Monday in April.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 9th April,* 1862.

Among the most remarkable photographic productions that will figure in your approaching universal exhibition, are some pictures of very large dimensions, representing views in Egypt, taken by M. Cammas. Specimens were exhibited at the last meeting of our Photographic Society, and excited much admiration. Herr Pretsch also presented some new proofs of heliographic engraving in relief, obtained by the process he published in 1854, in France and in England. He insisted that his proofs were not retouched, although the existence of a *grain* over the plate might, at first sight, render this hypothesis possible.

M. Gerard remarked, that having recently had occasion to examine Herr Pretsch's process of engraving, he found in the description given by the inventor, an indication which has possibly not been sufficiently remarked upon, but which would doubtless furnish an explanation of the cause of the general grain in the plates, and consequently exculpate Herr Pretsch from the charge of retouching. M. Gerard stated that, after having caused chromatised gelatine to be soaked in water, and before taking in relief the impression thus produced, he washed it with alcohol; and it is probably owing to the superficial contraction which is exercised by the alcohol, and a general cracking of the whole surface that ensues, that the effects of grain remarked upon the proofs of M. Pretsch are due.

M. Regnault, the president of our photographic society, has made an appeal to the generosity of those who are in possession of proofs which may possess an historic interest in the art of photography. The society already possesses specimens of the first efforts of Daguerre, Talbot, Bayard, Niepce de Saint Victor, Taupenot, and others. A collection of all these works must necessarily possess the deepest interest, and the president thinks that all who have it in their power to enrich it will take pleasure in so doing. Among the more recent contributions to the collection are some positives obtained by the last carbon printing process of M. Poitevin, presented by M. Vidal, of Marseilles; and a positive and a negative upon albumen, obtained in the earliest days of M. Niepce de Saint Victor's albumen process on glass.

M. Balsamo, of Lucca, has made a communication on the subject of his phosphorus process, he says: "I have only just seen Dr. Schnauss's remarks in the *Moniteur* on my phosphorus process. The proofs I have obtained are perhaps not first-rate, for want of good negatives and suitable apparatus, but they sufficiently demonstrate the facts announced in my *Mémoire.* Instead of attributing the ill-success of my experiments to charlatanism, Dr. Schnauss had better seek the cause in some peculiarity which has escaped his notice. He is wrong when suggesting the application of heat; by warming the sensitized paper a chemical action is produced directly opposed to photogenic action. To make sure of obtaining an image upon the paper saturated with the phospho-hydrochloric-cupric solution, it must be left to dry spontaneously at the ordinary temperature. I beg, therefore, that Dr. Schnauss will repeat his experiments without exposing the paper to the action of heat, for solar heat suffices to remove all sensitiveness from the paper. He will then see that my theoretical explanations have a practical value, and that the word charlatanism exists neither in my dictionary nor in that of urbanity. He will render me justice, and I shall then pursue photo-chemical phenomena hopefully. I can tell him that I have not only obtained the solution of phosphorus, which he regards as a new phenomenon, but also the black modification of it by an electric polarization of the phosphorus in hydrochloric acid.

Our society is not indifferent to the result of the action for piracy, in which Messrs. Mayer and Pierson were cast, as it involves a question of the deepest interest to photographic property. A committee is now engaged in the examining what measures it may be advisable to take, and to place the matter before the Commission appointed for the preparation of a law upon literary and artistic property.

Messrs. Gilles, frères, have recently constructed what may justly be termed a universal camera. The focus ranges from ½ inch to 70 inches; it enables the operator to take pictures of every size, from the *carte de visite* to half life size, with objectives from ¼ inch focus to 6 inches.

M. Adolphe Martin has made an important communication on sulphate of iron developing solution, which will doubtless remove any objections that may now exist for this substitute for pyrogallic acid; and M. the Abbé Laborde, has replied to the objections raised against his theory of the action of iodine in the sensitizing silver bath; he has also made a communication respecting the washing of proofs in the linseed oil process, which may have the effect of rendering that process practicable.

Some cannon have recently been cast in Austria, composed of a new alloy which is said to be more tenacious than the best iron; it is composed of 600 parts of copper, 382 of zinc, and 18 of iron; it is easily forged and bored, and while cold will bend without breaking. Another alloy, as a substitute for silver, is proposed by M. Trabuc, of Nisines; it consists of banca tin 375 parts, nickel 55, regulus of antimony 50, bismuth 20. One-third of the tin is placed at the bottom of a crucible of suitable dimensions, together with the nickel, antimony, and bismuth; upon this first layer a second third of the tin is deposited and covered with charcoal to the depth of 1½-inches; the crucible being covered up, it is heated to a white heat, then with the aid of a iron rod, also heated, we ascertain if the nickel be melted and the antimony be reduced, in that case the remaining portion of tin is passed through the charcoal, and the whole stirred until a perfect mixture of the different metals is obtained, it is then cast into ingots or other forms. The colour of this alloy is silver white, and it resists the action of vinegar and other vegetable acids.

### PAINTING LANTERN SLIDES—GLASS GUIDES —ROSS LENSES.

Sir,—A friend of mine, who painted some slides for me, used the usual oil tube colours, which he pressed out of the tubes on to a little clean blotting paper, in order to absorb the superfluous oil, and then mixed the various tints with a medium composed of about equal parts of copal varnish and turpentine. The glass, I believe, was formerly prepared by pouring over a very thin solution of Canada balsam and turpentine. There is, I believe, a young man residing in Cheltenham who colours magic lantern slides.

I have lately cut out some glass guides from thick ground glass, and they have the advantage of not slipping about like the polished glass, and yet are sufficiently transparent to allow one to see where to put them on the carte de visite stereo slide, &c.

My glass room being very short I have been using Ross's new stereo lenses for carte de visite portraits, using diaphragm No. 5, they fill out so well, and give so sharp a picture, that I am induced to recommend others who have those lenses to give them a trial for that purpose; eight to fifteen seconds is generally sufficient exposure. I enclose two prints from negatives taken with these lenses. The vase and stand I have copied from Messrs. Bull's work, best made, the high lights much darker than the originals, and now they seem to me to be too light.—Yours truly, Thomas Gulliver.

17, *Heathfield Street, Swansea.*

[The pictures are exceedingly well covered for a lens of such short focus, and which, it should be borne in mind, was never intended by the maker for such work. Where the glass room will permit, we recommend the use of lenses of much longer focus.—Ed.]

## Talk in the Studio.

The Alkaline Dry Process.—A correspondent of *Humphrey's Journal* says:—"I have been lately trying the various dry processes—the tannin, resin, and sinc-preservative process—so as to be ready for the field next spring, and have obtained good negatives from either. Last evening, having read in the *Journal* Bartholomew's new and simple gelatine-alkaline process, I set right to work and dried six plates, which I exposed and fixed this morning, all with perfect success. They are all they claimed to be; not one showed even an inclination to peeling or blistering, without any precautions taken, and *par excellence*, seem fit for in-door animated views. What a boon this will be!" Have any of our readers in this country tried the process further?

Amateur Photographic Association Prize Prints.—We have recently had an opportunity of looking over the prizes and other prints from negatives contributed to the Amateur Photographic Association. The prizes are all excellent pictures: perhaps that of Lieut.-Col. Shakspeare, of "Corfu from the Island of Vido" is in many respects the finest, both as a work of art, and as a specimen of skilfully surmounted photographic difficulties. The picture, when trimmed and mounted, measures 13 inches by 9 inches, and is apparently an instantaneous picture. It possesses an exquisitely perfect natural sky with delicate clouds, the soft refections of which in the water are charmingly rendered. "Hoar Frost: a park scene," by the Earl of Caithness, is a very perfect piece of photography, but is too mechanical in composition to please our taste. The other prizes are also good in many respects. Tastes will, of course, always vary; but we fancy that some which have only received honourable mention are superior to some which have received prizes, especially in artistic characteristics. Our own choice would certainly have fallen upon some of the productions of Captain Plaiflin, Mr. Edwards, or Mr. Ebbage for some of the prizes. Mr. Coles' "Bow Church" taken on a tannin plate, which we don't see mentioned at all, is exceedingly delicate and fine. There are many good pictures in the portfolio, which we cannot refer to in detail. There is, of course, as we from our Exchange-Club experience anticipated, a large mass of mediocre photography and common-place subjects; but very little, nothing that we remember, absolutely bad. The varied exhibitions of British and Foreign Photography, which photographers will have an opportunity of inspecting during the coming summer, will, we trust, give a fresh impetus to the artistic progress of photography, which we so often see desirable.

## To Correspondents.

*** To Advertisers and the Trade.—Next week the Photographic News will be published on THURSDAY.

D. D.—Where it is convenient, a glass room should be built so that the sitter should face north or north-east, in order to secure a steady light all day long. Whichever direction it be built in, it is important to have an open expanse of light uninterrupted by high buildings, &c. The size must largely depend upon the class of operations intended; for moderate purposes 25 feet to 30 feet long, and 14 feet to 18 feet wide, will give a good size. The height about 8 feet in the lowest part, running up to about 14 feet. Decidedly as much glass at the sides as you conveniently can.

F. P.—In asking "what is the size of a whole plate lens," we presume you mean of what diameter are the lenses in the combination. They vary in lenses of different makers: from 3 inches to 4½ inches.

Thomas Martin.—The object of acetate of soda is to convert any free nitrate of silver into an acetate of silver; but as we have no means of estimating correctly the quantity of free nitrate in the prints, it is difficult to state what quantity of acetate will be required. The only plan is to use the solution over and over, and strengthen from time to time, when a precipitate of acetate of silver ceases to be formed. 2. In developing large plates the plan of first washing the plate with a little distilled water, then applying the developer, and afterwards adding the silver and distilled water is, an excellent method of avoiding stains, and also conduces to softness. We see no objection to the plan at all.

W. G. H.—We do not know of any.

Cornish Chough.—We will take an early opportunity of trying the collodion and reporting upon it. The operation of the oxides of methyl in collodion is but little understood. There is a strong prejudice against their use in many quarters, which we conceive to be without good ground, as after considerable experience we never detected any injurious results. Their operation in discharging the colour from free iodine, or preventing its formation, is generally observed only when a bromide is present as well. The reason is not understood. A very excellent plan of precipitating excess of acetate of silver is to weaken the bath by the addition of an equal volume of distilled water, lower the temperature as much as possible, and filter out the precipitate which will fall. Then make up to the proper strength.

Bolus.—You will get the feet of your sitters better lighted by extending the amount of glass in the sides of your room. Your screens for arranging the disposition of light and shadow may be of white calico; judgment and taste alone can guide you as to their disposal, as they will continually require varying to suit circumstances.

E. Clark.—Either of the iodizing formulæ referred to will give good results; but we prefer that on p. 84 as being the one we generally use, and have most experience with; we think it will possess greater keeping qualities than the other. We see no reason why you should not succeed in iodizing for yourself. If not try No. 1 or No 3, or a mixture of either with No. 2.

Nonplussed.—You kept the solution too long, and the gold has been gradually reduced in the form of a dark powder as you describe. Never mix more than you will use in a few weeks at most. 2. The addition of any acid to a solution of hyposulphite of soda tends to decompose it. The addition of a strong acid like nitric would certainly do so; the milkiness and the smell of rotten eggs you describe indicate that decomposition has ensued. The bath may still be used for fixing negatives, but it is so much weaker than before. The addition of a few drops of *acetic* acid has been recommended for the fixation of collodio-albumen plates; but it is not necessary with wet collodion plates.

A. R.—A light bluish grey is a good colour for the inside of a glass room.

J. H.—The Referees of the Photographic Exchange Club are obliged by your kind suggestion; but they have undertaken their work without desire for reward. In any case it will be obvious to you, that whilst we might be willing to give publicity to your wish as regards our colleagues in the matter, being ourselves concerned, we cannot with any propriety insert your suggestion in our pages.

Young Photo.—If your lenses admit of the arrangement, you may use the front lens, reversed, as a landscape lens. Or you may use the combination as it is, well stoppered down. Try either the tannin or the collodio-albumen process; the first is the simplest, the latter the most certain. You will find a good deal of information in the Almanac which you have by this time received. Mr. Hughes' recently published shilling Manual will also help you.

Subscriber.—The best method of becoming familiar with all connected with alkaline toning, is to read the various communications on the subject which have appeared from time to time in our pages. There is no work published on the subject. The Photographic News Almanac contains a concise and clear statement of the various formulæ recommended.

An Amateur Subscriber.—It is probable that a less proportion of a bromide would be desirable for a portrait collodion than Mr. England uses in his instantaneous collodion for views. We have never found that for portraiture it was desirable to use more than one grain of bromide to the ounce. We will endeavour to obtain some further information regarding the dark slide. All, or the greater part of Mr. Wilson's stereoscopic views are taken with a single lens of six inches focus. There is not a triple lens made, we believe, for stereoscopic work. It is for views 7 + 4½ that Mr. Wilson uses the triple.

No. 35.—You mistook our meaning. We did not for a moment doubt that some of the lenses referred to were good, or even *very* good; but from our information we believed them to be uncertain, the result largely depending upon chance. The gentleman to whom you refer is a good professional authority in chemistry, but not, we believe, in optics or practical photography. We are obliged, however, for your communication.

Simplex.—The best arrangement for groups is an irregular crescent. By having the ends nearest to the lens and the centre the most distant, you favor the curvature of field which exists. If your lens does not cover a group so arranged it is faulty. Put a smaller stop in. Be careful to avoid inartistic formality in such an arrangement. 2. When the diaphragm cuts off a portion of the subject it is in the wrong place, too far forward. We are glad you find Mr. Window's articles of so much service. They will, we believe, treat of the subject you name before they are concluded.

W. H. T. N.—You have made a mistake. We nowhere stated that "stereoscopic vision is attained by converging the axes of the eyes until the left eye sees the right hand half of the picture, and *vice versa*." Sir David Brewster, in endeavouring to prove that Chimenti's pictures are stereoscopic, says that the originals are so mounted as to render necessary such convergence, and that if transposed they would be seen by the ordinary process of stereoscopic vision. We remark that the fact of their being mounted in a mode which would require a mode of examining them which is always difficult and often impossible, is an argument against any idea or intention of stereoscopicity in the artist. There need be neither convergence nor divergence of the optic axes in stereoscopic vision; but simply parallelism, each eye being fixed straight on the picture before it. See below.

Painting Transparencies.—From a mistake in reading the MS., an error occurs in the tenth line from the top of the column, in the communication of T. P. E. For "fading to tan glass," read "fading to bare glass."

T. P. E.—We are obliged by your offer, and shall have pleasure in receiving your communication.

North Briton.—We will take an early opportunity of ascertaining, and let you know.

Juvenile.—A few drops of a saturated solution of proto-nitrate of mercury in the last washing water, is perhaps the most delicate test for hypo, and will produce a dark turbidity if but an infinitesimal portion of hypo be present. But if we remember rightly, the committee appointed some years ago to report on the causes of fading, after trying this and all other suitable tests, came to the conclusion that there was no chemical test sufficiently delicate to determine absolutely when all hypo was removed, and that extreme care was the only safeguard. We cannot tell you what other machines have really done, but there have been others which professed to do similar things to this of yours. We do not doubt at all the possibility of sufficient washing being effected, by proper care, in an hour or two; but in the absence of strong proof, we doubt the wisdom of expending the cost of a patent in such a matter.

Thomas Bell.—See answer to Juvenile. We will endeavour to test the prints as far as possible at an early opportunity.

W. Deane.—The most probable cause of the spots in the negative which, from seeing the print, we can suggest, is some accumulation of a precipitate in the bath, which wants filtering out. A precipitate of iodide of silver, or dust, or almost anything of that kind at the bottom of the bath, might cause such spots at the bottom of the plate, which would stir the turbidity slightly up.

W. W. S.—You shall receive attention.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 189.—April 17, 1862.

## THE SOUTH LONDON PHOTOGRAPHIC EXHIBITION.

There is one clause in the "Rules for Exhibitors" in the forthcoming Exhibition of the South London Photographic Society, which, on reflection, appears to have been adopted without sufficient consideration of all its bearings. In order to secure in its fullest sense the photographic character of the Exhibition, the committee, in adopting a rule generally made, but rarely observed—that of requiring an untouched copy to accompany each coloured picture—resolved to insist upon its rigid observance. In doing this they intended to give emphasis to the fact, that in a photographic exhibition, coloured portraits—without a disparagement to the position of the colourist—were merely admitted as illustrating one of the applications of photography; and to render clear the nature and extent of this application, it was important that an uncoloured copy should be present for comparison. In order to make this condition stringent, and without thinking of the damaging effect on the general harmony of arrangement, it was resolved, that "coloured photographs would only be admissible when accompanied, *in the same frame*, with untouched specimens." A very little reflection will suffice to show that a most unsatisfactory, spotty, inharmonious, incongruous effect might result if this rule were rigorously carried out. The immediate juxta-position of things not intended for comparison, might often, in an artistic sense, be injurious to each, and have a bad effect, without either in itself being faulty. The untouched photograph, and the painting upon the photograph, might each be excellent, whilst the result of their contact and contrast might be more or less damaging to both. The monochrome and the painting glowing with colour each may have their special excellencies, but they do not harmonize. As M. Claudet observes, in a courteous letter to the Secretary, promising to contribute, no man of taste would hang engravings on the same wall as paintings or water-colour drawings; he would keep each in separate apartments, if he wished each to have their true value or produce a perfect ensemble.

We are authorized to state, therefore, that the committee having re-considered the question, have resolved to rescind such part of the seventh rule, as renders it necessary to place the uncoloured duplicate *in the same frame* as the coloured picture. It will still be imperative that coloured specimens be accompanied by untouched copies, the arrangement of such copies in the Exhibition being left to the discretion of the hanging committee. We trust that this decision will contribute to the satisfaction of exhibitors, and to the general effect of the Exhibition.

## THE PHOTOGRAPHIC DEPARTMENT AT THE INTERNATIONAL EXHIBITION.

The majority of the photographic contributors in the English department are now in the building, and are rapidly in the course of unpacking and arranging. Notwithstanding the thankless task imposed upon the gentlemen forming the photographic committee, they have worked heartily and energetically to make the most of the facilities placed at their disposal, aiming with limited means to satisfy extensive demands. Many of those, whose applications were at first refused, have, by the judicious management of space, by inducing some who received allotments in the photographic department to accept of space in other classes, and by other means, now received allotments according to priority of merit. Many are still, of course, disappointed at the amount or position of the space awarded to them, especially amongst exhibitors of apparatus. Some who especially require brilliant light have had dark corners allotted. Some who have prepared square cases have received oblong space for them. As far as it is possible all these defects are remedied; the most courteous anxiety to make satisfactory arrangements being manifested by the committee, and by Mr. Peter Le Neve Foster, the superintendent of the department, but the task of fitting square pegs into round holes can never issue with entire success.

The fact is, the space is so much too limited that anything like satisfactory results can scarcely be anticipated. As for the position in the building, it is one which will effectually keep the exhibition select. The Commissioners, as if ironically answering the outcry of photographers for the elevation of their art, have exalted it with a vengeance, placing it high above the picture galleries and everything else. We venture to predict that none but those actually interested in the matter, and seeking for the photographs, or it may be stray visitors who have lost themselves in wandering up interminable flights of steps, will undertake the task of mounting to the photographic department.

No official announcement of the jurors in the various departments has been made; but it is understood that Dr. Diamond, Sir David Brewster, and M. Claudet have been appointed to make the awards in Class XIV, which will include, we presume, all the photographic departments. As a whole, we fear this appointment will not give unmixed satisfaction. As regards the first-named gentleman the appointment is doubtless unexceptionable: the long connection of Dr. Diamond with photography, his high attainments in the various branches of the art, his representative position as Secretary of the Photographic Society, and the personal esteem in which he is held by photographers generally, all conduce to stamp him as pre-eminently fitted to fulfil such duties with efficiency, and to secure the confidence of the photographic public in his decisions. Regarding Sir David Brewster we regret to say we cannot express any such confidence. Willingly recognizing his high character and labours as a man of science, we cannot so readily admit his judgment in matters photographic. In the optics of photography his name has been identified with some crotchets which have had no confirmation in the practice of able photographers. Of his general acquaintance with photography we have no knowledge, but what we have recently gleaned from an article in the *North British Review*, which is publicly attributed to his pen. We have not hitherto called the attention of our readers to this article, as we are in the habit of doing with regard to any photographic contributions in periodicals devoted to general literature, simply because we have hesitated to couple a name so high as that of Sir David Brewster with the amount of misinformation and inexact statement with which the article abounds. Regarding the last-named gentleman, M. Claudet, no one will doubt for a moment his photographic knowledge or ability, his deep love of the art, and concern for its honour—yet we hesitate in acknowledging his fitness for the office. In the first place, and chiefly, because the appointment is a great injustice to himself. M. Claudet is a large and very worthy contributor to this department, and he has at no remote period taken prizes in exhibitions of photographs. As an exhibitor here he is manifestly disqualified from pronouncing as a juror upon his own works; and is, therefore, debarred from all chance of that recognition which it is probable his contributions may merit; for even if his coadjutors were disposed to confer any honour on his works, his delicacy would doubtless revolt from appending his name to a decision which contained an award in favour of his own pictures. There are other sound reasons why, we conceive, a professional photographer is scarcely desirable as a juror; for without doubting the honourable impartiality which will doubtless characterise his judgment, other professional photographers may naturally feel that they would rather not have been judged by one with whom they are in business competition.

Regarding the contract for photographing in the Exhibition it appears that no tender whatever has yet been made. The *Times* says:—

"No tenders have yet been received for the right of taking photographs in the building during the time of the Exhibition. Some of the first firms in the kingdom are willing, we believe, to give the Commissioners very large sums for this privilege, but all are at present withheld from making an offer by the most absurd condition with which they are clogged—namely, that the Commissioners will not provide any space or room for photographers, or for their processes of developing or preparing their plates or otherwise, all of which processes must be carried on beyond the limits of the Exhibition buildings. If this rule is adhered to, not a single shilling will be offered for the privilege, for, as any practical photographer can tell the Commissioners, the so-called privilege of taking views will be utterly worthless, unless they have some place in the building in which to prepare and develop their plates. In the form of tender issued there is no date put as to the time before which the offer is to be sent in, and, above all, the photographers most justly complain that they are required, when stating the sum which they are willing to pay for the right, to state also how many copies of every photograph 'which may be taken in the building they are willing to place at the disposal of the Commissioners for distribution, but not for sale.' If in the tenders for refreshments the contractor was called upon to specify how many free dinner tickets each day would be placed at the disposal of the Commissioners for distribution, but not for sale, the public, we think, would express their opinion very freely upon the nature of such an agreement, and we confess we are at a loss to see the difference in principle between such an arrangement and that which the Commissioners expect to make with the photographers."

We are unwilling to impute motives, but it has been suggested that the Commissioners do not expect or desire competition, wishing to place the job in certain hands; but that, since they must for decency's sake advertise for tenders, they fetter them with impossible conditions. An appearance of justice and impartiality must be preserved: as in regard to the election of juries, contributors were requested to nominate men in whom they placed confidence, whilst the authorities, it appears, had no intention to be guided—certainly not governed—by such nominations in making the appointment.

## HOT DEVELOPMENT, AN AMERICAN DISCOVERY.

Our American cousins have a funny habit of claiming all the discoveries in science and art. Photographers are at the present moment in a high state of excitement regarding the accelerating influence of heat in developing dry plates. In the Photographic News, for March 7th, Dr. Draper, of New York, communicated the results of some experiments he had recently laid before the American Photographic Society, in which, by the aid of hot development, he had secured instantaneous pictures on tannin plates. This was a gratifying application of the principle of hot development to tannin plates, and the announcement was novel. It is quite possible that with Dr. Draper the idea was original, and that the merit of independent discovery is due to him. Nevertheless our readers will be somewhat amused to find this recent application of an old principle described as the *discovery* of that principle. *Mr. Coleman Sellers,* whose name our readers may remember as the writer of some interesting letters in American Journals, writing to a British contemporary, recently, says:—

"To quote from a New York letter:—'We are all in *hot water* here. Try Dr. Draper's process, and you will soon be *warm* in your praise of it.' Much positive information has reached me, all tending to prove that it is the greatest discovery in the art that has been presented to us for several years. It is one of those remarkably simple discoveries which we cannot but wonder have not been developed sooner. As far as I have been able to learn, it has only been applied so far to tannin plates; but there can be but very little doubt that it will be of equal advantage in the treatment of other dry plates."

Most of our readers are familiar with the fact, that upwards of ten years ago M. Ferrier used hot development with albumen dry plates. For years past, Mr. Mudd has used hot development with collodio-albumen plates, and has secured considerable diminution in exposure by its use. Little less than twelve months ago, M. Roman re-discovered the value of heat in developing collodio-albumen plates, and announced that by the method he described, and hot development, dry plates might be worked with a rapidity equalling that of the wet process; and various other communications to the same effect have appeared from time to time in the English journals. The singular part of the business follows, however; American photographers may, of course, be pardoned for not always seeing English photographic papers; but it is a fact that most of the communications on the subject have been reprinted in the American photographic journals; and without instituting any rigid search, we have laid our hand in one minute on two communications in the *American Journal of Photography,* extracted from the Photographic News during last summer, solely devoted to the accelerating influence of hot development. The *American Journal* of the 1st of August 1861, contains a brief general statement of the case from our own pen, and the same journal of the 15th of August, quotes detailed particulars of manipulation from an article contributed to our pages a few weeks previously by the Rev. J. Galloway Cowan, and it is somewhat singular that the method of using *hot water* previous to the developer, and not simply a hot developer, is distinctly described in the article in question.

We hope shortly to have something to say on the general subject which Dr. Draper's fortunate application has given a fresh interest to; we now merely make the reclamation, not for ourselves, but on behalf of the Old World. It is a little amusing to find a man like Mr. Sellers *naively* remarking of a thing done long ago, that "there can be very little doubt that it *will be* of equal advantage in the treatment of other dry plates."

## Scientific Gossip.

Composition of the Photographic Image—The Three Theories—New Method of Photometry.

The composition of the photographic image—a problem in in photo-chemistry which has of late been so frequently discussed in the pages of the Photographic News, deserves attentive consideration from the circumstance that it constitutes almost the theoretical basis of the art of photography. In a recent number we gave an article (from the *London Review*) which seemed to give a very good general statement of our present knowlege on the subject. The importance of the subject induces us to give insertion to a few remarks bearing upon the present position of this interesting chemical inquiry which have been communicated to us by an esteemed friend and well-known man of science. The writer, under the signature "Experientia" commences:—

"The nature of the decomposing action of sunlight upon the chloride of silver appears to have formed one of the very earliest subjects of experimental investigation on the part of several distinguished philosophers, whose researches may be taken as indicating both the dawn and provisional establishment of the fundamental principles of our modern art. Irrespective of the fact that the alchemists were acquainted with horn silver, and its property of becoming blackened on exposure to the sun's rays, the subject seems to have been specially taken up by Wedgwood, Davy, Scheele, Bucholz, Berthollet, Draper, Herschel, Daguerre, and Talbot; besides being treated of more recently by many of our most competent authorities in science. A special report was prepared for the meeting of the British Association in 1859, setting forth a *resumé* of all that was known at that period with respect to the composition of the photographic image. The conclusions expressed in this report have been controverted by later experimentalists, whose results are briefly alluded to in the notices lately appearing in the Photographic News; and notwithstanding the fact of so much attention having already been given to the study of the question, chemists have not yet arrived at an unanimous decision in regard to the precise nature of the change brought about by the action of sunlight upon the chloride, bromide, iodide, and other salts of silver, especially under the modifying circumstances introduced by the presence of different forms of organic matter. So far only as the simple problem of the decomposition by light of the pure chloride of silver is concerned, there appear to be no less than three distinct views advanced in explanation.

"1. The supposition according to which the white protochloride of silver undergoes gradual decomposition, affording metallic silver as the ultimate product, but at an earlier stage an intermediate compound, which has been termed subchloride of silver.

"This view was advanced by Messrs. Hadow, Hardwich, Llewellyn, and Maskelyne in their joint report to the British Association.

"2. That which asserts the decomposition to consist merely in the separation of the elements chlorine and silver, not recognising any intermediate stage in the process of reduction.

"MM. Girard and Davanne, Mulder, Van Monkoven, Dr. Guthrie, Mr. Spiller, Mr. Malone, and Mr. Crookes are among those who have advocated this mode of explanation.

"3. The opinion according to which the chloride of silver absorbs oxygen at the same time that it loses chlorine, but with the ultimate formation of metallic silver.

"Mr. Robert Hunt, in advancing this statement, explanatory of the chemical change, includes the elements of water in the decomposition, and refers to the probability of subchloride of silver being formed as the product of partial reduction.

"This third hypothesis has not been confirmed by the results of later investigation; but it will be sufficiently apparent from the discrepancy in these several accounts that much remains to be worked out in connection with this interesting chemical problem, and that notwithstanding the evidence gathered from moderate research, there is yet room for diversity of opinion. More facts are wanted for the satisfactory elaboration of the inquiry in all its phases, and it is certain that renewed experiment, pursued conjointly with the discussion of the results, will greatly contribute towards the attainment of more precise theoretical means, by which the interpretation of these important photographic phenomena will be placed eventually on an indisputable scientific basis."

Professor Dove has proposed a most ingenious and accurate method of photography, which will, doubtless, prove of considerable use to scientific photographers and others engaged in the measurement of light. The method has the advantage over those now in use, that it is equally applicable to the determination of the intensity of light proceeding from a bright or faintly luminous body, whether it be white or coloured, transparent or opaque; it is suitable also to determine the amount of light transmitted by photographic lenses and other optical instruments. The apparatus used is the compound microscope, which is usually brought into a horizontal position; a minute photograph representing black letters on a white (transparent) ground, or simply a cross on a similar ground is placed on the stage, and viewed under a power of from 20 to 60 diameters. The letters will, of course, appear by transmitted light, black on a white ground; and white on a black ground, by reflected light; while the two illuminations can readily be balanced, so that the letters are made to disappear. This is, perhaps, most elegantly effected by the use of two Nicol's prisms, one placed under the stage, the other directly behind the objective or the eye-piece. By the revolution of either prism the transmitted light is weakened till the compensation is exactly effected, and the letters made invisible. The compensation may also be effected by reducing the size of the aperture under the stage, or by varying the distance of the luminous body which stands on the axis of the microscope. The light furnished by two candles is compared by placing them one at a time in the prolongation of the axis of the compound body, and varying their distance from the microscope till the compensation has been made for each separately. Their distances from the microscope is measured, and furnish the data for calculating the relative amounts of light emitted, the zero of the scale being the microscope photograph. The intensity of the light in various parts of the spectrum is measured by allowing different portions of it to fall on the under side of the photograph and effecting compensation. Nothing can be simpler than the application of this method to the determination of the equality, or inequality, in the amount of light transmitted by, or reflected from, differently coloured substances. Dove recommends that photographs should be especially executed for this photometer, and it has in fact been found that some are more delicate in their indications than others; the letters or figures ought to be very sharp at the edges, for if they are surrounded by an outline differing a little in density from the central portions, this in practice becomes a dividing band between two shades, and renders compensation difficult. It would also be as well to remove the iodide of silver by cyanide of potassium, instead of hyposulphite of soda, as the letters then appear considerably brighter by reflected light. It is desirable that the sensibility of this new method, as compared with others now in use, should be tested by a carefully made series of numerical determinations.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

*Baths and Dippers.*—The baths used in photography are of two classes; the vertical bath, and the horizontal bath. The former is at present the most generally used.

The materials of which baths are made are various. Glass, porcelain, gutta percha, india rubber, slate, ebonite, and wood have all been employed for this purpose, and although undoubtedly some of them are better than others, for general use, for reasons which I will presently examine, an efficient bath may be constructed with any of them.

The office of the bath is to hold the solution of nitrate of silver by which the iodized plate is rendered sensitive to light. The substance of which it is formed must therefore be inactive with regard to nitrate of silver. But this is not the only requisite. It is essential that the bath liquid should always be limpid and clear but when in work it is constantly depositing upon the bottom and sides of the vessel, sundry particles, sometimes of silver reduced by light and organic matter, sometimes of iodide of silver from being supersaturated with this salt, sometimes of dirt or impurities that have fallen into it. The receptacle, therefore, should be of a form and material easy to be cleaned, and especially of a nature easy to determine whether it be clean or not. The ordinary

* Continued from page 172.

vertical dipping-bath is of a very inconvenient form for cleaning, and when made of an opaque material, for ascertaining with certainty whether it be really clean. Glass and white porcelain ware are the most satisfactory in this respect, as the dirt can be seen upon their surface; but the cleanliness of baths made of the other substances named must be taken a good deal on credit.

The form of a vertical dipping-bath is naturally in a great measure determined by its intended use. It must be a deep trough larger all ways than the plates that are to be sensitized in it, and of little breadth so as to economise the silver solution. There should be no sharp interior angles or corners, as the dirt collecting in these is difficult to clean out, so they should be carefully filled in and rounded. The interior surface should be smooth, because asperities encourage the deposit of the dissolved iodide of silver from the liquid. Finally there should be a spout or lip to facilitate the emptying of the bath without spilling any of the solution. Few of the vertical dipping baths generally manufactured for sale fulfil completely *all* these conditions.

Vertical porcelain baths, as mostly made, approach nearest to the desired conditions of form and surface, but the interior angles are rarely rounded off sufficiently to make the cleaming of them an easy operatiou. If this fault were corrected they would be very perfect baths, and leave little to be desired.

The cast glass baths of commerce, do not, I think, as a rule, come up to the standard of workmanship we have a right to expect from the trade which can produce the exquisite *mousseline* wine glasses which we see upou our dinner tables and the beautiful apparatus that aid the experiments of the chemist and electrician. They are characterized by a smooth internal surface, and generally also by the absence of any interior angles, which qualities render them very valuable, and causes their deficiences to be the more regretted. The great thickness of the material is probably one cause of their high cost, which for large baths is almost prohibition for a poor person; but I believe this excessive thickness is a mistake when given with the idea of increasing the strength of the vessel, because thick glass castings from their necessarily inferior quality, and the greater difficulty in annealing them, are frequently more liable to fracture than those of lighter substance or of blown glass, even where great care is taken in their manufacture; and also because photographic baths intended for the studio from their very nature are so little exposed to rough usage that precautions to give them extra strength seem unnecessary. Where we consider the thinness of the glass of some of those large bells which are used inverted as aquaria, containing often four to five gallons of water, and which are employed with safety for that purpose, it seems needless to more than double that thickness for vessels intended to hold one or two pints. Again, they are generally made too broad from back to front which uecessitates a larger quantity of bath liquid then should be required. Three quarters of an inch, inside measurement is amply sufficient in my opinion, but if it be found that some customers prefer broader baths, I thiuk a certain proportion should be made each way so that the purchaser may have the opportunity of choosing for himself. Also the sides in many cases are not parallel to those opposite, and frequently both sides are curved, sometimes inwards, sometimes outwards. It is held by some to be advisable that the front side of a dipping bath should be slightly curved outwards, that the collodion may not be rubbed against it. I am hardly of opinion that this is necessary, as such an accident can only arise from the extreme carelessuess of an operator, and such a form largely increases the quantity of liquid required to fill the bath; but in any case the side against which the back of the plate is to rest must be flat, as if it curved outwards it would have a tendency to push the plate off the dipper, and for either side of a bath to curve inwards, which happens from the soft casting bending while being annealed, is clearly bad. Lastly, glass baths, as now supplied to us, have no lip, and when they are very full it is a matter of considerable difficulty to return the liquid into the bottle without spilliug any of it, unless a syphon is employed.

Seeing the excellence to which glass manufactures have arrived, I am sure that there would be no difficulty iu obtaining a cheaper and more suitable glass bath if the makers were better acquainted with the shortcomings of those now manufactured, and the real requirements of the case. They cannot do better than take for models for a cast glass bath some of the best gutta percha baths with the only difference of having care to rouud off all the inner corners and angles, the same as in the cast glass baths made at present

I am of opiniou however that a very effective and more satisfactory bath can be made of blown glass, in the same manner as cheap tumblers, which are blown iuto a mould. In point of strength blown glass is as superior to cast glass, as wrought iron is to cast iron, therefore a great diminutiou in the thickness might be allowed with safety, and as such an article would be easier to manufacture than the thick unwieldly castings now supplied, it would probably be made better, more workmanlike in fashion, and more agreeable to the eye as well as better suited to its purpose. I do not thiuk it necessary to do more than allude to the *built* glass baths which have (fortunately) long ceased to be a part of the apparatus used in photography. They were always a source of misfortune and vexation, though it must be admitted they were at least as much sinned against as sinning, for they were generally constructed with little science or care, and cemented with a material, ofteu unsuited for such a purpose. *Requiescat in pace.*

Gutta percha baths have been much praised, and equally much abused, according as the writer got a pure gutta percha bath, or one made with an adulterated or unclean specimen of the gum. A clean, pure gutta percha bath may be used without the remotest danger; but it is very probable that many baths of good gutta percha, have been condemned from impurities having collected on their surface, either of the mould in manufacture, or otherwise during use, which, combining with the uitrate of silver, have spoiled the bath liquid. The great drawback to gutta percha for a vertical dipping bath, is the impossibility of ascertaining with certainty if it be clean which is rendered still more important from the tenacity with which some chemical stains adhere to this material. (We all know that gutta percha trays cannot be used for developing wax paper negatives, because the deposit upon them, which always occurs in that process, cannot be with certainty cleared away, and the silver is constantly being thrown dowu on the tray instead of on the pictures.) A simple sensitizing bath liquid, does not give any deposit that cannot be rubbed off with ease, therefore *when once clean*, a pure gutta percha bath may safely be used, but more than ordinary care should be taken in washing it out frequently, as the eye caunot examine every part of it, and detect dirt as in a glass or white porcelain bath. The only objection to the form of the gutta percha baths of commerce is the sharp inside corners and angles, which are difficult to clean out. They might easily be corrected. These baths are especially valuable to the laudscape photographer, since they can be carried about without danger of breaking.

The same remarks apply to ebonite baths as to gutta percha. I am not aware of any advantage they have over the latter. Great stress is laid in the announcements of this material, that it will bear a temperature of over 212° Fah. without injury, but this is a property without much value in general practice for dipping baths. In the few exceptional cases when such a property may be desirable it would be best to employ one made of porcelaiu.

(*To be continued.*)

## SOME EXPERIMENTS WITH A NITRATE BATH.

BY VALENTINE BLANCHARD.

Some time ago, during some experiments made to induce a refractory bath to abandon its wayward conduct and return to the society of well behaved and orderly baths, I came upon some very curious results.

The bath was an old one of about fifty ounces, and contained both nitric and acetic acids. A quantity of carbonate of soda, as much as could be heaped up on a shilling, was introduced. The bath was then filtered and put away for several days. On trying a plate in it, before adding acid to neutralize the alkalinity, I was astonished to find a negative start into being with a speed truly electric. Like a flash of lightning the image made its appearance immediately after the application of the developer, which was protosulphate of iron, about thirty grains to the ounce, and there was no need of further intensifying, for it was a negative perfect in every particular.

I tested the bath with litmus paper and found it decidedly alkaline. This went to confirm a pet theory which I have long entertained, but have never been able to successfully work out, viz., that that which we call fog in an alkaline bath is such an exalted state of sensitiveness as to be with the ordinary methods of manipulation quite unmangeable. Hennah several years ago mentioned in his hand-book some curious and unaccountable results somewhat similar to those I describe, but until lately I have never met with any one who have in the course of their photographic experience stumbled upon such a curious phenomenon as an alkaline bath giving good negatives.

Some short time ago the editor of the News described just such a case. A bath was sent to him to tame, for it was pronounced by the owner refractory and incurable. The bath, when made alkaline with carbonate of soda, gave good results, but when acid was added it fogged, and continued to do so in an exact proportion to the amount of acid added. This I at once saw was exactly a parallel case to the one I have described, and I determined, therefore, the first moment I could spare, to try and bring about the same results with a new bath. Accordingly, some weeks ago, I made a bath 35 grains of silver to the ounce of water, employing the ordinary silver for the purpose. After saturation with iodide of silver, I filtered it, and then added 12 drops of glacial acetic acid, solid at 50°. I now introduced as much carbonate of soda as I could conveniently put on sixpence and after well shaking it, and letting it remain at rest some time, I filtered it. Three weeks afterwards I returned to my experiments, and succeeded in getting some very good pictures. But on making up the iron developer to about fifty grains to the ounce, I at once obtained negatives that were so dense as to require in some cases no after treatment, indeed, a few drops of silver in the iron solution proved sufficient at any time to give the requisite amount of density. The strking peculiarity about these negatives so obtained is the rapidity with which they start into being, and the vigorous appearance they present to the eye immediately after the application of the developer.

It is, I believe, absolutely necessary to use a collodion containing a fair amount of bromide in order to produce the best results.

There has always been a difference of opinion as to the accelerating influence of acetate of silver in the bath. Some years ago, when pyrogallic acid was invariably used as the developer for negatives, acetate was largely introduced into the bath by many; but lately, since iron has come so generally into use, its employment has been completely abandoned. The result of the experiments I have recorded have proved thus far so satisfactory that I am induced to believe that with a collodion containing two grains of bromide to the ounce, and with a developer of iron fifty grains to the ounce, negatives can be produced in a shorter space of time, and possessing more vigour, combined with delicacy of detail than can be produced by the usual method.

I hope to have more to say on this subject shortly.

## ON PHOTOGRAPHIC REPRODUCTIONS.

BY ALFRED H. WALL.*

We have in photography a discovery which is to art what the printing press was to literature; and of the great masters in art it may be more truly *now* said than at any other time—"Their conceptions are no longer pent up in galleries open to but a few: they meet us in our houses, and are the household pleasures of millions. Works designed for emperors, popes, and nobles find their way, in no poor representations, into humble dwellings, and sometimes give a consciousness of kindred powers to the child of poverty." The engraver may translate into monochrome every line and tint of a painting accurately enough; but so surely will his own individualism, his own peculiar "*manner*," find expression in his reproduction, that even the finest of such are no less representative of the original painting than of the copyist and engraver. The truth of this seems very widely and generally recognised. The *Athenæum* remarked not long since, when speaking of the pictures at Hampton Court:—"Copies multiplied by this—the photographic—process would render more service to students than any lithographs or line engravings now current; and the *Times*, otherwise no friend to the art-claims of photography, said, not long since:—"A photograph of a drawing in black and white, sepia or gray, is hardly distinguishable from the original: and even when the original is in red chalk, the photographic reproduction, darkened as it is, has a precision and spirit that give it a value beyond the most careful copy that can be made by hand." Of paintings the same influential authority says:—"The practice of having their pictures photographed is largely spreading among our painters, and the fact shows, what no man who has the the painter's feeling needs proof of, that photographs of pictures have qualities that more than make up for their inevitable untruthfulness in rendering certain colours. They render the spirit and expression of the originals with an effect they may well drive the engraver to despair. * * What line engraving can stand beside even the most unsatisfactory of these photographs as a representative of the original for those, who love, above all, the essence and spirit of a picture?" But without further quotations it will be at once apparent that a branch of art which can reproduce with such extraordinary fidelity, rapidity, and comparative cheapness, the noblest and grandest works of high art—extending their influence, multiplying their admirers, and inspiring with their perfections the loftiest art-patron and the lowliest art-stuent—must, sooner or later, exercise remarkable power in educating and refining the popular taste in art.

The capability of photography as a reproductive art agent being admitted, there is another view of the subject to which I am desirous of next briefly calling attention.

In the year 1773 you would have found in all London only two small shops devoted to the print trade. These dealt chiefly in engravings *imported* from Germany, Flanders, Holland, and France; while the very few inferior English engravers in this country could scarcely preserve themselves and their families from destitution.† So rapidly did the art emerge from this degraded condition that only nine years afterwards it was stated in the House of Lords that, as as articles of *export*, engravings produced the country £200,000 per annum. This great change was chiefly brought about, we must remember, by the application of engraving to the reproduction in monochrome of paintings and other similar works of art. William Hogarth, our great English painter, was the first to bring the obscure and ignoble art into high esteem and popular favour, by applying his skill as an engraver to the reproduction of his own immortal works; and, by thus demonstrating the commercial, educational, and industrial capabilities of engraving

* Read at a meeting of the South London Photographic Society, April 10th, 1862.

† Roquet.

as allied to painting, awakened a spirit of enterprise which speedily created a new and very flourishing branch of trade.* Now, if the most important element of this branch of trade is, as appears probable, about to pass into the grasp of photography, it is of absolute national importance that so valuable a department should be properly cared for, cultivated and encouraged. The difference between exportiug and importing the productions of any art is the difference between wealth and poverty for its professors—the difference between ignoble obscurity and honourable eminence for the art. Remembering this, it surely becomes members of a Society like our own to give such department careful study, and its process their full share of culture.

If "the highest value of the arts of design consists" (as was said by one of our recognised authorities on the administrative economy of the fine arts) "not in their power to minister to the luxury and splendour of the few, but in their eminent capability to promote the fitting culture and education of all," then may photography fairly lay claim to such value. Indeed, in the mere act by which the Art and Science Department of the South Kensington Museum re solved, in 1858, to publish at cost price photographic reproductions of works by eminent masters, the claim of photography to such distinction was publicly recognised and acknowledged. In the face of such facts as these, then, it seems difficult to understand why Her Majesty's Commissioners for the International Exhibition could have evinced so little policy, foresight, or common sense as they did in classifying the tools of the art and its productions as the result of equal skill and intelligence. If only in this one of its very numerous and valuable applications, the art had the very strongest claims to receive at their hands a more than common share of honour and encouragement, instead of this act of injustice and discouragement. For these reasons, therefore, I bring my subject unhesitatingly before you this eveuing, trusting that both upon this aud upon future occasions it may receive from us that meed of interest and research to which it has so paramount a claim. For myself, as I have no new facts to advance, no scientific experiments to chronicle, no very great experience to speak about, some apology may be due, which I now duly proffer. My further remarks will be chiefly devoted to a few practical hints, rather intended to elicit in discussion more valuable conclusions and opinions than to stand upon their own consequence. There is one circumstance of some significance, however, which I may mention before proceeding. In the last French Exposition of Photography there were nearly two hundred specimens of reproductions of drawings and paintings by celebrated masters: in the London Exhibition there were, perhaps, not a dozen. I shall first speak—

### Of Copying Engravings.

Choice rare prints are costly things, and their reproduction, as a commercial speculation, would doubtless frequently prove very remunerative. But the cost of copying and reproducing by engraving such works, say, as Marc Antonio's "Adam and Eve," which sold for 150 guineas, or the celebrated sabre portrait of Rembrandt, which fetched £600, would be so serious a consideration as to be unworthy of any enterprising print publisher's attention; and thus many an invaluable work of art passes secretly out of existence. Aided by the camera this no longer need be the case, as few or many copies may be reproduced at an expense fairly proportioned to the number required. These old engravings are frequeutly so stained and discoloured as to render their copying a matter of no small difficulty; it may, therefore, be serviceable if I give a method, which will be found most effectual and easy, which restores the whites, and the clearness, sharpness, and strength of the lines. It is simply taking equal portions by weight of strong muriatic acid and water, and adding three parts of this to one of the red oxide of lead. The discoloured prints are then steeped in this and taken out when restored.

In copying from a flat surface the question of focus is very much simplified; but, as with a good lens the engraving is apt to appear tolerably sharp on the ground-glass when the perfection of sharpness is not yet reached, one ought not to be too easily satisfied. The collodion should give good iutensity and not be too new: a slight addition of free iodine secures transparency in the blacks. I prefer copying in direct sunlight, and developing with a weak iron developer (iron eight grains, acetic acid twenty minims), not too new, intensifying afterwards with pyro and silver. The collodion, although it should not be in what would be called its best state (for portraits or views), should record the most delicate lines with great clearness and precision. Of course over-exposure, over-development, and everything which tends to mar the perfect transparency of the blacks, or destroy the more refined details of the graver, must be avoided—pure white and clear blacks being the elements of success. (I feel ashamed to mention these simple things here, although they may be useful in some quarters, perhaps.) When the destruction of the print is of small consequence, and the margin is very much torn, stained, or discoloured, this may of course be cut away and the print be placed against a piece of white board or paper for copying. In selecting a print for copying we should remember that there is a vast difference between a really good proof and those feeble, chalky impressions from worn out plates which are to be found in the shops of cheap printsellers.

But copying engravings is a very simple matter compared with the

### Copying of Paintings.

Here more real and tangible difficulties meet us—difficulties which in theory look so truly formidable that one can only wonder when in practice they are so gloriously overcome. The amazing success with which Mr. Thurston Thompson has reproduced the wonderful creations of Turner's genius in the specimens before us, must convince us that such difficulties only exist to be conquered. But the victory is not always *easily* won. It is only after loug experience and many experiments in photographing the more difficult paintings we succeed in making every step in the process a triumph over some enemy or another, until the end is gained —getting over this in the exposure, mastering that in the development, securing something else in the intensifying, and managing other points in the printing, so as eventually to secure what, after all, some worthy gentleman amateur, who has just mastered a shilling manual, and taken his fourth "picture" from nature, will perhaps sneeringly denounce as *only* a copy. Knowing that the bromides are more sensitive to the colours called non-actinic, and the iodides to those of the other eud of the scale, it at once strikes us that the judicious combination of both, with reference to the warm or cold characteristics of the paiuting, is the most hopeful thing for success. In a general way the bromised collodion will give the most satisfactory results.

And here I must pause. The simple fact is that I have now only just time to lay down my pen and start for this evening's meeting—my paper, in consequence of the accumulating business of the Society's Exhibition, having been delayed until there was not sufficient time remaining for its conclusion. I must therefore beg your pardon, and come at once to a few experiments made to test the power of certain combinations of the iodides and bromides in rendering certain coloured diagrams.

I took a sample of collodion and bottled off twelve separate ounces in twelve small bottles. No. 1 contained five grains of bromide of cadmium and two and a-half grains of iodide of ammonium. No. 2 contained five grains of bromide of ammonium. No. 3 five grains of bromide of cadmium and two grains of iodide of potassium. No. 4 contained as much of the iodide of potassium as it would take up. No. 5 contained five grains of iodide of ammonium.

* Alderman Boydell—once the poor engraver, afterwards as a follower in the steps of Hogarth, the great print publisher—being at the Royal Academy dinner, his health was drunk by Sir Joshua Reynolds, at the suggestion of Burke, as "the commercial Mæcenas of England."

No. 6 two and a-half grains of bromide of ammonium, and as much of the iodide of potassium as it would take up. No. 7 contained one grain of bromide of cadmium, ditto bromide of ammonium, and as much as it would take up of the iodide of potassium. No. 8 contained two grains of bromide of cadmium to as much of the iodide of potassium as would dissolve. No. 9 contained the same proportion of the iodide of potassium, with two and a-half grains of iodide of ammonium. No. 10 contained iodide of ammonium four grains, bromide of cadmium one grain, iodide of potassium and bromide of ammonium ditto. No. 11 held five grains of bromide of cadmium; and No. 12 one grain of bromide of cadmium, two grains of bromide of ammonium, and five grains of iodide of ammonium.

Desiring merely to test the qualities of these various samples for reproducing the correct *chiaroscuro* of the coloured diagrams, I simply developed with iron without intensifying, and shall now lay the result before you in the twelve negatives, and twelve prints from the same.

In conclusion, I promise to resume this subject at some future time, when, my engagements being less numerous and urgent, I shall be able to devote a larger share of time and attention to some experiments of a more conclusive character. I think in the specimens of my experiments some foundation will be found in a discussion of greater value than my paper—even had it been completed—could have boasted.

Thanking you for your polite attention, I now place the subject in your hands.

## INSTANTANEOUS PHOTOGRAPHY.*

The production of instantaneous pictures has been a favourite subject for speculation and experiment from the earliest history of the art, and soon after the discovery of the collodion process began to be regarded as *un fait accompli*. Many photographers will remember the early photographs of birds, &c., taken instantaneously by Count de Montizon in the Zoological Gardens, and the cloud-and-water pieces of Legray. The writer has in his possession a photograph taken by Dr. Diamond ten years ago, which unites in itself the two facts, generally regarded as of modern date, of being a *carte de visite* in size and style, and of being an instantaneous equestrian group. Most old photographers have, in fact, occasionally produced instantaneous pictures, either by chance or design. It has only been comparatively recently, however, that the art of instantaneous photography has been systematized, or that any attempt has been made to lay down and control the conditions for its successful practice.

Very early indeed in the history of the collodion process, experiments were made with a view to obtain increased sensibility, and a variety of organic and inorganic compounds were added both to the collodion and the bath; but all were gradually abandoned as at best of doubtful and uncertain advantage. The process suggested in 1854 by Mr. Maxwell Lyte of covering the excited plate with a solution of nitro-glucose and silver, by which he obtained perfect pictures of moving bodies with a landscape lens and very small aperture, scarcely received a fair trial, we fear, as indeed processes involving any complication either of formula or manipulation rarely do. For years past all extraneous aids to extreme sensitiveness have been discarded, and the recognized methods of securing the most rapid results, were briefly and generally comprised in good chemicals in good condition, good lenses, and good light.

Good chemicals consisted in a bath of pure nitrate of silver, as nearly neutral as possible, good collodion newly iodized, and pyrogallic acid development. The great difficulty consisted in the uncertain and ever-changing conditions of the collodion. The sample, which possessed sufficient sensibility to produce in a good light instantaneous pictures one day, was frequently comparatively useless a few days afterwards. The introduction of iodide of cadmium in place of the salt of potassium effected an immense improvement in the stability of collodion, and facilitated considerably systematic attempts at rapid exposures, although many experienced photographers still believe that by far the greatest amount of sensitiveness possible in photography when combined with perfect results, is attained by the use of a collodion made from good pyroxyline and pure solvents, newly iodized with a pure alkaline iodizer, excited in a neutral bath of pure nitrate of silver, and developed with pyrogallic acid containing a *minimum* of acetic acid. Our chief object in the present article is, however, to give a *résumé* of the different formulæ, which have either been published, or are gathered from private sources, used by various photographers whose published instantaneous pictures have received the stamp of public approbation. In the processes to which we refer there is a singular uniformity of principle, a collodion containing a large proportion of some bromide as well as iodide, and iron development, being used in almost every instance.

Mr. Wilson, of Aberdeen, leads the van of professional instantaneous photographers. His charming pictures of breaking waves and flying clouds, of gun practice in which not a wreath of smoke is blurred, of steam vessels and of street scenes, are familiar to every one, and admired by all. His operations are very simple; he uses the best bromo-iodized collodion he can buy, not confining himself to the product of any one maker, and sometimes using a mixture of several; a thirty-grain nitrate of silver bath, as nearly neutral as possible. For stereoscopic work the lenses are single lenses of six inches focus, with a stop of about half an inch diameter; for larger instantaneous views a triplet with full aperture. The developer used is a 30-grain solution of iron, with 30 minims of glacial acetic acid. The pictures produced by this formula rarely attain sufficient vigour in the first process of development, but require further intensifying by some process. The method employed by Mr. Wilson is a very simple one; it consists merely in washing well, and flooding the plate again with 30-grain silver solution, and again developing with iron, and so on repeatedly until the right amount of intensity is obtained.

Mr. England's method of producing instantaneous pictures will be found briefly described by himself in a paper read at the last meeting of the Society, when it was illustrated by the exhibition of some very pure delicate negatives. In principle, it will be seen that Mr. England's method resembles in many respects that of Mr. Wilson. The bromide, it will be seen, is used in unusually large proportions, generally equalling the iodide in amount, and sometimes even exceeding it. An old empirical formula used to obtain at one time, to the effect that when bromides were used the amount of the iodide should be increased by a proportion equalling the amount of bromide added: thus, if 3½ grains of iodide to the ounce of collodion were considered the right amount to be used alone, 4½ grains would be required if 1 grain of bromide were added. Mr. England's formula appears to be directly opposed to this notion, and has the advantage of successful results to guarantee its value. A neutral silver bath, and very strong iron developer, also form parts of Mr. England's method, the latter being sometimes used as strong as 48 grains to the ounce. His negatives also require same intensifying after development; and this he effects in the manner now very common, by the use of pyrogallic acid and silver. Nothing could exceed the beauty of the negatives exhibited at the meeting of the Society, or speak more highly for the method by which they were produced.

In another page a notice will be found of a series of very fine instantaneous views of street scenes and of marine subjects produced by Mr. Blanchard. The process he details is similar in principle to the two already described. A bromo-iodized collodion is used, the proportion of bromide being varied according to the state of the light and character of the subject, the proportions being from 1 grain to 5 grains of bromide of cadmium to each ounce of collodion, and in all cases 4 grains of iodide of cadmium to each ounce of collodion. The difficulty arising from glutinosity, which is sometimes experienced where the salts of cadmium are employed solely, is avoided by the use of a pyroxyline made at a high temperature, with a full proportion of water, which is very soluble and tends to give a very fluid collodion, limpid, and structureless. A 35-grain nitrate bath is used, which has been first neutralized with oxide of silver and then acidified in the slightest possible degree with nitric acid to ensure clean working. An iron developer, varying with the temperature from 15 grains to 30 grains, and a minimum of acetic acid is used. The amount of intensity obtained by simple development here again is insufficient for printing, and intensifying is resorted to. Mr. Blanchard's method is, in all cases, to leave this to be done at home, as it not only wastes time but is inconvenient to effect comfortably in the developing-box uses for the field operations. The plate is kept moist by means of a coat-

* From the *Photographic Journal*.

ing of glycerine and water. When about to be intensified, it is well washed and flooded with a solution of iodine and iodide of potassium, about two grains of each, in water; this is washed off in a few minutes, and a solution of pyrogallic acid, with a little silver added, is applied to the plate until the right intensity is obtained.

Both Mr. England and Mr. Blanchard, unlike Mr. Wilson, use portrait combinations for producing their instantaneous views, and each use lenses of different focal length and different stops for different subjects. In street views the curvature of field incident to combinations of lenses does not become a serious evil: we believe, however, that the rapid portrait lenses recently made by some of our best opticians give a flatness of field not to be exceeded by single lenses. Where from the nature of the subject, and the the amount of light, view lenses can be used for landscape work, they will doubtless be preferable; but as in instantaneous work rapidity of action is the first consideration, there can be no question as to the superiority of combinations for many purposes.

The modes proposed of uncovering and covering the lens to obtain the minimum of exposure are various, each operator having some favourite method. Mr. Wilson frequently uses his Scotch cap, moving it off the lens and on again as rapidly as possible. Mr. England's clever contrivance, described in another page, seems as perfect in principle as it is found efficient in practice. Mr. Blanchard's practice is similar in principle to that of Mr. Wilson, only he uses a piece of wood with a ledge to rest upon the lenses, instead of the Scotch cap. We have seen other impromptu contrivances of the same kind made to answer the purpose perfectly; the argument in their favour is, that anything so under the control of the operator gives him more latitude in varying the rapidity of the exposure with the character of the subject than any contrivance depending upon the action of a spring or its own momentum no matter how acquired.

The general conclusion to be deduced, then, from the practice of professional instantaneous photographers, appears to point out highly bromized collodion and strong iron-developing solution, in conjunction with a nitrate bath of pure silver as nearly neutral as possible, together with good lenses and good light, as the necessary agents in producing instantaneous pictures. We have before us a series of examples of the instantaneous productions of other professional and amateur photographers, together with statements of the formulæ and manipulations used; but we have thought it desirable rather to refer to pictures with which the public is familiar, and afford an opportunity of comparing processes with published results. In the majority of instances, however, we find, when the proportions of the sensitizing salts are given, that from one-third to an equal quantity of a bromide is added with the iodide, and that the salts of cadmium are generally preferred. In some instances the collodion of different commercial manufactures is quoted, and in these cases we find that those collodions which have the reputation of containing cadmium, and containing bromides, are generally referred to; and also that it is a very common circumstance to find that a mixture of the collodions of two different makers is found better than either singly. It must not be forgotten that in instantaneous photography pre-eminently, the best chemicals, the best formulæ, and the best apparatus, will be of little avail, without great judgment, skill, and care at every stage of the operations.

This hasty sketch of the rapid processes in use would be very incomplete without some reference to the rapid dry processes at present exciting public attention. We notice in another page some instantaneous views taken on dry plates prepared by Dr. Hill Norris. This process is, unfortunately, a secret one, and as such scarcely of legitimate interest for discussion in our pages. There are two facts in regard to them of which, however, we are in a position to speak with certainty, the information having been derived directly from Dr. Hill Norris himself. These facts are, that they are not prepared with a simply iodized collodion; and that their sensitiveness does not depend on the presence of free nitrate of silver, as every effort is made by washing to remove every trace of a soluble salt of silver from the film. Mr. England has by his process, he states, prepared dry plates which equal in sensitiveness ordinary iodized collodion when developed by pyrogallic acid. But the chief source of rapidity to which attention has recently been directed is the aid of heat in developing. Old photographers remember that many years ago Ferrier, Martin, and others, used hot solutions of gallic and pyrogallic acid for developing albumen plates. Mr. Mudd in this country, and more recently M. Roman on the Continent, have pointed out the fact, that the use of hot developing solutions permitted a considerable shortening of the exposure in collodio-albumen plates. More recently still, Dr. Draper and others, in America, state that good pictures have been obtained on ordinary tannin plates, by an exposure of two or three seconds, when heat has been used in developing; whereas the same plates required an exposure of an equal number of minutes when the ordinary processes of developing were adopted.

These facts are important and interesting, but they require the verification of successful repetition in this country. We shall refer to this subject in our next, when we hope to be able to state the results of some experiments.

## MATERIALS FOR SILVER BATHS.

BY NICHOLAS PIKE.*

Within the past year quite a number of articles have been contributed to the photographic journals published in this city, on the peculiar merits of the recently introduced wooden baths the holding nitrate of silver solution for photographic purpose. These articles are, in my opinion, likely to lead the professional community, and more especially those who are living in the rural districts, into an error. For some time past I have experimented with many different materials in constructing baths for holding silver solution, and particularly with wood.

It is well known that by a careful examination of a cross section of any kind of wood, with a good microscope, it reveals to us at once that it is not solid, but composed of a vast number of small tubes ramifying through every part, and even the oldest and most compact species are nothing more than a collection of vessels and cells, which consist of extremely thin and delicate membranes. In selecting specimens for my experiments, I examined, microscopically, more than thirty different kinds of wood in order to make use of those which were most compact and which contained the most minute vessels and cells.

The baths were carefully made, and a good coating of shellac was used inside, but in every instance in a few months the silver solution became injured by the decomposition of the shellac, which would crack and peel off. This decomposition would be more rapid when the solution was slightly acid. In a large bath which was in use about ten months, the shellac was completely dissolved away, and the silver solution permeated the wood in such a manner that I recovered three ounces of metallic silver on reducing it to ashes; and from the bottom of another bath which only measured fourteen inches in length, by two in width, and one in thickness, I recovered one ounce and eleven grains. The solution had remained in this bath undisturbed for sixteen months. The sides and ends I have not yet examined chemically, but am sure they are rich in silver, as a microscopic examination of a longitudinal section reveals the fact that the medullary system is completely filled with the precious metal. The solution has permeated every part and has crystallised on the outside.

My next experiments were with the common porcelain bath, such as are usually sold by the trade. I have had three or four of these baths filled with silver for the past three years, and in every instance I have found them to absorb and injure the solution. After they have been in use ten or twelve months the glazing begins to crack, and owing to their porous nature the solution permeates through and crystallises on the outside, and in a short time the bath becomes completely saturated. From a bath of this kind, which Mr. Davis, of Brooklyn, had in use, I took sixty-four grains of metallic silver which had formed on the outside in the short space of twelve hours. I reduced this bath to powder, and from a small portion I extracted one ounce and twenty-three grains of pure silver, and I have not the least doubt that from the balance I shall procure two or three

* Read before the American Photographical Society Monday evening Feb. 10th, 1862.

ounces more. From a small porcelain dish used for holding the floating bath for silvering paper which had been in use for eight years, I obtained one ounce and forty-five grains. This proves conclusively that porcelain, and all kinds of ware of a similar description are unfit for photographic purposes.

I had in use a bath made expressly for me in England of a composition of gutta-percha, which was highly recommended to me and warranted to last an indefinite length of time; but this, like all others made of a similar material, soon contaminated the solution, and was in a short time laid by unfit for further use. I have now in use the bath made of French glass plate, invented by Mr. Huffnagel of this city. The bath is strongly secured in a wooden box, and can be transported without danger of being broken. It is, in my opinion, the best bath in use, and the profession generally are indebted to him for his valuable invention. They are sold at a moderate price. Having studied for many years the delightful art of photography, and being only an amateur, I have no interest whatever in the matter of baths, other than to do good to the profession as well as to place my fellow amateurs on the right track.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting was held at the City of London College on the evening of Thursday, April 10th. The Rev. F. F. Statham, B.A., F.G.S., in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. Larchin, Macarthy, Heaton, and Lloyd.

Mr. Martin exhibited some fine stereographs by Mr. Alfred Pellett, some of which, consisting chiefly of huge icicles, something like Mr. England's "Ice Cavern," were very interesting, as were also those of the graves of Wordsworth and Hartley Coleridge.

Some stereographs by Captain Scott were also shown. The cases in which these slides were shown resembled books and were much admired. An album for *cartes de visite*, manufactured by M. Bourquin, was shown by Mr. Hart, as possessing many features of interest and novelty, and received much admiration.

Mr. S. Davis had pleasure in announcing that from the communications received there appeared every probability of the Exhibition being very successful. The warm feelings of interest in the matter already expressed by other societies was very gratifying, and he hoped they would still receive such further co-operation of the same kind as should aid them in opening an exhibition in every way worthy of the present exalted state of the art.

The Chairman stated that Dr. Diamond, Secretary of the Photographic Society, had very kindly intimated, through Mr. Simpson, that any members of the South London Society who might feel desirous of attending the Photographic Soirée at King's College on the evening of Friday the 25th inst., would receive a ticket on handing their names and addresses to Mr. Simpson, who would forward them to Dr. Diamond.

A vote of thanks to Dr. Diamond and the Council of the Photographic Society, for their liberal courtesy in this matter, was passed by acclamation.

Mr. A. H. Wall then read his paper "On Photographic Reproductions (see p. 185). He explained that the pressure of duties, public and private, had prevented him from making the paper as complete as he could have desired, but he hoped to return to the subject at some future period. In the course of the evening a very magnificent series of reproductions from Turner's paintings were exhibited in illustration of the paper. These copies, which were produced by Mr. Thurston Thompson, as yet are unpublished, but were kindly lent by that gentleman to Mr. J. G. Cole, to bring to the meeting in illustration of the paper. Those who are familiar with the paintings of Turner, in the South Kensington Museum, and remember the startling masses of vivid colour which distinguish some of them, will readily understand the difficulty of translating them into monochrome by means of photography. The pictures were about 15 inches by 11 inches, and included some of Turner's most popular pictures. "The 'Fighting *Temeraire*' towed to her last berth," is a marvellous reproduction of a picture presenting very great photographic difficulties. The "Rebuilding of Carthage" is one of the most perfect reproductions we have ever seen, and in the photograph seems as full of atmosphere as in the celebrated picture intended by Turner to rival the productions of Claude. "A Storm at Sea," "Whalers," "The Trogan Fleet," and others of the great pictures were equally well rendered, and all more or less effective. Some exquisite reproductions of *bas reliefs* in terra cotta, also by Mr. Thompson, were exhibited; and together with those of the paintings were much admired. Mr. Cole stated that the lens used in these reproductions was one of Ross's orthographic lenses.

The Chairman in moving votes of thanks to Mr. Wall and to Mr. Thurston Thompson, commented on the vast importance of the art of photographic reproduction as a means of opening to the public those treasures of high art which were now limited to the possession of a few persons. As to the capability of photography to do justice to paintings generally, a more striking proof could scarcely be adduced than the remarkably fine specimens which Mr. Thurston's courtesy had placed before the meeting. More difficult subjects for photography than Turner's paintings could not have been chosen. Notwithstanding their great beauty, there was, as every one knew, not merely the varied and brilliant colours to deal with, but a peculiar indistinctness, which, however perfect in its effect in the painting, was necessarily very difficult to translate into photographic monochrome. Perhaps it was from the fact of the general indistinctness of outline in the paintings that a common feeling prevailed that his paintings were improved by engraving, a decision being there supplied which some persons fancied the paintings lacked, especially those of his latter period. These photographs possessed so much of the atmospheric charm belonging to the paintings, that one was irresistibly led to the conclusion that they were just what Turner would have painted if he had worked in sepia instead of in colour. He thought the publication of such reproductions could not fail to have a good effect upon the art education of the country.

Mr. Wall, without any disrespect, wished to record his protest against the idea that Turner's pictures were better in the engravings than in the originals.

The Chairman had simply expressed a commonly felt conviction.

Mr. Sebastian Davis thought that the sentiment and true character of many of Turner's pictures was better felt in monochrome than in the presence of colour, which by its profusion and exaggeration in many of his pictures disturbed the quiet enjoyment of light and atmosphere which was so apparent in these reproductions.

Mr. Wall referred to Ruskin's estimate of Turner's paintings, his statement that Turner had originated new ideas of the power of colour.

After some conversational discussion

Mr. Howard remarked that although, doubtless, the reproductions under attention were very fine, he must confess he should have liked better to have seen copies of the works of such men as Webster and other popular painters of a similar class.

After some further consideration

Mr. G. Wharton Simpson observed, that when Turner painted studies for educational purposes he painted in monochrome, his *Liber Studiorum* series consisting of sepia drawings. These photographic reproductions, therefore, just did for his larger works what he had done for himself in the *Liber Studiorum*. In regard to the criticisms of Ruskin upon Turner it should not be forgotten that, able and instructive as they were, Turner himself had repudiated some of them, and stated that Ruskin discovered meanings in his work that he never dreamt of.

Mr. Martin asked what was the effect of the preparation of hydrochloric acid and red oxide of lead, which Mr. Wall had recommended for improving discoloured engravings?

Mr. Wall said its peculiarity was, that it not merely restored the purity of the whites, but seemed to deepen and give crispness and vigour to the blacks.

After some further conversation the Chairman asked Mr. Wall to which of the modes of preparing collodion he gave the preference, judging from the results?

Mr. Wall had not arrived at any decided conclusion on the subject. Each would, probably, have its advantages under given circumstances.

Mr. G. Wharton Simpson, in answer to a question from the Chairman, said that Mr. Thurston Thompson had never, he believed, published his method of manipulating, it might, however, reasonably be inferred that it was not widely different from that adopted by other operators, who had obtained equally successful results. Mr. Simpson further stated, in compliance with a request from Mr. Fitch, that his experience in that department of photography was not so extensive as that of professional photographers, who devoted themselves to that branch of the art: he could, however, recommend with confidence the use of bromo-iodized collodion in reproducing any dark oil painting, or anything else with vivid contrasts. He (Mr. Simpson) had that morning made an experiment to verify one which he had made some years ago, and had found bromide of silver alone very much less sensitive to light than iodide alone, and that a combination of bromides and iodides was more sensitive than either. With an exposure of four minutes in full aperture of a portrait lens he had not obtained a trace of an oil painting with a collodion containing 4 grains of bromide alone, but with one grain of bromide and four grains of iodide he had a good negative.

Mr. Sebastian Davis remembered having some conversation with Mr. Thurston Thompson at the time when Mr. Hardwich's collodion was before the society. Mr. Thompson then informed him that he found he had obtained the best collodion from some French pyroxyline which he imported direct. He could not obtain any so good in England, he stated. He sensitized with a mixture of iodides and bromides, using somewhere about equal parts, but varying according to circumstances. For his own part he liked an old red, bromo-iodized collodion for copying purposes, as it allowed slow development, to obtain detail and intensity without danger of fogging.

Mr. Valentine Blanchard said, as the result of somewhat extensive experience in copying oil paintings, he would offer one or two suggestions as to what he conceived would be Mr. Thompson's mode of lighting those pictures for copying. He conceived that the light would be thrown on the picture to be copied in the direction, and at about the same angle as that in which it was painted by the artist. This might easily be seen by examining the pictures, as the heavy impasting on Turner's paintings would be found to give definite cast shadows. The very fact of this heavy loading of the picture with colour, although at first sight it appeared to create a photographic difficulty, really was the salvation of the photographs, redeeming them from flatness, and filling them with atmosphere. The light caught the rough surface and without altering the drawing gaining innumerable points of pure light, which at once gave brilliancy to the photograph. It was well to let the light strike the picture at a long angle to get the best effect in copying. Another point of great importance was to have everything darkened around and in front of the picture, so as not to be reflected by the surface of the picture. Regarding bromides he believed they produced a great increase of sensitiveness, but he believed it was to all rays, and not to certain coloured rays in particular. Their especial value in reproductions consisted in the fact that they so materially lessened contrasts, and produced harmony. He himself generally used as much bromide as iodide in his collodion. Direct sunshine was most important. Himself and parties had recently had to copy a very old painting, believed by some to be an original Tintoretto, of great value. Several persons had tried to copy it and failed. They found it impossible to do anything with it in a room, but on taking it into the open air and direct sunshine, they got a very successful negative. He had no doubt whatever but that these copies of Turner had been taken in full sunshine by Mr. Thompson.

Mr. Simspon referred, in corroboration of the opinion expressed by Mr. Blanchard, to the copying to the Raphael's Cartoons at Hampton Court by Mr. Thompson, who had them placed in the open air. He (Mr. Simpson) felt somewhat unwilling, however, to admit that the only pyroxyline suitable for the purpose was obtainable in Paris, as Mr. Thompson seemed to think. It was, however, somewhat singular, that in a recent conversation on the collodion used in producing instantaneous pictures, Mr. England had stated that he obtained his pyroxyline from a certain Paris house, and that none which he obtained in this country was so satisfactory. After some further conversation,

Mr. Davis, referring to the lenses most suitable for copying, remarked, that he believed that no lens was so suitable to this kind of work as Dallmeyer's Triple. It covered better, gave a flatter field, and straighter lines than any other lens, and was in every way best for reproductions. The orthographic, he considered, was inferior, and it should be borne in mind that the copies before them, stated to be produced by it, were no test of the value of a lens for copying purposes, as there were no straight lines to be produced without distortion.

Mr. Wall said he had recently received a letter from Mr. Maddison, of Huntingdon, who had considerable experience in reproductions, and he gave similar testimony to Mr. Davis as to the superiority of Dallmeyer's Triple for copying purposes.

Mr. Howard remarked that he remembered some very fine copies at one of the Society's exhibitions some years ago, before triplets were made.

Mr. Davis remarked that those were, he believed taken with a portrait lens with Waterhouse diaphragm, which would answer for copies very well, but the triplet was better.

Some conversation ensued on the samples of the results of different collodion exhibited, and also on the best mode of using the bleaching agency of chlorine in restoring the pure whites of discoloured engravings. The use of chlorate of potash and of chloride of lime was recommended.

Mr. Simpson stated that owing to the very bad printing weather, Mr. Robinson had not been able to supply the copies of the presentation print; but he hoped that they would be ready in the course of the next month, and before next meeting.

Mr. Davis wished to call the attention of members to the alleged accelerating influence of hot developers on dry plates, a subject which the Experimental Committee were about to investigate. Trustworthy information on the subject would possess high value; and he invited all members who had opportunity, to experiment and communicate results to the Experimental Committee.

The Chairman asked if any preparation had been made by photographers to give a reception to foreign photographers who might be attending the International Exhibition? Other trades and professions were taking such steps, and he thought it very desirable that photographers should do so. Doubtless, the parent Society ought to initiate any movement of the kind.

Mr. Wall thought something of the kind was most desirable, and it should be by the combined action of all photographic societies.

A paper "On the Use of Bromides in Collodion," by Mr. Blanchard, was promised for the next meeting, and the proceedings terminated.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 15th April, 1862.*

By the aid of the electric light, M. Nadar has succeeded in obtaining a large number of views in the Catacombs of Paris, which form, certainly, one of the most singular contributions to science that has ever been made by the photographic art. They will, doubtless, find a place in your Universal Exhibition. These views must now possess a greater interest than ever, as, owing to the insecure condition of the roof of the excavations forming the Catacombs, the public are no longer admitted to them in order to gratify their curiosity.

M. Alphonse suggests a method of obtaining vignette portraits without the aid of the vignette glasses usually employed for that object. Reviewing the experiments generally adopted for vignetting, such as the introduction of cotton wool, swans down, screens, &c., none of which appear to completely satisfy the wants of the artist; the coloured glasses have the objection of being rather costly, and are frequently broken in the printing frame, consequently their use is greatly restricted. The method proposed to be substituted is as follows:—Trace on a piece of white cardboard an oval of the size required, shading off from a deep black centre to the edges, by means of a stump. From this drawing, as many negatives as required may be taken, and of different sizes, if desirable, by varying the distance between the lens and the cardboard. The negatives are developed and fixed in the usual manner, intensified with bichloride of mercury, and then varnished. If the drawing be properly executed, a very good substitute for the coloured glass, may be obtained. By a little forethought and management, the place on the glass may be fixed with the nicest accuracy, so that no difficulty in placing the head in the centre of the oval, need be experienced.

M. de La Blanchere has published a treatise on the stereoscope. It contains a history of the discovery, and various improvements in this magical little instrument, an excellent summary of the various theories of binocular vision; and a description of the materials necessary in the production of stereoscopic pictures, the methods by which negatives and positives, both on glass and on paper, are obtained or working with dry collodion, and an account of the various apparatus to which the stereoscope has been applied. Although little more than a compilation, the book will be found to possess a certain usefulness to those who are interested in this branch of the photographic art.

M. Berthelot has succeeded in a most interesting chemical experiment, resulting in nothing less than the direct combination of hydrogen and carbon. Having for a long time been convinced that by placing hydrogen in contact with carbon, at an extremely elevated temperature, they would combine with each other, he tried the experiment at all temperatures, but, at first, without obtaining the desired result. Finally, the extremely simple and happy idea occurred to him of making a current of hydrogen pass between the two carbon points of the electric light excited by Bunsen's battery of 60 elements, and then his efforts were crowned with success. At this extreme temperature the hydrogen combines with the carbon, and the product of the combination is carbide of hydrogen, discovered some years ago by M. Berthelot, to which he gave the name of acetilene. He has been able to collect sufficient of the product to submit it to numerous experiments, and discover that it possesses all the properties of acetylene derived from organic sources. M. Berthelot has previously succeeded in —firstly, forming by means of mineral compounds, and by a purely chemical method, the principal carbides of hydrogen; secondly, in transforming these carbides into alcoholic compounds; but this was neither a carbide nor an alcohol resulting from the direct combination of two mineral principles—from carbon and hydrogen. This, however, is only a *philosophical* production of alcohol, not yet available for manufacturing purposes: though, as a scientific fact, it is both curious and important.

M. Froment has invented a new chronograph, which promises very remarkable results. The apparatus measures seconds, the duration of which is only one five hundredth part of a second: it consists, mainly, 1st, of drum about 40 inches in circumference, silvered on its surface, which is covered with lamp-black at the beginning of an experiment, and to which clockwork imparts a motion of three turns in a second. 2nd, Of a diapason giving 500 vibrations per second, perfectly controlled, by comparison during several whole days with a regulator, which is both electrical and astronomical. 3rd, Of a fixed point in the diapason, which traces a sinuous curve upon the cylinder covered with lamp-black. 4th, Of a little electrical apparatus, intended to mark, by a point proceeding from the spark of induction, the beginning and the end of each phenomenon.

What distinguishes this chronograph from all others which have preceded it, is the very great length by which a phenomenon of infinitely short duration is represented on the blackened cylinder, and the facility with which this length may be subdivided by a microscope. It is stated that in recent experiments the time occupied by a ball in passing through a space of some inches, after being projected from a rifle, was accurately measured.

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## PHOTOGRAPHIC CONTRACT IN THE INTERNATIONAL EXHIBITION.

*"Semper stultus."*

Dear Sir.—The extraordinary document which has emanated from the Commissioners of the Great Exhibition, inviting "tenders" for the sole privilege of operating in the building; is to my mind, one of the the most glaring evidences of official blundering, that these profound and talented gentlemen have yet been guilty of, and in saying this, I make a bold assertion.

In the appointment of Captain Fowke, who may however be an excellent engineer officer, but whose design for the Exhibition building, has caused him to become celebrated as the most original architectural bungler of the day; instead of obtaining a gentleman whose abilities would, at least, have been of such an order, that he would have been competent to have erected a temple of industry and art, which might bear a favourable comparison with an arcade market or a railway station, which it is an acknowledged fact that "the house that Fowke built," either in point of symmetry, elegance, or architectural beauty does not. In classing art photographs with patent grubbers, liquid manure distributors, and other products of mechanical dexterity, as though a picture which embraces in itself the highest efforts of scientific skill and artistic ability, was produced by a process similar to grinding "Dixey's land" upon one of those anacreontic abominations yclept a barrel organ, they displayed a deep seated, and no doubt laboriously acquired, ignorance of art and architecture, which might scarcely be anticipated from a New Zealander. Such being the case it ought not to be surprising that they indulge us with a taste of their leading propensity, when they invite tenders for the privilege of operating in the building, by constructing a code of rules for intending "tenderers" which, I think, will have the effect of deterring any but those who may have friends at court from making an offer for the monopoly. In the first place, they do not bind themselves to accept the highest, or, in fact, any tender. Now this appears to me to be a very "tender" subject. Though a gentleman may stand at the summit of his profession, his taste and skill beyond question, and his offer considerably in advance of other competitors, his tender may be but so much waste paper, unless he posess a friend amongst the Commissioners. This is unjust to the profession, and makes tendering a mockery and a delusion. Now the fairest system would be to have tender completely open, taking care, however, that only operators of proven ability be allowed to manipulate.

Again, in the event of any dispute, the Commissioners form the only tribunal of judgment, and from whom there is no appeal. Now as the unlucky photographer will, in all human probability, have more rows with the Commissioners than any other individuals, I scarcely think that the court could be considered an equitable one, when the judges are parties to the action and will allow of no appeal from their fiats. They rouse a never slumbering suspicion in my breast, of either their total ignorance of the theory and practice of the art of photography, or else their prejudice against it, and their desire to injure it in the eyes of the public, by decreeing that no operating will be allowed after 10 a.m., or if I read the rule right, before that hour, unless upon conditions that are not detailed: and, as a culminating point to a tissue of eccentricities, which would be laughable, were they not unfair to the public, and unjust to the profession, they will not allow any space within the building for either sensitizing or developing, nor yet will they allow those two indispensable formulas of the wet collodion process to be carried on in the building. This rule, if carried out, will totally prevent the application of what is universally allowed to be the best and safest system now known to science, and will compel the artist to use dry plates against his judgment and experience, besides entailing on him double labour, and poorer results.

Now Mr. Editor, I would call upon the profession to protest to a man, against what all must look upon as either an evidence of the densest stupidity, or a strong desire to lower photography in the eyes of the public, to minister to the vanity of a clique of painters who arrogate to themselves alone, the privilege of being called legitimate artists I would also advise the non sending of tenders, till the specifications are modified. I am yours, &c.,

Thomas D. Bell.

## Talk in the Studio.

Photography and Astronomy.—Mr. Warren De la Rue delivered the Bakerian lecture, at the Royal Institution, on Thursday evening last, in which he described his photographic operations in Spain, in connection with the great eclipse. After the lecture the Astronomer Royal made some interesting remarks on the immense value attaching to photography as a recorder of such phenomena, its superiority consisting in the absolute certainty of its testimony, whilst that of any individual was apt, under such circumstances, to be warped, coloured, or disordered by the intense excitement of the moment, arising even out of honest interest in the subject. Photography was subject to no such sources of error, and hence the great value of its record.

Photographic Washing Trough and Well Baths.—We have received from Messrs. Bland and Co., some earthenware vessels, manufactured by Mr. G. Elliot, for photographic purposes, which supply a want and are well worthy of attention. The first is intended for washing prints, and is a large earthenware circular pan, something like a foot-bath about 15 inches in diameter and a foot deep. At the bottom is an aperture which communicates with a syphon moulded in the earthenware and forming part of the pan. This principle, as our readers know, as been suggested and used before in washing prints, but we have never seen it so neatly carried out. The bath being placed beneath a tap the flow of which is properly regulated, will, as soon as it is full, commence to empty itself, and so keep up a steady flow of water: whilst the solution of hypo being of greater specific gravity than water, will sink to the bottom of the vessel and be carried off first all the way. If the mouth of the pipe giving the suppy be turned a little to one side so that the stream enter the pan at an angle, a rotary motion will be communicated to the prints, which will aid the completeness of the operation. The other vessel is a very convenient form of the horizontal well bath, which will be very useful for exciting large plates with a very small quantity of solution. Instead of being formed like the ordinary horizontal baths, quite flat, the well, or portion where the solution is held, is placed at an angle with the portion in which the plate is laid. When the solution is in the well that part rest flat on the table, the other portion in which the plate is laid being elevated at about an angle of 45°: when this is quickly lowered into a horizontal position, the solution flows evenly over the plate. For experiments, traveling, and other purposes, this will be found very useful.

Photographic Albums.—We have received from M. Bourquin an album for photographic portraits, which has some points of novelty in ornamentation. In addition to an elegant binding of morocco, studded with bosses of gilt metal, it is adorned with an imitation of Tunbridge ware, or inlaid wood. The pattern is printed in oil on a veneer of light wood, and then French polished. The imitation is perfect, and the ornamental effect very good. The interior of the book isalso of a very superior character, the mounts being of fine card, with a delicate tint, which gives an excellent effect to the photograph. A correspondent of a daily paper remarks on this notice :—" Is it for the sake of the postal revenue, or from a desire of the authorities to patronise obsence art—or do they lack the legal power to destroy such pernicious things? Her Majesty's customs at once seize and destroy all obscene prints and the like productions, whether imported with merchandise or in passengers' baggage, and occasionally the police and the Society for the Suppression of Vice shew activity in prosecuting the miscreants who, for gain, pander to the morbid passions and sensual vice. Your readers may blush for their country when they read such a public official notice, if the Postmaster-General does not; and, I hope that the notice may be withdrawn for a more stringent one.

Obscene Photographs, &c., in Book Packets.—A notice has been issued by the Post Office authorities, stating that on the 1st of May next, and thenceforward, all photographs, drawings, prints, or other things, which may be obviously and unquestionably of an obscene character, will be excluded from the privileges of the book post, and must not be sent in open covers to any place in the United Kingdom, or to the Colonies, or to any foreign part. It is added that it will be the duty of postmasters to send forward in envelopes, as unpaid letters, any packet which may seem to them clearly to fall within the meaning of this prohibition.

## To Correspondents.

South London Photographic Exhibition.—Notice to Exhibitors.—Wo are desired to announce that a modification has been made in Rule 7. Exhibitors, instead of sending untouched duplicates in the same frame as coloured pictures, are requested to send them in separate frames.

T. R. Heaton.—We believe the rules are reprinting. We will Inquire, and if any are in existence send you a copy. If not we will do so as soon as they are reprinted.

N. B., Newbury.—We can only recommend you to read the various articles and communications on the subject of mealiness which have appeared durIng the last few months in our pages. Do you take care to let the toning bath stand a few hours before use? We believe that several causes induce mealiness; but it is only the printer who can tell the probable cause on examining his own operations, carefully comparing them with the possible or probable causes of this defect.

Wellwisher.—An optician will make you the mounting, or get it made for you.

Annesley Free.—The best mode of removing either black or white varnish from a plate, must depend entirely upon the solvent originally used in the varnish. Almost all black varnishes may be dissolved by means of turpentine or benzole. The white varnish may be dissolved by benzole or chloroform if it were of the class applied cold. If it be a spirit varnish it will be more difficult, but strong alcohol may remove it. Any method of toning and fixing together is uncertain as regards permanency. You had better be content to secure this quality even at the cost of a little trouble. We are obliged by your kind intentions.

N. sends us some defective prints and observes: "The progress of civilization in photography is productive of new diseases—as elsewise. I have never had such results as these in former days, before the introduction of the acetates and phosphates into the toning bath. Have my prints 'measles?' examine them by transmitted light. I have ascertained the cause of failure. *I used too much of the acetate (and phosphate of), soda with the chloride of gold*, and it attacked the albumen of the paper. It is *not* a case of under-fixing, or of imperfect washing. The only question I ask is, have these prints the 'measles?' The disease is new to me, and I desire to be able to recognise it." The specimens sent are very decided and malignant cases of "measles;" and with all deference to our correspondent's judgment and ability, we should unhesitatingly pronounce the cause imperfect fixation The mottled dirty yellow effect is due to decomposed hyposulphite of silver, which is in the body of the paper, and underneath the albumen, as may easily be ascertained by splitting away the albumen with a penknife. The cause of the imperfect fixation is not so clear, but may proceed from hypo too weak, or too old; or from too short immersion. Or it may be from impure hyposulphite of soda.

Francis B.—You will find Information on the Solar Camera on pp. 247 and 253 (Nos. 142 and 143), of our fifth volume; and on p. 110 (No. 96), of our fourth volume.

North Briton.—The information on the subject of bees, regarding which you inquire, is in the letter of our Paris correspondent, on p. 222 (No. 105), of our fourth volume.

O. K. Walker.—Your vignette head is very good. The other is just a little hard. With practice and care you will succeed.

F. M. S.—If you had been a careful reader of our pages, you would have ascertained that there is no especial secret in what is called producing negatives by the positive process. The phrase simply means that a positive collodion and iron development are used, and the amount of printing vigour required, obtained by intensifying. If your positive collodion give a somewhat vigorous image, you may use it as It is; if not, add a little of some intense negative collodion. If your positive bath be freely acidified with nitric acid, it will be scarcely suitable for the purpose, as the bath should be nearly neutral. Expose a little longer than for a positive. Omit all nitric acid from the developer; use about 15 grains of protosulphate of iron, and 15 minims of glacial acetic acid in an ounce of water. In developing, do not stop short so soon as for a positive, but continue the development as long as any additional detail can be obtained; taking care however not to continue it until there is a foggy deposit on the shadows. Now wash, and then pour on to the plate a solution made as follows:—pyrogallic acid, 2 grains; citric acid, 1 grain; distilled water, 1 ounce. When this flows freely without greasy lines, return it to the developing cup, add about ten drops of a 20-grain solution of silver kept for the purpose, and again pour on the plate; keep them moving, and when the desired intensity is obtained, wash and fix. Sometimes the intensity is not readily secured: if the pyro and silver decompose and become discoloured before the negative is sufficiently Intense, wash it off and repeat the operation. This is a very brief description of the operations; but we cannot enter Into them more fully here. See articles on Iron Negatives, and on Modes of Intensifying, in the Photographic News Almanac, where you will obtain all the information you require. Good results depend more on intelligence, skill, and care than on secret processes. Use the alkaline toning by all means; do not commence the old system.

Pyroxyline.—We generally prepare our own soluble cotton. We regret to say that we do not know of any house that supplies a trustworthy article. We have repeatedly tried samples from different photographic chemists, and have unwillingly come to the conclusion that they have been portions of waste batches, which were unfit for the manufacture of collodion for sale. We have recently been favoured by Mr. England with a sample of the pyroxyline he uses, and which he gets direct from Paris, but we have not yet had an opportunity of trying it.

An Amateur Subscriber.—Mr. England's dark slide and instantaneous shutter were made, he informs us, by Mr. John England, manufacturer of photographic apparatus, 56, Upper Charles Street, Fitzroy Square.

Teesdale.—A lens intended to cover a plate 10 by 8, will, of course, cover a plate 9 by 7 still better; but you must bear in mind In using a lens of longer focus, and covering a plate larger than you intend to use, you include a less angle in the picture; that is, everything will be on a larger scale, and there will be less subject in the picture than if a lens of shorter focus were used. You will however gain the advantage of better definition and less perceptible distortion, by practically cutting off the margins. In using cyanide to reduce the density of an over intensified negative, there is great danger of the half tones being attacked first, and the picture being injured; great care should be exercised in its use. We have handed your order to the publisher.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 190.—April 25, 1862.

## THE PHOTOGRAPHIC DEPARTMENT OF THE INTERNATIONAL EXHIBITION.

So far as we are able to judge at the present moment, there will be no startling novelty in the English Photographic department at South Kensington. A respectable display of good photography, such as may usually be seen at the annual exhibition of the Society, will unquestionably be presented; but nothing more. Already, without the guidance of a catalogue, we recognise without difficulty the presence of many old favourites, in whose productions wet collodion and dry plates divide the honours. In the latter, as might be anticipated, the Manchester men take high rank; and we recognise with pleasure, already well hung, the magnificent results obtained on collodio-albumen plates, by such men as Mudd, Sidebotham, and Wardley. In wet collodion, nothing we have yet seen hung, surpasses the landscapes of Mr. Vernon Heath. Leiut.-Col. Stuart Wortley has some exquisite instantaneous views of the Bay of Naples, and Vesuvius in eruption, very similar in delicacy of style to Mr. Vernon Heath's pictures. Mr. Dixon Piper exhibits some very perfect large pictures, amongst which are some very fine atmospheric effects. In portraiture the fine studies of Mr. D. O. Hill, will attract much attention, as will also the subject pieces and *genré* pictures of Rejlander and Robinson. So far as we can judge at present the contributions of life-size pictures are not so numerous as might have been anticipated; as the hanging was but slightly advanced, however, on our last visit, it is impossible to speak with certainty.

In the classification and arrangement on the walls, every care possible under the circumstances, is taken to give the best pictures the best positions, but as every foot of hanging space must be made available, it follows that some pictures must hang far above the line, and others below, whilst others must be used as they will best fit in or fill up. A staff of efficient and active operatives, accustomed to hanging, are engaged upon the work, under the superintendence of the Committee, who attend from eight in the morning to six in the evening, working with more than the energy of paid labourers.

Since our last, some modification in the arrangements as regards jurors in this department has been made. Of those we before mentioned as appointed to that duty, two remain —Dr. Diamond and M. Claudet. To these are added the names of Professor Tyndall, Mr. Thurston Thompson, and Lord H. G. Lennox. Sir David Brewster now takes office in another department. Regarding the additional names we have little comment to make. No name stands higher in science, or will command more confidence and respect, than that of Professor Tyndall. Mr. Thurston Thompson is one of the most accomplished photographers of the day, and although a professional photographer, is not engaged in any competitive relation to the majority of other professional photographers; nevertheless, as he is a contributor to the Exhibition, we cannot but think there is some lack of propriety in the appointment. Of Lord Lennox's photographic accomplishments we know nothing beyond the fact that he was a pupil of Mr. Thurston Thompson. A jury of five, however constituted, is necessarily more likely to give satisfaction than one of three; and although we cannot but think some men in whom photographers would have had more confidence might have been appointed, we trust that, on the whole, justice will be done.

The contract for photography in the building has been undertaken by the London Stereoscopic Company. We hope that some modification of the original conditions has been obtained.

## MR. SUTTON ON RAPID DRY PROCESSES.

Mr. Sutton has recently been giving considerable attention to the maturing of a rapid dry process; the principle upon which he is working being somewhat similar to that announced by M. Roman last summer, in which a certain amount of free nitrate of silver was to be left in the film of a collodio-albumen plate. Unlike M. Roman, however, Mr. Sutton discards hot development. He says:—"Whilst others have been varying the preservative, or using dry collodion without a preservative, or availing themselves of the assistance of heat in development, we have been endeavouring to apply the principle of retaining some free nitrate in the film without allowing it to produce stains, or eat away the iodide, and the result is that our experiments have been crowned with success; and we have prepared rapid dry plates which have yielded excellent negatives with the same exposure as the best wet collodion." As to the quality of the negatives he further desires to place on record that—

"We have succeeded in preparing rapid dry plates as sensitive as the best wet collodion,—that these plates yield excellent printing negatives, having clean lights and red blacks—that the film will bear the ordinary rough treatment of washing without being protected by varnished edges; that it does not wrinkle or produce blisters; that the picture is quickly developed by means of a cold developer, consisting of pyrogallic acid with acetic acid and a few drops of nitrate of silver added; and that the principle on which these plates have been prepared consists in using a suitable iodized collodion, in washing the excited film thoroughly from the silver bath in order to prevent stains, and in restoring the sensitiveness by means of fresh silver added to a suitable preservative, which never becomes absolutely dry and hard."

The only point upon which Mr. Sutton expresses any doubt is the keeping qualities of the plates, but bases a conviction that they will keep, upon the fact that the plates of Dr. Hill Norris keep well, and that they contain free nitrate of silver. This, however, Dr. Hill Norris denies of his recent rapid dry plates. Nearly twelve months ago, Dr. Norris informed us that he had succeeded in eliminating all free nitrate, and that the quality of the plates was improved. We may state, however, in reference to the keeping properties of dry plates containing free nitrate, that Dr. Diamond informed us the other day, that he had just opened a packet of dry plates which had been prepared by Messrs. Bland and Co. four or five years ago, and were found to be perfectly good. Mr. Bland has subsequently informed us, when speaking of the fact, that the plates in question received no washing at all; but were coated with the preservative solution, consisting of gelatine with citric acid, direct from the nitrate bath.

Without offering further comment, we proceed to make some extracts from recent numbers of the *Notes*, in which Mr. Sutton develops his ideas of the correct principle upon which rapidity in dry processes should be based, and explains the details of formulæ and manipulations:—

"The principle which we have followed in preparing these rapid dry plates, is that of a double coating, similar in character to albumenized collodion, but differing in some important points. For instance, in the process of Dr. Taupenot you are obliged to use a very thin collodion, greatly reduced by the addition of ether, or your plate will be covered, during the development, with a multitude of blisters about the size of a pin's head, which spoil the negative. Now the use of this kind of collodion greatly reduces the sensitiveness of the plate because sensitiveness depends, in great measure, upon the state of the excited collodion film. In our new process this objection does not occur, because we commence with the most sensitive and creamy cadmium collodion, and yet avoid all chances of blistering by using a suitable second film. In the next place in the Taupenot process, the second nitrate bath is strongly acidified with acetic acid, which is added in about the same proportion as the silver. This renders the second film insensitive. But in our process the second nitrate bath contains very little acetic acid, and it is not impossible that even that little may be omitted altogether. If, therefore, our process resembles that of Dr. Taupenot in having a double film, and a double excitation, it still differs from it in two very important points. In a word, we have taken the Taupenot process as a basis, and have modified it in those particulars in which it was evident that sensitiveness was sacrificed, through mistaken notions of what was right and necessary."

The details of the process follow, but as they are modified in a subsequent number, we shall quote them from the latter, in which also some further affirmation of the principle is given :—

"Before giving minute directions, we will endeavour to explain the principle upon which we believe the rapidity of a dry plate to consist. It is in the retention by the film of a certain small quantity of free nitrate of silver, this small quantity of nitrate being entangled or combined with a coating of organic preservative applied to the iodized collodion film. Our experiments do not permit us to believe in the possibility of employing any other principle in the production of a rapid dry plate, and we cannot endorse the opinion expressed by Mr. Bartholomew, in a communication which we have copied from the News into the present number, or encourage our readers in the hope that they will obtain any good result in that way. If you take an excited collodion plate from the nitrate bath, and wash it thoroughly in distilled water, it is notorious that you reduce the sensitiveness immensely, and it is equally certain that the lost sensitiveness cannot be restored by the application of any of the known preservatives to the film. At the same time it is not necessary for the preservation of the original sensitiveness that the nitrate of silver which remains upon the plate should be of the same strength as the nitrate bath. If the excited plate is removed from the 30-grain nitrate bath in which it was excited, and immersed in another of only one-third the strength, the sensitiveness will remain about the same, and it will only become necessary perhaps, in some cases, to add a little silver to the developer to give the necessary intensity to the blacks.

"Assuming then the truth of the above principle, our object has been to ascertain the best means of allowing a sensitive plate to dry with a little free nitrate of silver in it, and yet to keep well for a few days, and give clean, good negatives.

"There are three ways of accomplishing this object :—

"1st. You may apply a very thick coating of iodized collodion to the plate—excite it thoroughly by a prolonged immersion in the nitrate bath—then dip it into a 10-grain bath of nitrate of silver, slightly acidified with acetic acid (say one drop to the ounce of bath), and then pour a preservative over it and let it dry. A plate prepared in this way would closely resemble in its appearance and properties one of Dr. Norris's rapid dry plates; that is to say, if freshly prepared it would be as rapid as wet collodion, and would give a bluish-black picture, with a slight tendency to greyness in the lights, if the development is pushed too far. In this process the drop of acid to the ounce in the second bath is for the purpose of making the plate keep better; and the use of the preservative is to combine with or entangle the free nitrate, so as to prevent it from attacking the iodide of silver in the film. A mixture of honey and gum arabic, dissolved in water, seems to be a good preservative for this process. A thick film of iodized collodion is recommended in preference to a thin one, because it will hold more material, and is always more sensitive. The way to get a thick film is to use collodion containing a great deal of pyroxyline, made at a high temperature, and very soluble; or to coat the plate twice with collodion.

"2nd. Coat the plate with iodized collodion in the usual way, that is, so as to get a film of the common appearance, and not a thick one. Excite the plate, and wash it thoroughly with water. Pour over it an iodized preservative, and let it dry. It is now insensitive to light, and may be put away ready for use at any time. In order to excite it a second time, dry it well before the fire, and then pour over it iodized collodion as before, and excite it in a 30-grain nitrate bath, containing one drop to the ounce of acetic acid. Wash, as in the first process, in a 10-grain nitrate bath, let it dry, and it is ready for use.

"A plate prepared in this way, with a double coating of collodion, looks just as creamy and solid as a piece of opal glass, and the flame of a candle looks dull and red through it. The object of the preservative intervening between the two films is to prevent the second coating of collodion from attacking and dissolving the first. It also entangles the free nitrate. Iodized gelatine solution may be used for the preservative. Say 4 grains of gelatine and 2 grains of iodide of potassium to the ounce of water, which is quite strong enough.

"3rd. This is simply a modification of the Taupenot process. Coat the plate with collodion of the usual density, and excite in the usual way. Wash thoroughly, and pour over the plate the following preservative :—

| | | |
|---|---|---|
| Albumen ... ... ... ... | 3 | ozs. |
| Water ... ... ... ... ... | $1\frac{1}{2}$ | ,, |
| Honey ... ... ... ... ... | 10 | grs. |
| Gum arabic ... ... ... ... | 10 | ,, |
| Iodide of potassium ... ... ... | 20 | ,, |

"Dissolve the three last substances in the water made hot, then strain the solution into the albumen, and beat all up to a stiff froth. When settled it is ready for use. The object of adding the honey and gum arabic to the albumen is to prevent blistering of the film, and the proportions given above are nearly the same as those used by Mr. Macpherson, of Rome, in his albumen process. The plate is now insensitive, and may be put away for use as required.

"In order to excite it, dry it first before a hot fire, and dip it into a 20-grain nitrate bath for half a minute, and afterwards into a 10-grain bath, both baths being being slightly acidified with about one drop of acetic acid to the ounce, as before. Then put the plate away to dry, and it is ready for use.

"Whichever of these three methods is employed, the plate is as sensitive as an ordinary wet collodion one, and instantaneous views of breaking waves, &c. may be taken upon it when dry, and after it has been prepared some hours or days, according to the season.

"The mode of development may either be that recommended by Dr. Hill Norris, viz., by first moistening the plate, and then pouring over it the pyrogallic developer, with a few drops of nitrate of silver added, or it may be developed thus :—

"Without first moistening the plate, put it into a dish containing some very weak pyrogallic acid with very little acetic acid, and no nitrate of silver. Let it remain in this until all the details are faintly visible, and then intensify in the usual way. Citric acid is perhaps less liable than acetic to obliterate the image produced by light, and one grain of citric acid to a pint of weak developer might be enough to use. The image is at first brought out by means of the free nitrate which is retained by the film. If the plate had been *thoroughly* washed it would be absolutely necessary to add nitrate to the developer, or no image would appear. Fix with saturated hypo, and finish in the usual way.

"The first and second of these three methods are rather more rapid than the last, and give softer negatives, but they are more liable to become veiled in the development. The last process gives cleaner pictures.

"In working with process No. 3, the tourist would take with him a lot of plates in the first stage of preparation, and also a nitrate bath for the second excitation and washing. Some of his plates he would prepare as rapids, in the manner described, and the others as slow ones, by giving them a thorough washing. This he would do from time time as he wanted them, and in the meantime the rapid plates would keep two or three days, and the others as many weeks. The plan would be a great gain upon wet collodion, and the subjects would be better selected, and the negatives quite equal in quality, if not better. The time is not far distant when wet collodion will be altogether given up for out-of-door work, whether the exposure be long or instantaneous. Let us all strive to hasten the arrival of that good time, and give a new impetus to photography, and render it a tenfold more attractive pursuit to the amateur than it is at present."

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

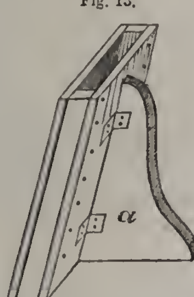
BY F. R. WINDOW.

Baths and Dippers (*continued*).

India-rubber, slate, and wooden baths, have not, I believe, been manufactured for sale, or been much used by photographers generally. I will confine myself to describing the last mentioned, which may perhaps prove useful to some of my readers, should they ever find themselves beyond the pale of photographic civilization, with a broken bath, and no shop within a hundred miles or so, where another can be procured. It is convenient in such a case to be able to obtain an effective substitute, by simply applying to the village carpenter and at the oilman's; also a wooden bath is so exceedingly cheap, so easy to make, and so perfectly efficient when properly made, that *the recipe* may be useful to many a country photographer for his ordinary daily use.

The best material is dry soft pine, as this wood imbibes more readily the resinous cement: common deal will do very well. Pieces should be selected without knots. The two larger sides, which I will term the *back* and *front*, may be made for baths up to 12 by 10 inches, of ¼-inch stuff; and the bottom must be of ½-inch stuff. Having cut the several pieces to the required size, they are to be planed on both surfaces. It will be seen by referring to fig. 13 that the sides and bottom fit in between the back and front pieces, and therefore the breadth of these former determine the breadth of the opening of the bath, which must be settled according to the particular idea of the maker. I think in most cases that three-quarters] of an inch is sufficient. On to the back is fixed a foot ($a$), for the bath to rest

Fig. 13.




upon when in use, and if it be intended for field work this must be fastened with hinges, to enable it, to be folded up.

Having prepared all the pieces, and screwed on the foot, a line must be drawn upon the inside of the back and front pieces, half an inch from the edges of the sides and bottom of each, to mark where the side-pieces and bottom will join on to them. They are then laid on a table face upwards, and thoroughly coated on that side with rosin cement, by means of a coarse brush, to within about an eighth of an inch of the line. The cement must be laid on thinly at first, very hot, and rubbed well into the pores of the wood, and several subsequent coats must be given, until there is a thickness of at least $\frac{1}{32}$-inch, evenly spread over the whole surface. If any difficulty be experienced in getting finally a nice smooth surface, a hot iron, such as a shovel, held at a little distance above it, without touching, will be found an easy remedy. When the inner faces of both back and front are well coated, and the cement perfectly set, the trough is then put together firmly with screws, wood to wood; no glue being used. Except for the question of appearance, it is not necessary that the joints be a very perfect fit. A sufficient quantity of cement is now made hot in a pipkin or ladle, and poured into the bath, being run down one of the sides, which is tilted downwards for that purpose. This coats that side piece, and also runs into and fills up the joint. The bath is next held upright, that the hot cement may flow over the bottom and into the joints round it, and finally tilted in the reverse direction, that the surplus may run off over the other side. If on inspection it appears necessary, this operation must be repeated. The bath is thus thoroughly protected on the inside with a material quite neutral to nitrate of silver, it is perfectly water-tight; and a good coat of cement upon the top, and a thin layer all over the outside, makes it complete.

I should observe that care must be taken when using a bath of this description to avoid rubbing the dipper or plate hard up against the sides, as by doing so small particles of the cement may be ground off, and they may settle upon the plate. A little caution will avoid this.

The cement for lining wooden baths, or for coating any parts of photographic apparatus that require protection against the action of nitrate of silver, is composed of

| | |
|---|---|
| Yellow beeswax ... ... ... | 3 parts |
| Rosin ... ... ... ... ... | 4 „ |
| Fine grit ... ... ... ... | 3 „ |

The above proportion of wax and rosin cannot always be strictly adhered to, owing to the varying quality of commercial samples of these substances. If, upon experiment, the compound is found too brittle, more wax must be added; and on the other hand, too great softness must be corrected by the addition of more rosin.

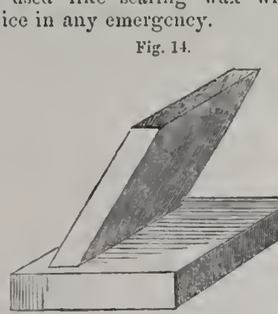
The grit may be either red tile, red brick, bath brick, slate, tobacco pipe, or any such material, reduced to a fine powder in a mortar. It will give its colour to the compound, according to the substance selected.

To make the cement: first boil some water in a pipkin over a bright fire, to make certain that there is no flaw in it, and that it will stand heat properly. Then dry it well inside, and place it on the hob near (not on) the fire with the rosin and wax in it. When these are melted, add the grit, and stir it to mix all the ingredients thoroughly. Whenever it is being used, it must be constantly stirred before each brushful is taken, otherwise the grit will sink to the bottom. Before using it for the first time, a trial must be made, to see if it be of a proper consistency. My practice is to let a drop about the size of a shilling fall upon a piece of glass, and place it in the air until thoroughly cold and set. I then chop at it with the blade of a table knife, which should chop out little pieces only in close vicinity to the point struck. If large pieces are chipped off, leaving the glass bare in places, more wax must be added; if an impression of the knife be only made, and nothing chipped off at all, more rosin is wanted.

It must be borne in mind that the ingredients of the cement are of a very inflammable nature; and every precaution must be taken to avoid accident from their becoming ignited. If a pipkin be not at hand, an iron ladle will do.

This cement will also be found useful for repairing photographic glass and porcelain dishes, measures, baths, &c., as well as for sundry minor purposes, and the amateur especially will find it a very useful article to have always handy in his laboratory. I generally keep some by me in sticks that may be used like sealing wax with a candle at a moment's notice in any emergency.

Fig. 14.

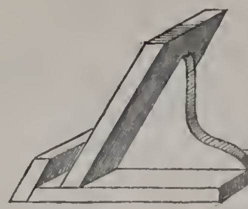


The simplest foot for a dipping bath is a block of wood with a mortice cut in it of a proper size to receive the bath; but this is a rather clumsy affair, because the wood must be of

* Continued from page 184.

some considerable thickness to take proper hold of the bath, and it must project, as shown in fig. 14, a good way behind the bath, to prevent the whole being top heavy. This arrangement also necessitates a separate foot for each different sized bath. The universal foot (fig. 15) is far more

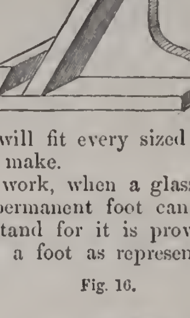
Fig. 15.



convenient, as it will fit every sized bath, and it is also simple and easy to make.

For out-of-door work, when a glass or porcelain bath is used, to which a permanent foot cannot be attached, and when no special stand for it is provided in the arrangements of the tent, a foot as represented in fig. 16 will be

Fig. 16.



found very convenient. Both the front and back being provided with hinges, it folds up into little compass, and may be made of slight materials; therefore it is very portable. When in use, to prevent the bath from slipping off the bottom ledge, which is made without any beading upon it, so that it may fit all baths, an india-rubber band is passed round foot and bath, to keep them securely together.

A foot should never be made so as to hold the bath in a vertical position: it must always be a little inclined backwards (figs. 14, 15, and 16), to prevent the plate from falling off the dipper.

All dipping baths of whatever kind or material should be provided with a cover for the double purposes of keeping out dust, and of protecting the plate from the light during sensitizing, so that the door of the laboratory may be opened without danger while a plate is in the bath. This cover for opaque baths need only fit loosely over the opening of the bath like the lid of a pill box, and may be made of wood, cardboard, or any convenient material. The cover of a transparent glass bath should fit over the whole bath, and rest upon the foot, so that all parts may be entirely shielded from light; or it is still better to enclose the glass bath in a wooden case, and fit the cover on to this latter. The bath must not be fastened in the case, but should fit easily into it, so that it may be taken out whenever it is necessary to clean it.

Some baths intended for use in the field are fitted with water-tight covers, by means of which the photographer is enabled to dispense with a bottle for the bath liquid, which can by this means be carried safely in the bath itself, and his baggage is so much lighter and less bulky. All kinds of baths can have such water-tight covers fitted on to them, but those made of gutta-percha are generally preferred, both from their greater cheapness, and especially from their non-liability to fracture, which is a valuable quality in such an article for field work. The water-tight cover consists of a wooden lid, lined with gutta-percha or india-rubber, which is pressed firmly upon the opening of the bath by means of screws working in a frame-work, adjusted on to the bath itself, or on to the box which contains it. There are several designs used for pressing the cover upon the bath, which are all of them perfectly efficient. Gutta-percha is the best material for the packing of the cover. It has just sufficient spring to answer the purpose. Pure india-rubber would be superior to gutta-percha in warm weather, but in the cold it becomes hard and useless. Vulcanized india-rubber should be avoided for this purpose, as any combination of sulphur, especially such in which free sulphur exists, is dangerous to be used in direct contact with silver solutions; by boiling vulcanized india-rubber first in a strong solution of caustic potash, to eliminate the free sulphur, it might possibly be rendered harmless to the bath liquid, but I think it is safer to reject the material entirely.

(*To be continued.*)

## M. FOUCAULT'S HELIOSTAT.

The Heliostat, as hitherto constructed for scientific purposes, acts usefully only on a luminous ray of 2½ to 3 inches in diameter: besides, we do not require the reflected ray to maintain an absolutely fixed direction, and provided that the deviation remain within the limits of the solar angle, the experiments proceed regularly. Now-a-days, for illustration of lectures, and for various applications of astronomy and photography, it has become indispensably necessary to operate with a larger quantity of light, to collect more rays, and to fix them as long as possible in a given direction.

Of all the heliostats known, the easiest to place in position, and the one which resolves the problem in the most elegant and general manner, is unquestionably the heliostat of M. Silbermann. By placing his mirror in the centre of motion, and by taking the points of support upon two exterior and concentric arcs, M. Silbermann has given to his heliostat the property of assuming positions unattainable in all other instruments of the same kind. But these advantages, universally acknowledged, have not reconciled experimentalists to the necessity of supporting and moving a heavy mirror. It was necessary, therefore, to contrive some other arrangement.

In the instrument invented by M. Leon Foucault, the metallic mirror, which is not less than thirteen inches long by six and a half inches wide, is supported by a vertical column, upon which it rests by means of a disc which resembles in every particular the circular mirror of S'Gravesande's heliostat. This disc is in fact suspended by two pinions diametrically opposed to each other, and put in motion by the action of a horary index upon a normal axis fixed on its back. The mirror attached to this disc, which surrounds it on all sides, can be made to turn in its own place around a common centre; and as it is important that at every moment its greatest dimensions coincide with the plane of reflection, this condition is met by prolonging the directing index behind, and by engaging its second extremity in a groove fixed on the back of the mirror, in the direction of its greatest length. The directing index, the normal tail of the disc, and the groove of the mirror, thus form a rectangular triangle, constantly comprised in the plane of reflection, and the hypothenuse of which has an invariable length. The directing index represents the incident ray, and the reflected ray is figured both by the line which passes the point of intersection of the index with the horary axis, and by the centre of the disc; this line is equal to the two halves of the needle, and divides the rectangular triangle into two equal isoceles triangles.

The principal centre of the instrument is the point where the conducting needle of the mirror crosses the horary axis which gives it motion. To dispose at will of the direction of the reflected ray, it is sufficient to move spherically the centre of the disc around this central point. To this end we take as a fixed centre of all the motions another point situated lower down in the vertical projection of the principal centre, and attach to this point the base of the column of the mirror by a crank of invariable length: then, by virtue of the parallelogram thus formed, we can turn the column in every direction, and by this means direct the reflected ray without altering the distance of the centres.

The rest of the instrument presents nothing special; the horary axis is put in motion by clockwork. Its inclination fixed upon, is adapted beforehand to a given locality; following in this respect the custom of constructors of astronomical instruments. The directing needle of the mirror is placed at the declination of the day by means of a graduated half circle, furnished with an index, and mounted upon a true centre.

To put the instrument in operation the course to be followed is precisely that which has been recommended for M. Silbermann's heliostat. Of the four conditions to be fulfilled, which consist in putting the instrument in the meridian in the latitude of the place at the hour and the declination of the day, it is sufficient that any two be primarily satisfied in order, generally, to fulfil the others, with the aid of the index mounted parallel with the directing needle.

Thus it will be seen that the new instrument is characterized by two peculiarities, which in heliostats previously known, exist only by one excluding the other. In the first place the mirror is set *a plomb* upon the inflexible vertical column, capable of supporting a considerable weight; in the second place the mirror of elongated form, orients itself spontaneously, following the plane of reflection, so as to project the reflected ray in the most favourable direction.

## REMARKS ON THE PREPARATION OF PHOTOGRAPHIC PYROXYLINE.

BY M. M'A. GAUDIN.

It has become a habit to continue to call by the names of gun-cotton, fulmi-cotton, pyroxyline, fulminating-cotton—the cotton soluble in a mixture of alcohol and ether, employed in photography. But, in fact, photographic cotton cannot be usefully employed with fire-arms: when ignited it generally melts, leaving behind a considerable residue of an aqueous nature.

Everyone who has prepared photographic cotton must have remarked how variable the nature of this product is, according to the circumstances under which it is prepared; hence it is exceedingly difficult to constantly obtain an identical product. As the product varies according to the circumstances under which it is prepared, in order always to obtain the same product, it is necessary to realize at each operation conditions which shall be perfectly identical; but instead of so doing the operations are performed, first with one acid and then with another; with a cold mixture or with a hot; with cotton, or paper, or rags; hence the dissimilarity of the products which must necessarily result from the various formulæ acted upon for the production of a very delicate molecular reaction, which includes an entire series of bodies readily transformed into each other.

The composition of the various pyroxyles is still but imperfectly known; it was at first supposed that the fulminating compound resulted from a sort of combination of lignine with nitric acid, and this is doubtless true; but what is most important to ascertain is, in what photographic cotton differs from true fulmi-cotton, in order to have clear ideas upon its mode of preparation.

Until recently I had always thought that to act well upon the lignine, the nitric acid ought to be entire; and, with many others, I believed that any appearance of nitrous compound in the acid was a bad precedent. I had many times seen my cotton inflame, disengage reddish fumes, and become converted into a viscous and burnt substance; but there is a great difference between the existence of nitrous gas during the preparation, and its appearance during the destruction of the fulmi-cotton. Then this gas is the *result* of decomposition, not its *cause;* and, doubtless, analagous reasoning had led M. Rivot to adopt a rational process, which always gives an excellent product.

According to M. Rivot, the nitrous gas in the nitric acid far from being injurious in the preparation of photographic cotton, is, on the contrary, the best element in its production, so much so, that, according to him, photographic cotton will be, so to speak, the result of the displacement of water by deutoxide of nitrogen $N_2O_4$, while in fulmi-cotton this water is replaced by nitric acid $N_2O_5$, as admitted in principle.

Abandoning all theory, the utility, I may even say the aptitude, of the nitrous gas to produce photographic cotton, is demonstrated by the process discovered by M. Rivot, and which he has always practised with complete success. He has obligingly communicated to me the following as his recipe:—

Commence by saturating nitric acid with binoxide of nitrogen, by passing through it a current of this gas, which is easily obtained by the action of nitric acid (cold), diluted with its volume of water upon turnings of red copper. This apparatus is mounted upon a mattrass closed by a cork, pierced with one end of a glass tube, connected with a disengaging tube of vulcanized india-rubber. The disengagement is continued until the acid has acquired a density of 1° 31.

We then add to 50 parts of this acid, saturated with binoxide of nitrogen, 60 parts of fuming nitric acid of commerce, marking 1° 47. The mixture should mark 1° 40 of the densimeter.

Eighteen fluid drachms, weighing 25 drachms, are poured into a porcelain capsule, and perfectly covered with a plate of glass; then 15 fluid drachms of concentrated commercial sulphuric acid; weighing 27 drachms, are added; when perfectly mixed, raise the glass cover, and add, one at a time, pieces of white filtering paper, cut round to the diameter of the capsule, until 3 drachms are added. The reaction is allowed to take place for a quarter of an hour at the least, then the paper is withdrawn from the acid, and washed in abundance of water.

This washing is easily performed, but to cause the last traces of acid to disappear, it appears necessary to submit the paper to the action of boiling water for a time.

I have received some information upon the solubility of photographic cotton in alcohol alone. I had been told that cotton of this nature, which readily dissolves in a mixture of ether and alcohol without residue, was generally soluble in absolute alcohol, and that the collodion made in this manner was employed for the negatives of reduced geographical charts. This process, therefore, does not appear to me to be new, but the publicity given to it at the present time, with the means of making suitable photographic cotton with certainty, is a good thing.

Some time ago I attempted to produce photographic cotton by *steam;* that is, by submitting rags to the vapours of fuming nitric acid; that, however, did not succeed, but as nitrous acid appears to be so efficacious in producing the reaction required, it is very probable that in exposing the lignine under the form of cotton, filtering paper, rags, &c. and a sustained current of nitrous acid gas, a very marked result may be obtained, which cannot be determined beforehand; but the experiment which may very easily be performed, deserves to be made, as it may lead to a very good process.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Sulphides* (continued).—*Sulphide of Silver.*—Most unfortunately for photographers, sulphur is an element for which silver seems to exercise an especial predeliction; and as sulphuretted compounds are almost constantly present in some degree in the atmosphere, and are always liable to find their way into that great receptacle for gaseous emanations, photographic processes, in large towns at all events, are carried on under certain disadvantages; whilst the preservation of the finished photograph from the fatal attacks of this insidious enemy, sulphur, always forms a subject for anxious deliberation for the artist who wishes his productions to be handed down to, and admired by, succeeding generations. Not only may sulphur obtain access to the print from atmospheric agencies, but it may exist in the pores of the paper itself, owing to a variety of causes; the print may have been insufficiently washed from the hyposulphite of soda, and this salt by the gradual absorption of atmospheric oxygen, will then become converted into sulphate of soda with deposition of half its sulphur, according to the following equation:—

$$NaO.S_2O_2+O=NaO.SO_3+S.$$

But, supposing all the free hyposulphite of soda or of silver has been removed in the washing process, sulphur may still find access to the delicate silver film forming the picture. Very frequently the paper on which the picture is printed contains this element in the free state to start with. Hyposulphite of soda is now almost exclusively used by papermakers as an *antichlor*, and by the action of acids upon it the extra equivalent of sulphur is deposited in the pores of the paper, where it sometimes exists in such considerable quantities as to be detected by chemical tests. Another source of sulphur may be the sulphates which the paper or the washing water naturally contains. It is well known that a soluble sulphate in the presence of organic matter, favoured by *damp and darkness*—those well-known enemies to the keeping qualities of photographs—are gradually deoxidised by the hydrogen or the carbon of the organic matter, with formation of a sulphide, thus:—

$$NaO.SO_3+4H=NaS+4HO, \text{ or}$$
$$NaO.SO_3+2C=NaS+2CO_2.$$

The danger to which the print is thus exposed is very great: the silver, even in the darkest parts of the photograph, is present in extremely small quantities (it probably owes its peculiarly intense colour more to the molecular condition in which it exists than to any other cause), and when the metal is changed into sulphide, either by contact with sulphur or an alkaline sulphide, it loses its tinctorial properties, and assumes the pale, yellow colour belonging to a very attenuated film of sulphide of silver, and the appearance of which is probably well known to all our readers. The chemistry of sulphide of silver, therefore, possesses an interest to the photographer on more than one point, as a knowledge of it would frequently tell him that he was about to place his pictures in conditions of danger, where a more ignorant artist would see no harm. The photographers' silver residues are likewise most frequently collected from spent fixing baths in the form of sulphide of silver; a knowledge, therefore, of the chemical reactions of this salt are necessary for its conversion into the metallic state. We will, therefore, briefly give the most important chemical facts connected with this body.

Sulphide of silver occurs native, and is formed when silver and sulphur come together; thus the yellow, and afterwards brown, film with which silver vessels become tarnished when exposed to the atmosphere, to the sulphurous exhalations from sewers, &c. consists of sulphide of silver. When a soluble sulphide, or sulphuretted hydrogen gas comes in contact with a solution of silver, this sulphide is precipitated in black-brown flakes. When heated in the air it is resolved into metallic silver, and sulphur, which burns into sulphurous acid; at a gentle heat some sulphate of silver is also formed. Fused with iron, it yields sulphate of iron and metallic silver; and when lead is used the products are sulphide of lead, and an alloy of lead and silver. When heated to redness in hydrogen, it is also reduced to the metallic state; but with aqueous vapour the decomposition is only partial. Chlorine does not act upon it at all in the cold, and very slowly when heated. Sulphide of silver is insoluble in solution of ammonia, except when it has been precipitated in company with chloride of silver, when it partly dissolves together with the latter.

The reduction of sulphide of silver to the metallic state is a point of some interest to the photographer who finds his residues of silver accumulating, as the greater portion of them are most likely to be in this condition. The most successful process, as well as the one most readily adopted for this purpose, is that of Mr. Spiller. The hyposulphite fixing bath, after repeated employment, will, if set aside, gradually let fall the greater part of its silver in the state of the insoluble black sulphide, which usually forms an adherent crust on the bottom and sides of the vessel. The portion of metal remaining dissolved may also be completely precipitated, by the addition of sulphide of sodium or ammonium, and thus the entire quantity of the silver may be collected together on a filter as sulphide. Mr. Spiller recommends that this should be dried, and triturated with about an equal weight of carbonate of soda, and added by successive portions to fused nitre contained in a crucible, and employed in tolerable excess. The process is known to be finished when the contents of the crucible no longer show any trace of the black particles of sulphide; and, according to the temperature of the furnace, the silver will either be found as a melted button or in the condition of a honey-combed, partially fused mass; in which latter case it is convenient to pour off the flux while yet fluid, so that the produce may afterwards be more readily washed from the alkaline salts by a stream of water. The silver recovered by this process is not likely to contain any other impurity than a small quantity of gold originally derived from the toning bath; and this will be left behind as a purple or brown powder on dissolving the metal in nitric acid. Furthermore, Mr. Spiller states that he has repeatedly tested the flux for silver, but without finding any, unless the precaution of adding carbonate of soda had been omitted.

Before mixing the precipitated sulphide of silver with the carbonate of soda, it may be advisable to *roast* it, in order to drive off the free sulphur which it contains. This precaution is unnecessary when pure sulphide of silver is employed, but as this body is always contaminated with sulphur when it is obtained from spent hyposulphite of soda fixing baths, it saves some expense in nitre to get rid of this excess of sulphur. This is readily done. The dried sulphide is to be placed in a shallow crucible, and submitted to a temperature which must on no account exceed a dull red heat. The sulphur will be seen to take fire, and the mass should be well stirred with an iron spoon, until the blue flame has disappeared from its surface. The black mass which remains is pure sulphide of silver. If the heat has been properly regulated, the sulphide will be in the form of a powder; but if the temperature has much exceeded a dull redness, the sulphide of silver will have become fused, and will then be difficult to deal with, owing to the slight malleability of the fused sulphide, which renders it difficult to mix with carbonate of soda and nitre. In such a case as this the best plan will be to throw some iron nails (in excess) into the crucible, and then to cover them with a mixture of carbonate of soda and borax, and expose to a bright red or white heat for an hour, stirring the contents of the crucible at intervals with an iron rod. The sulphide of silver will be decomposed by the iron with formation of sulphide of iron, and metallic silver which collects together at the bottom of the crucible.

## The International Exhibition.

### THE BUILDING.

Before the issue of another number of the Photographic News the International Exhibition at South Kensington will have been opened. As we shall from time to time have to invite the attention of our readers to its lessons in connection with our own and the cognate arts, it may be interesting at the outset to give a brief abstract of an official description of the building. In common with every one else who has seen the erection, we regret to say that it is irredeemably ugly. Various similes have been used to convey an idea of its utter lack of architectural beauty; it has been compared to a barrack, to a railway station, or rather a goods station, and to a horse repository. It is a huge squat square brick building, mean looking in spite of its vast proportions, and still meaner in its detail. The two large domes, surmounting nothing in particular, seem only to add to the grotesque effect instead of conferring either beauty or grandeur. It is beside our purpose here, however, to enter into architectural criticisms; we merely wish to give completeness to future accounts of its photographic and scientific departments, by first supplying a brief description of the design and character of the erection.

The site of the principal portion of the buildings adjoins the Royal Horticultural Gardens at South Kensington. It lies between Prince Albert's Road on the west, Exhibition Road on the east, and Cromwell Road on the south. The ground belongs to the Commissioners for the Exhibition of 1851, and was purchased by them out of the surplus funds of that exhibition.

The character of the structures, unlike the uniform glass building in 1851, is varied, the different purposes for which the buildings are destined having been kept in view in designing them by their engineer and architect, Captain Fowke, R. E. The buildings provide on a large scale for four objects:—I. *Picture Galleries*, which require to be solid structures, secure from all accidents of weather, extremely well ventilated, and lighted at the top; II. Ample spaces of different forms, and lighted in different ways, for the *Exhibition of Works of Industry*, arranged in courts and galleries; III. Platforms and wide passages, for *Ceremonials and Processions*; and, IV. Accomodation for *Refreshments*.

The picture galleries occupy three sides of a quadrangle. The largest gallery is in Cromwell Road; this is 1,150 feet long, 50 feet wide, and 50 feet high above the ground floor; being about as long as the gallery at the Louvre, at Paris.

The passage from end to end of this great picture gallery is uninterrupted, although the entrance is in the centre of it. The construction is of substantial brickwork. The piers at the entrance are 14 feet wide, and 7 feet thick; and the foundations throughout are of concrete, 5 feet thick. The walls will be lined with wood, and pictures may be hung, if desired, to a height of 30 feet. The lighting will be on the principle so successfully demonstrated in the Sheepshanks Gallery, which was the first *public* gallery perfectly lighted by day and gas light. These principles require that the quantity of light should be as great as possible, be subject to control, and obtained from above; and that the rays from the skylight incident on the pictures should in no case be reflected by their varnished surfaces, so as to strike the eye of a spectator while standing at a convenient distance for examining the pictures. The inflexibility of these principles, and the necessity for perfect ventilation, have regulated the architectural treatment of the present structure: as the light *must* come from the top, and the pictures *must* hang on the walls, there could therefore be no fenestral treatment in the upper walls. The greatest damage has been done to pictures by want of proper ventilation; the miasma from crowds is most injurious if not effectually removed. In this gallery ample provision has been made for ventilation in the only right and effective places. Not to waste valuable space, a floor has been provided beneath the picture galleries, and this must be lighted from the sides.

The entrance to the principal picture gallery in Cromwell Road will be through three noble recessed arcades. They are each 20 feet wide, and 50 feet high, and will look as imposing in their quantities as the principal façade of St. John Lateran, at Rome, and other Renaissance porticoes of Italy. The visitor enters a vestibule and hall, 150 feet long, and together 110 feet wide, which leads to the industrial halls and galleries; whilst two flights of steps, 20 feet wide, lead on either side up to the picture galleries.

The auxiliary picture galleries are in Prince Albert's and Exhibition Roads. They are 25 feet wide, and about 30 feet high, and jointly 1,200 feet long, and are, of course, lighted and ventilated on the same principles as already described. They will receive the smaller-sized oil-paintings, the water-colour paintings, architectural drawings, designs, and engravings.

The industrial buildings will be constructed chiefly of iron, timber, and glass. They consist of the following parts:—Two duodecagonal domes, which are 160 feet in diameter and 250 feet high, and are the largest of ancient and modern times. The dome of the Pantheon is 142 feet in diameter and 70 feet high; the dome in the Baths of Caracalla was 111 feet; Bruneleschi's, at Florence, is 139 feet in diameter and 133 feet high; the dome of St. Peter's is 158 feet in diameter and 263 feet high from the external plinth; the dome of St. Paul's Cathedral is 112 feet in diameter and 215 feet high. The domes will be of glass, with an outer and inner gallery. It has been proposed to erect one of Messrs. Chance's dioptric lights at the top of one of them and to illuminate it at night. The vista from dome to dome, through the nave, is 1,070 feet. Each of the domes springs from the intersections of the nave with the two transepts. The nave and transepts are 100 feet high and 85 feet wide; the nave is 800 feet long, and the transepts are each about 635 feet long, including the domes. They are lighted on both sides by clerestory windows upwards of 25 feet high, and would reach a mile if extended. The roof will thus be water-tight, which a glass roof can hardly be made. The building will be much cooler in summer and warmer in winter than a merely glass building. The nave, which runs east and west, will thus have a north light, undimmed by blinds. At 25 feet from the ground a gallery runs at each side of the nave and transepts. The level of the ground is five feet below that of the surrounding roads. Instead of descending into the building upon entering, the visitor ascends two steps to a great platform or dais under each dome, and then may descend into the nave and transepts by three noble flights of steps, each 80 feet wide, which lend themselves to most decorative arrangements, or he may ascend into the galleries. The entrance is therefore made on a mezzanine, as it were, of the building. There is more than a mile and a half of upper galleries, some 50 feet and some 25 feet wide; two courts, each 250 feet by 86 feet; two courts, each 250 feet by 200 feet; two central courts—that at the north 150 feet by 86, that at the south 150 feet by 150 feet. All these glass courts are 50 feet high, and lighted from above. These courts will be the only portions which at all resemble the Crystal Palace.

The entrances to the industrial buildings are in Prince Albert's and in Exhibition Roads. Each entrance is 55 feet wide. As many exits from the building will be provided as public convenience may require.

The refreshment halls and arcades will be permanent buildings. They overlook, with a north aspect, the whole of the Royal Horticultural Gardens, with its cascades, fountains, &c. They will be cool, but with a sunny view. The halls will be 300 feet long and 75 feet wide; the two arcades will have about 1,500 feet in length and 25 feet in width. All kinds of refreshments, both light and solid, will be supplied. The visitor will be able to obtain—in the morning, a *déjeuner à la fourchette*; at luncheon, Neapolitan ices or Bass's ale, and bread and cheese; at dinner, English roast beef and plum pudding, or the latest inventions in cookery from Paris, with samples of the wines of all nations.

The machinery galleries are the only portions which are obviously of a temporary character. They extend along the west side of the Royal Horticultural Gardens for about 1,000 feet in length by 200 feet wide, in four spans of 50 feet wide each. They are constructed of timber, and offer a very useful suggestion for the cheapest kind of agricultural buildings. These are all of framed work, without any joinery.

A bed of gravel underlies the whole ground. The foundations have been excavated to the gravel, and a base of concrete put in, on which brick piers, with York stone slabs, have been placed to receive the iron columns. The slabs for the columns of the great domes weigh upwards of a ton.

The iron castings comprise 166 round columns for the nave and transepts, 12 inches in diameter, connected with a like number of square pilasters; 312 eight-inch round columns, and 149 twelve-inch square columns, for the galleries; 138 eight-inch square clerestory columns, and 160 ten-inch square columns, supporting the floors of the picture galleries; 62 round columns for supporting the roofs of the glass courts; (put all the columns end to end, and they would extend from the Exhibition building, either eastward as far as the London Docks, or westward as far as Kew, or northward as far as Hampstead, or southward to the Sydenham Crystal Palace;) 1,165 girders throughout, 11,600 feet of pipes, 15,000 feet of gutters, 14,000 feet of railings, 1,000 brackets, 700 trusses and girders, 1,400 shoes, &c.: the whole is estimated to weigh nearly 4,000 tons. The wrought iron is estimated to weigh about 1,200 tons.

It is estimated that about 17,000 loads of timber will be consumed. For the windows below the picture galleries there are 32 window-frames 16 feet by 13 feet, and 68 window-frames 16 feet by 7 feet. For the top lighting of the galleries, 45,000 feet superficial of frames and glass are in preparation. For the clerestory lights of the nave and transepts, nearly a mile length of frames, 25 feet high, is preparing; and for the courts, upwards of 30 miles of sash-bars and glass.

The roofs will be covered with slates for the great picture galleries, and elsewhere with felt, except in parts, to show how ornamental roofing may be hereafter applied.

The contract for the whole works was let to Messrs. Kelk and Charles and Thomas Lucas, Brothers, whose tender was the lowest. The whole responsibility for the nature and execution of the works rests with the contractors. Mr. Meeson, C.E., prepares the working drawings for them. All proceedings are submitted to Captain Fowke, R.E., who acts for Her Majesty's Commissioners. He confers with a Building Committee, consisting of the Earl of Shelburne, Mr. W. Fairbairn, and Mr. W. Baker; and Her Majesty's Commissioners reserve to themselves the final approval of everything. Captain Fowke is assisted by Captain Philpotts and Lieutenant Brooke, and certain non-commissioned officers of the Royal Engineers. Mr. Clemence is the contractors' foreman of works. No clerk of works is employed. The contract is of a threefold character: for the use and waste of the buildings a sum of £200,000 is to be paid absolutely; if the receipts exceed £400,000, then the contractors are to take up to a further sum of £100,000; and if this sum is fully paid, then the centre acre of the great picture galleries is to be left as the property of the Society of Arts. Lastly, the contractors are bound to sell absolutely the remaining rights over the buildings for the further sum of £130,000, which may be paid by the surplus receipts of the Exhibition, if the success be great, of which there is a good prospect.

Regarding the Photographic Department, which is not referred to in the document of which we have given an abstract, we may state that it is high up in the Central Tower, and is reached by flights of not less than seventy steps. The amount of space we have repeatedly described; apart from its remote and inconvenient position, and the limited proportion, the room is well enough, being lofty and well lighted.

## DR. HENRY DRAPER'S HOT-WATER PROCESS.

BY E. BORDA.*

Your remarks respecting the rapidity of tannin plates, developed by Dr. Draper's hot-water process, suggests a point which it is of great importance to ascertain.

Is a tannin plate, developed by that process, quicker or even as quick as a wet plate? I am of opinion that it is far from having yet been proved conclusively; it is a complex problem to solve. The difficulty arises from one singular fact which every practical tannin worker cannot fail to have discovered; the rule so often given, that the exposure required by a collodion worked with tannin is a constant multiple of the time required by the same collodion used wet, is not confirmed by experience; it may appear so with a slow collodion, the margin of exposure of a tannin plate developed cold being so wide, but with quick collodion it does not hold out. A collodion rapid wet, is not proportionally as rapid with tannin, compared with a slow collodion.

I have found collodion which was very rapid wet, to be fully as slow with tannin as some collodion which would have required, if wet, many times the exposure of the former to give a similar result. Tannin appears to equalize the length of exposure, and the merit as to rapidity of a collodion used with tannin, is to be found on a different basis from the same quality being possessed when used wet. How far this property may be extended to other dry processes I am not prepared to state, but I have fully tested it with tannin. It is not to be inferred from this that a collodion may not be found which, while very rapid wet, will be equally so with tannin; as a general rule, however, it is a mistake, and, therefore, the photographer must not rely too much on the rapidity of a collodion used wet to govern the exposure of his tannin plate prepared with it.

After making a first attempt to develop some tannin plates by Dr. Draper's process, and meeting with no success, I repeated the experiment, and it resulted most encouragingly, with an exposure shorter than, under the same circumstances, the same collodion would have required wet at the time the plate (four months old when exposed) was prepared. This would naturally lead me to the conclusion that Dr. Draper's process is quicker than wet collodion, if the fact above mentioned had not been well known to me. Here is a new and vast field open to the experimenter. As to loss of sensitiveness by time, it is so slow that in four months I have been unable to detect any.

My complete failure at my first attempt to develop by Dr. Draper's process, arose from several causes; I used the water too hot, the developer too cold, too much silver, and proportionally too little citric acid. These are all important points, which, while they add to the difficulty of developing a tannin plate successfully without some practice, becomes with skill and judgment elements enabling the operator to control the best result with more certainty. I have, in a former communication, stated how the exposure could be carried much further than was strictly necessary to obtain a well-defined negative without injury, provided the development was regulated accordingly. Dr. Draper's process increases the margin in the opposite direction. It seems as if almost any exposure within reasonable limits, either very short or very long, could, by judicious development, give a good negative with a tannin plate.

The temperature of the water in which the plate is soaked before development is a new element, and a never-failing indication enables us to regulate it. The same developer gives a different tint to the negative according to the exposure, which tint alters from bluish-black to bright purple-red, and is the more red that the plate has been more over-exposed. This same sensitive indication applies to the hot-water process, a proper tint being soon ascertained with a constant developer, and too high a temperature having the same effect as too much exposure, so that if the image appears too red the temperature is too high. Really almost every day reveals, in the beautiful tannin process, the most useful and interesting features.

I thought that the enemy after abandoning his Munson Hill and wooden guns would be satisfied with the "madness" of his pursuers and abandon the field; but he introduces two redoubtable champions, which Siccus is perfectly willing to meet, with as many more as he or they wish to enlist, on fair ground. Sellers tells us that Mr. R. Shriver has come to the conclusion that *nothing but the wet collodion* can give the superb delicacy of shades the wet always gives. This is rather sweeping. If Mr. Shriver has given a fair trial to dry processes, and to the tannin in particular, his opinion is the more worth quoting, that he is an excellent photographer, and his stereographs among the best I have ever seen; but if he has not, his conclusion has no weight. The same applies to Mr. T. R. Peale, who *assumes* the wet to be the most perfect condition of the collodion film. I would forever regret that the ephemeral condition of collodion, wet, should prove the most perfect—but, an assumption may do to discuss abstract questions, it becomes an axiom when self-evident, in the present instance it amounts to nothing.

The relative value of the different processes must be established by a comparison of the results they give. Two years ago, a committee being appointed to decide for a prize photograph amongst the many productions at the Manchester Exhibition, a print by Mr. Mudd, from a Fothergill negative, was decided to be the best. Repeatedly, prints from dry plates, albumen, collodio-albumen, tannin, &c., are mentioned in the accounts of the different exhibitions through Great Britain as deserving the palm. The albumen transparencies of Messrs. Ferrier and Soulier, from albumen negatives, have not been surpassed. Nor are dry processes a "*madness*" or

* *American Journal of Photography.*

a "*fashion*," they are older than the wet, and used far more extensively for field work. Therefore, I would conclude by stating, what no one can deny, that the relative merits of negatives obtained, wet and dry, are at least an open question, and to be decided by time and careful comparison, and not by mere assertions.

## WET AND DRY COLLODION.

BY COLEMAN SELLERS.

The readers of the various photographic journals must have noticed that there is being more and more written about various dry processes, and that some perfect process of that kind (equal or superior to the wet in skilful hands) is to be considered the goal towards which all enthusiastic amateurs are to hasten, and the attainment of which is to leave nothing to be desired. Thus, what a host of advocates for the dry are giving their testimony in its favour, while hardly one is the champion of the wet in the field. They all seem to agree that time is no object, that for views without animated objects it matters little whether the exposure required is five seconds or five minutes, so far as the result is concerned, and some even think the long exposure an advantage, making the result more controllable.

Now, too, Mr. E. Borda is added to the list, and I tremble lest he should make me throw away all the various little conveniences I have arranged with care for the wet work in the field, and convince me that I must be a "Siccus" against my will. As he says in a recent letter, "What a triumph it will be to convert the would-be 'Jamin and glycerine' into a 'Dry Harrison.'"

Almost daily too, do letters come with the oft-repeated question, "Can you advise me what dry process to try?" And only yesterday, a (for a long time) correspondent, who has had all kinds of trouble with the wet, writes me, in his joy, that his first tannin plate "is developed, and is on the stove drying," the best negative he had ever made. There must be some reason for all this. Some who have never been successful with the wet, are doing charming work with the dry; and even successful amateurs are throwing aside their dark tents, and working tannin. All admit that portraits and pictures of moving objects can only be taken with wet collodion, but many prefer to avoid such subjects and take pictures only of still life.

It has occurred to me, since reading Mr. Borda's article in the last number of this Journal, (and right glad I am to see him in print,) to answer the general enquiry of "What dry process shall I try?"—through the pages of the *American Journal*, and referring my correspondents to it, save much needless writing. Having tried most of the formulæ proposed, and been successful with many of them, I may be considered as a disinterested party—and give my opinion in favour of Major Russell's tannin process—more from observing the general success of others who work it, than any fondness of my own for it; and let not friend Borda think that my conversion is complete, when I advise all who have had trouble with the wet to select some reliable dry process, and persevere with it until they are perfect; and of the processes now in vogue, Major Russell's is the best.

The reason I have come to this conclusion is from the fact that success in the wet is more dependent on the collodion than on any of the other chemicals used; an amateur buys his stock of chemicals, and among them a bottle of collodion from some reliable maker; his picture will be very good for a beginner, and all seems clear before him; soon, however, comes the cry, "I can get no intensity;" the same chemicals will not give the same result. The bath is doctored, and all sorts of expedients are resorted to, to produce intensity, while the fault in reality may be the deterioration of his collodion from age. Taking for example my own experience when I had a great many 14×18 plates of machinery to take, I used pound after pound of collodion, it never got old on my hands, and a uniform degree of intensity was obtained. But when I had taught another to do my work, and had thus limited my experience to the *semi-occasional* work of an amateur with no time to operate, then these troubles came to me; but knowing the cause, I could throw aside my old collodion, make fresh in small quantities, and thus avoid all trouble. All, however, cannot do thus, few are willing to do the dirty work of making gun cotton, and prefer to purchase collodion ready made.

Having tried all the various sensitising salts, my own choice has been the iodide and bromide of ammonium. Collodion prepared with these is quick when new, but no matter how well the cotton has been washed, it will redden work slower as it gets old. Now with the tannin process, all kinds of collodion seem to do well, some better than others it is true; but samples good for nothing wet, have been first-rate dry. This I know from having given many kinds of collodion to those who work the tannin, and have seen the result. See, too, Borda's account of his wet picture with new collodion, how very quick it was. That collodion was from cotton I have been working for some times past, but it will not always be so quick; as it gets older it gets slower, and must be thrown aside, or used for dry plates. In the case of an amateur who can only find time to work, say once a week, every pound of collodion bought, if it is new and quick when purchased, will yield only a few days' good work before it gets old.

There is a way, however, of managing collodion, recommended by Hardwich and others, which I am now trying, and time will show if it will get over all the trouble or not; it is as follows:—Take of cotton (such as will dissolve ten grains to the ounce in equal quantities of ether and alcohol) eighty grains, wet it with four ounces of absolute alcohol, shake it well, then pour off two ounces, leaving two ounces in the cotton. Throw away the portion poured off; add then 4 ounces of ether, which will dissolve the cotton and make a plain collodion with only half the quantity of alcohol necessary to make up bulk. Mark this plain collodion with the date of its mixture. Next, in two ounces of alcohol dissolve sixteen grains bromide of ammonium, and forty grains of iodide of ammonium; this, filter with care, and mark sensitizer, with its date of mixture. When about to use any collodion, take, say one ounce of the plain collodion, and add to it one third of an ounce of the sensitiser, shake up and use immediately.—*American Journal of Photography.*

## DIFFICULTIES IN PRACTICAL PHOTOGRAPHY.

BY S. R. DIVINE.

The difficulties and discouragements that beset the professional photographer in his daily work, do not require to be told to those who have had much experience; but there are those who think that other practitioners in the sun-painting art are not troubled with the obstacles that spring up in their own path, and that if they could only get this man's or that man's process, they would be able to produce fine works uniformly, and escape all their own peculiar cares and difficulties. If you, my aspiring photographic friend, have any such idea, banish it at once. Take our word for it, that every artist has his heart-rending discouragements, and the beautiful works that your neighbour produces are the results of his constant care and never-failing patience. His knowledge of photographic mysteries is perhaps not greater than yours, but he may exercise more care in the details of manipulation.

Every photographer has his chemicals out of order occasionally, and must go to work to rectify them. The bath may work splendidly in the morning, but exhibit obstinate freaks in the afternoon. The collodion which gave so fine intensity yesterday is worthless to-day, and so it goes. When everything is in perfect order for making pictures we must not expect such a state of things to last, but must be always on the alert to discover the least symptoms of derangement, and apply the remedies.

A journeyman photographer once made application to us for work, and, being in want of help, we proceeded to ascertain something of his capabilities by asking questions as to the methods he pursued in obviating the difficulties that occur with the nitrate bath for negatives. He replied that he never had any difficulty with his bath, when we promptly informed him that we did not require his services, for he either told an untruth, or else he had no experience in the management of chemicals.

The great source of difficulty in making pictures is the bath, and it might be well perhaps to mention the means we employ to rectify it when out of order. If our bath fogs, we first ascertain whether it contains acid or whether it gives an alkaline reaction. An alkaline bath will always fog, and in case alkalinity is the sole cause, it is remedied very speedily by the addition of a small quantity of acid. But a negative bath must possess only a very slight degree of acidity. If acid does not cure a fog, the probability is that the bath is foul with organic matter, which may be removed in several ways. A good method is to evaporate the bath to half its bulk, by pouring it into a suitable earthen dish, and applying heat. Most of the organic matter will precipitate, rendering the solution black and dirty, and, after adding pure water to make up the original quantity, it is ready for use, after filtering. Another method is to set the bath in the sun till the foul matter separates. It will be some time before the black matter completely precipitates, and if sufficient time is not given, the solution will fog worse than before. Still another method is to add a substance that will cause a precipitate, which in settling carries down the organic matter with it, by a mechanical action. A few drops of a solution of common salt is very good, which, by addition to the bath, forms an insoluble chloride of silver which settles slowly to the bottom, and takes some of the impurities with it. Solution of cyanide of potassium is also very good for the purpose, as it forms a nearly insoluble precipitate.

But the method we employ more than any other is precipitation with bicarbonate of soda, and re-solution with nitric acid. A bath can be cleansed in a very short time by this method, and most thoroughly.

Collodion may produce fogging even when the bath is in proper condition. It generally results from an alkaline state, and may be cured in that case by adding a small quantity of hydrobromic or glacial acetic. It does not require much practice to be able to take a picture when all the chemicals are in working order; but to know the cause and cure of all the difficulties that occur in practical photography requires years of experience.—*Humphrey's Journal.*

## Proceedings of Societies.

### North London Photographic Association.

The monthly meeting of this Society was held at the Myddelton Hall, on Wednesday evening, April 15, G. Dawson, Esq., Lecturer on Photography at King's College, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. R. W. H. Stuart, of Chiswick, was elected a member of the Society.

The Chairman then called upon Mr. Bockett to read his paper on "Photographic Micrography."

The paper was illustrated by some very good enlargements of animal tissues, sections of wood, coal, &c., mounted on cards of the size now so fashionable for albums.

The apparatus employed was also placed upon the table for inspection.

At the conclusion of the paper, the Chairman, calling attention to the apparatus exhibited, wished to know if Mr. Bockett proposed making any experiment for the enlightenment of the members.

Mr. Bockett said in answer that he had not come prepared to take any negatives.

Mr. Shadbolt in opening the discussion felt that like a bather his great difficulty lay in making the first plunge. He would observe, by way of commencement, that he would have liked to have seen some results produced by the apparatus, had it been possible. He thought there were some objections to the focussing glass, and begged to recall to the remembrance of the members some experiments made by Claudet on the ground glass of the focussing screen. He thought Ramsden's eye-piece a more desirable instrument to employ, as it would then be impossible to focus beyond the plane. He could not understand Mr. Bockett's objection to sunlight. It struck him also that the exposure mentioned in the paper, viz. five minutes, was simply enormous. Mr. Wenham, followed by Mr. Delves and others, had produced micrographic subjects instantaneously.

Mr. Bockett begged to remind him that while they used sunlight, he simply employed diffused light.

Mr. Shadbolt in continuation said, that in making the pictures instantaneously, the exposure could be easily managed by the insertion of a cardboard between the object and the light. He thought that the animal tissues were scarcely ever well rendered. The palates, particularly that of the slug, were decided successes; but he begged to call the attention of the members to the tip of the blow-fly's tongue, which, though not out of focus, had that appearance, owing to the want of detail. This was caused by the non-actinic character of the membrane. He thought the suggestion made by some to throw actinic light on a non-actinic body a mistake; his plan would be to retard the light on the actinic portions of the subject. One of the chief difficulties to be encountered was want of sharpness, for the 200th part of an inch was quite appreciable in the microscope. In reference to polarized light, he thought its principal use was in the delineation of non-actinic subjects.

The Chairman called upon Mr. Ross for some remarks.

Mr. Ross said that his knowledge of the microscope was limited.

The Chairman thought the narrow tube of the apparatus before him objectionable, as it was calculated to cut off some of the rays.

Mr. Burr: A large body would be an improvement, as it would prevent any reflection from the sides which would tend to destroy the vigour of the image.

Mr. Shadbolt employed a paper tube covered with black velvet, which effectually absorbed all the stray light.

The Chairman thought a conical tube desirable.

Mr. Ross thought the dividing of the tube in half would meet the case. A series of joints, after the principle of the telescope, would produce the requisite widening at the end attached to the camera.

Mr. Shadbolt thought it desirable to adjust the object glass instead of the image for the correction of the visual and chemical rays. An object with a certain amount of thickness would enable the operator to determine with very little trouble the amount of difference.

Mr. Burr asked the use of a secondary magnifier?

Mr. Shadbolt could not see any advantage.

Mr. Bockett had tried, but had not succeeded in getting the itch insect.

The Chairman recommended him to go down to his country (Scotland), and he would have no doubt of his success.

Mr. Shadbolt handed round for inspection a micrographic enlargement of a section of one of the palm species. It was produced by Mr. Hodson, on a Daguerreotype plate, as far back as 1841. He employed in its production a small ¼-plate camera arranged vertically. As moveable ground glass was employed for focussing, which was removed, and the sensitive daguerreotype plate was dropped in its place.

The Chairman, referring to the date, said the exposure must have been extremely long, as it was before the introduction of bromide.

Mr. Martin thought there was evidence of bromine in the picture.

After a discussion on Kingsley's condenser, and Ramsden's eye-piece, in which Mr. Ross, Mr. Shadbolt, Mr. Bockett, and other gentlemen took part,

The Chairman, referring to the collodion mentioned by Mr. Bockett, viz., Thomas and Ramsden's, objected to both, as containing a considerable amount of structure. The collodion most desirable for micrographical experiments would be one, the pyroxyline of which was made in acids at a temperature not below 160°. Such a pyroxyline, dissolved in alcohol, nearly absolute 5 parts, ether 3 parts, would carry a large amount of iodizing solution even when considerably diluted. It would also bear any amount of washing, and could be intensified with perfect ease. He admitted the pyroxyline he had described would be expensive to prepare commercially, as so much would be lost in the acids.

Mr. Seely thought such a collodion would be admirably suited for instantaneous pictures in the magic lantern.

Mr. Shadbolt thought it a question of manipulation, as structure could be avoided with care. The two causes of failure was water in the ether or alcohol. Absolute alcohol was very greedy of water, and would drink it from the atmosphere. The great remedy was to keep the plate a long time out of the bath.

The Chairman still thought the structure depended more upon the cotton.

No further discussion ensuing upon the paper, a vote of thanks was proposed to Mr. Bockett.

The Chairman announced that three photographs were presented to the society's portfolio by Mr. Moens. The subjects were: "The Aqueduct at Carthage," "The Caves at Balaclava," and "Whippingham Church."

Mr. Bockett announced, in answer to the Chairman, that his micrographic results were quite at the service of the meeting.

Mr. Shadbolt called the attention of the meeting to a photograph by Mr. Edwards, said to be 10 by 8, but which was imperfectly covered at the top edges. By the segment at the top he was enabled to get at the diameter, which he found to be 11 inches. He had no desire to run down lenses, but he did desire to establish facts.

The Chairman: What is the square?

Mr. Shadbolt: Barely 9 by 6¼.

Some discussion followed relative to the determining the size of different oblongs to be obtained out of a given circle.

Mr. Shadbolt handed round for inspection two beautiful *cartes de visite* pictures by Robinson, of Leamington, as illustrations of what can be produced by the introduction of artistic arrangements into photographic portraiture.

There being no other business before the members, the meeting terminated.

## Correspondence.

### PHOTOGRAPHIC DEPARTMENT OF THE INTERNATIONAL EXHIBITION.

Dear Sir,—You are doubtless familiar with the final arrangements made by the Commissioners for British photography, and may possibly have visited the *camera obscura* devoted to its reception, but as I have just returned from my first visit, and as my blood in consequence is at very little little below 212° Fah., I have dared to pour the *boiling* thoughts that burst their channels, into print: that is if you will insert them.

I had heard of the conciliatory spirit of the Commissioners, and that in spite of the misunderstanding between them and the photographic body, they were desirous of doing all honour to photography, that though its claims to rank as a fine art had not been legally indorsed, it should have a fair field, with every opportunity to distinguish itself; that it should have a room to itself, without the portals of the fine arts, it is true, but not beyond their benign influence. With a contented mind therefore, and a feeling of self congratulation that I had been one of the fortunate ones chosen, from the many unchosen, I attached the official printed label to my package, and mounted it and myself on the roof of an omnibus, bound for the Exhibition. So full was I of eager anticipation of the busy sight that would soon meet my eye, that I had made myself unusually attractive, until my neighbour on the roof suggested that the big label in front of me announcing me as class 14, addressed to Her Majesty's Commissioners, wanted "this side up, with care," to make it complete. On arriving at door C, a policeman barred further progress until I had wasted full five minutes in convincing him of what he knew already, that I had a right to enter. After smearing the package with some mysterious hieroglyphics in paint, a porter who wore an official bandage on his arm, seized the package, and bade me follow him. On we trudged down a long corridor, through the opening of which a constant whirr, hum, and bustle streamed in, vaguely indicating what an immense beehive it was. We had now reached the centre part of the building, but had no time to take in anything but the most confused impressions, for I was following the nimble-footed porter rapidly up a broad staircase, which brought us to the entrance of the fine-art galleries. Through an open door I saw grand old pictures, hung in a magnificent gallery, and lit by a mellow subdued light, which came from above. I felt that if photography had found a home anywhere adjacent to these galleries, it had at length recieved full and complete justice. These thoughts, however, were the very vanity of vanities, for the porter was already half way up a narrower and meaner staircase, the walls of which are brick, washed with red colouring, and I reluctantly followed. A landing is reached, and then another flight; now another landing and another flight, and still another, and we are in the Photographic Department.

Here I paused to take breath, and gulp down the bitter disappointment which was almost choking me. Truly the Commissioners, if they have proven themselves anything but men of business, as the many cases of mismanagement, and something worse, which have come to light, go to show, have, at any rate, shown themselves good hands at a practical joke. This last joke, at the expense of poor photography, is worthy a place in *Punch*. Their acts say plainly enough this new-fangled would-be art, that is scarcely out of swaddling clothes, and yet has the presumption to try and swell itself out into the majestic proportions of the arts, old as the Parthenon or the Capitol, like the frog in the fable, truly it shall receive a lesson not easily forgotten. Photography would be a fine art, indeed! Its desire for elevation shall be fulfilled, for it shall be the highest art in the building, an art so high, that those who would behold its productions shall take a lesson in gymnastics before they can do so.

Unfortunately, poor education bears the biggest half of the burden of this joke, for it occupies the largest portion of the room. It appears the Commissioners think that, as the object of education is to elevate, therefore the instruments employed should be placed so high as to be beyond the gaze of nine-tenths of the people who will visit the building. Truly there is no royal road to knowledge and photography, the path is a steep and uninteresting one of 72 steps.

An Exhibitor.

### PHOTOGRAPHIC JURORS IN THE EXHIBITION.

Sir,—In your last number after having alluded to my appointment as a juror of class 14, in terms which cannot but be most gratifying to me, you have expressed some doubts as to the fitness of a professional photographer for the office, because other professional photographers may naturally feel that they would rather not have been judged by one with whom they are in business competition.

I am happy to be able to dispel your fears. My fellow photographers have already proved what is their feeling on this question, for they have themselves demanded that I should be one of their jurors. The special Commissioner for the department of jurors in the International Exhibition of 1862, in apprising me of my appointment, stated in his letter that it was in consequence of my having been recommended by a considerable number of exhibitors, to be juror in class 14 (photography and photographic apparatus).

If the appointment had been conferred by Her Majesty's Commissioners, without their having consulted the exhibitors, I might have felt some delicacy in accepting the office; but I could not hesitate one moment in considering that the exhibitors, having acted themselves *as jurors in my case*, had wished that I should be honoured with their confidence.

Owing the highest distinction an exhibitor can desire to a most honourable and brotherly feeling of my fellow labourers and competitors, I have accepted it with pride and gratitude, and I assure you the remembrance of it will be for me an everlasting source of gratification.—I am, dear sir, yours very truly,

A. Claudet.

[We have much pleasure in giving record to the grounds of M. Claudet's appointment as a juror. Our remarks were written under a conviction, based upon what we believe are good grounds, that the Commissioners had given but little heed to the nominations of exhibitors.—Ed.]

## Talk in the Studio.

Royal Patronage.—It will interest many of our readers, who are familiar with the name of Mr. Jabez Hughes, in connection with frequent communications at the metropolitan photographic meetings and in photographic journals, to learn that he is at present executing a series of commissions for Her Majesty. Mr. Hughes has recently fixed his residence at Ryde, having purchased the business of the late Mr. Lacy, of whom he will be a worthy successor. It is somewhat singular that the first picture Mr. Hughes took in the Isle of Wight was a portrait of Prince Leopold. This was so satisfactory that it was succeeded by commissions to execute photographs of various works of art in the palace at Osborne, and of various views of the exterior and interior of Wippingham Church, which has been recently rebuilt by Her Majesty. Several of the views already successfully executed, we have seen; and may mention amongst them one or two of a marvellous extent of angle, having been taken on plates 10 by 8 with a No. 1 triple achromatic lens of about 8 inches equivalent focus, with a large stop. The prints when trimmed were upwards of 9 by 7, with sufficient pictorial definition to the edges. We are glad to record, in the commission of Mr. Hughes, another of the many graceful tributes to the art on the part of Her Majesty, in the employment by turns of almost all photographers of reputation or ability.

Mason v. Heath.—This case came on again in the Court of Common Pleas, on Thursday week, before Lord Chief Justice Erle and Justices Willes, Byles, and Keating, sitting in Banco. Mr. Montague Smith, Q.C., said the action was brought by the plaintiff, who was the publisher of *The Photographic Portrait Gallery*, against Mr. Vernon Heath, the photographer, of Piccadilly, to recover two negatives of the late Prince Consort. At the trial, last sitting, the plaintiff stated that he had written to, and obtained the permission of his Royal Highness to publish his portrait in the *Gallery*; and that he then made an agreement with Mr. Heath to take two negatives for the sum of five guineas. The defendant alleged that there was no agreement of the kind, and refused to give the plaintiff one negative without the payment of fifteen guineas. The jury found that there was no agreement for two negatives, but considered that the plaintiff should have one negative upon the payment of five guineas. His lordship then directed a verdict to be entered for the defendant, with leave to the plaintiff to move to enter the verdict for him according to the finding of the jury. The learned counsel then moved pursuant to leave reserved. The Court granted a rule nisi.

The Photographic Contract at the Exhibition.—The long-pending question of the right to photograph the Exhibition was settled on Tuesday evening, when the secretary announced that the tender of the London Stereoscopic Company had been accepted. Several of the most eminent photographic firms were eagerly competing for this privilege, and the keenness of the contest was enhanced by its being rumoured that Messrs. Day and Sons were also striving for it, as the most valuable auxiliary they could obtain for the production of an illustrated work on the chief contents of the Exhibition. It is much better, however, that the choice has fallen on professional photographers, and from the high character of the London Stereoscopic Company they are likely to do the work admirably well. A very high price was paid to the Commissioners for the privilege, and a still higher sum must be expended by the firm to perform the contract well. No photographs are to be sold in the building; no views to be taken after 10 a.m., and none at all without the consent of the exhibitors themselves. The latter, however, is a merely formal clause, as, of course, the main source of profit will arise from the desire of the exhibitors to have their stalls and cases represented in stereoscopic views.—*The Times.*

Patent Ozone Light.—"This latest improvement in the combustion of air for illuminating purposes," says the *Manchester Courier*, "has just been tried at the Victoria Station. The invention is patented by Messrs. Trachsel and Clayton, engineers, Ardwick. A first-class carriage was darkened and then lightened with the brilliancy of gas by the new flame, which burned in the usual lamp; its advantages are—that it cannot explode, and shows colours as in daylight. The light is very mild and steady, even when the carriage is in motion; it is evolved from air passing through certain chemicals; is not dearer than gas, and is much more portable."

## To Correspondents.

William Vaughan.—It is impossible to state with certainty what amount of glass should be in any part of a glass house, without a precise knowledge of all details, only to be obtained by personal inspection. Seven feet of top light, with plenty of side light, would in many circumstances be sufficient. Take care, however, to have those seven feet well forward, and not immediately over the head of the sitter. 2. The lenses called half-plate, in either Dallmeyer's or Ross's catalogue, will cover a whole plate better than many whole-plate French lenses.

A. B. C.—The simplest and least expensive instantaneous shutter consists in the use of a piece of wood held in the hand. If you require something inexpensive for occasional use, this, or a hat or cap—anything in short which will cover the lens—may be employed with a little care and dexterity. 2. The card picture is a little hard, from slight under-exposure. The lens is not quite equal to the work; and the background is not quite free from stains. The printing is pretty good and free from mealiness. 3. If a proper collodion be used, and the plates properly prepared, there is no reason why the result should not be good, a day or a week after preparation.

H. V. C.—The small white houses on the shore at the foot of Mount Orgueil, are at all times inimical to the effect of a picture, in which, as in the scene itself, they have a spotty effect. In the specimen sent, the result would have been better if the plate had received longer exposure and less development, or if less silver had been used in the development. By giving sufficient exposure to bring out all detail, without forcing the development, you will generally obtain skies which will print slightly through, just giving a tint instead of white paper. To secure clouds, the best plan if the exposure be not instantaneous, is to shade the sky, either by using a Dallmeyer's shutter, or holding a piece of blackened card or board horizontally above the lens, so as to cut off the rays from the sky until the foreground is properly exposed, and then give an instantaneous exposure for the clouds. We have not had personal experience in the processes recently recommended by Mr. Bartholomew, and cannot, therefore, give much information beyond what is supplied in his various communications. No apology whatever is needed for your queries, which we always take pleasure in answering, and giving the best information in our possession.

Achromatic Lens.—It is the custom of all opticians, of any reputation, to engrave their names on the mounts of their lenses. We can form no idea of the maker of the lens you mention from the initials given. Probably it is from some French house which manufactures for "the trade."

J. G. L.—Ebonite will stand with impunity a very strong solution of nitric acid. The mode we adopt with such baths is first to wash with a solution of soda, then with a solution of nitric acid, and finally rinse thoroughly.

W. R. D.—We cannot devote the amount of space in this column necessary to instruct you how to take a good negative, and then how to print from it. The information you require is scattered over our pages; but perhaps your simplest plan would be to get any good elementary manual expressly intended to meet such wants as yours. Try that of Mr. Hughes.

Photo.—The person you name was at one time a photographic dealer in New Oxford Street, but has not been in the business we believe for the last two years. We are sorry for your victimization, and would willingly prevent others from sharing the same fate; but we cannot, unfortunately, insert the letter of warning, as the law of libel is apt to put awkward constructions on such matters. We can only recommend our readers to deal only with houses of known respectability, of which our advertisement pages present a goodly list, all of whom have "a local habitation and a name."

An Amateur Subscriber.—In speaking of portrait lenses of 3½ in., 4½ in., and 5½ in., Mr. England referred to the distance from the back lens. Waterhouse diaphragms are always placed between the front and back lenses; but they are not necessarily central. The exact position depends on the relative power of the lenses in the combination; and if the lenses are made by an optician who understands his business, the position selected is that which will give the least distortion and the flattest field, consistent with rapid action. By placing the stop nearer the front lens, the field is flattened, but the amount of light is diminished. We should imagine a stereo picture would be covered by the lens you refer to sufficiently well for most subjects with a stop of ⅜ in. diameter, and that on occasion a much larger stop might do. Probably the maker himself can give you exact information of what ought to be done with the lens.

H. G. B.—Your remarks on the article in the *Saturday Review* are very true. M. Claudet remarked to us the other day in a conversation on the subject, that it might be accepted as a certain rule in reference to the writers of such articles, that they were personally *ugly*, and had received from photography uncompromising justice! Hence the spleen.

R. G.—If an iron negative be very full of detail but thin, use the pyro solution of moderate strength, and add plenty of silver: take care, however, to have sufficient acid to prevent reduction on the shadows.

New Light.—We are obliged for the extract, which as you see we insert. We will examine the specification, and if it afford any useful information, our readers shall be put in possession of it.

A New Subscriber.—In using a focussing glass, take care that the ground glass be very fine, otherwise its texture will be so much magnified that you can scarcely distinguish a sharp image on it. Your focussing glass should be adjusted to your sight by screwing the end in or out, and when once adjusted may be screwed tight and kept so. For use it is placed with the open end flat against the ground glass. Unless your sight be bad, it is rarely necessary to use magnifying power in focussing.

Puzzler states that for some time past he has been unable to obtain a rich creamy-looking film: on taking the plate from the nitrate bath it looks blue and thin; but after exposure in the camera it becomes quite dense and creamy. This is a somewhat puzzling circumstance at first sight, but it is not due to the action of light. If the plate had merely stood in the dark during the time it was in the dark slide, the result would have been the same. It simply proves that the whole of the iodide in the film was not converted into iodide of silver before the plate left the bath: and some free nitrate remaining on the film, the process of double decomposition—whereby the iodide of silver is formed—continued whilst the plate was in the dark slide. You must allow the plate to remain longer in the bath. Probably the collodion you are using gives a somewhat repellant film, or it may contain a larger proportion than usual of pyroxyline and iodides; in either case a little longer immersion than usual in the bath will meet the difficulty.

G. C. is thanked. Nitrate, T. P. E., E. T., X. P. R., J. F., J. M., and several other correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 191.—*May* 2, 1862.

## THE OPENING OF THE INTERNATIONAL EXHIBITION.

The grand exposition of the world's industry and art is now open. The spectacle, and the music, and the worship by which it was inaugurated are over; and, according to the programme, the Exhibition is, with a flourish of trumpets, declared open. Writing, as we do, immediately upon leaving the building, with the mind possessed by almost bewildering echoes of glorious music, by confused and fragmentary visions of, perhaps, the most magnificent collection of paintings ever assembled in one place, the choicest array of the world's industry, and, as the Laureate phrases it—

> " Shades and hues of Art divine,
> All of beauty, all of use,
> That one fair planet can produce,
> Brought from under every star,
> Blown from over every main,"

With all these, and a thousand nameless and indescribable associations, it will readily be conceived we are not prepared now to enter into any detailed description, even if we had time, before going to press.

The general arrangements for the opening many of our readers have doubtless learnt from other sources. The building was crowded at an early hour by a gaily-clad assembly, and the reserved seats, or rather such of them as were desirable, were soon filled. At about one o'clock the bands outside the building proclaimed the arrival of the procession, consisting of the various officers connected with the different departments of the undertaking, and with the Horticultural Society and the Society of Arts, Chairmen of Juries, Acting Commissioners of the Colonies and Foreign States, Civic Authorities, the Commissioners of the Exhibition of 1851, and those of the present Exhibition, the Bishop of London and some other clergymen, Her Majesty's Ministers, and finally the special Commissioners appointed by Her Majesty to represent herself in conducting the opening ceremony, and their Royal Highnesses the Crown Prince of Prussia and the Prince Oscar of Sweden. These slowly proceeded to the Western Dome, where was placed the throne and chair of state. The National Anthem was then sung by the choir in the Eastern Dome with magnificent effect; after which Earl Granville addressed the special Commissioners, briefly describing the origin, progress, and intention of the Exhibition. After a few words of response from the Duke of Cambridge, the procession again formed, and proceeded to the Eastern Dome.

The special music composed for the occasion now commenced. Meyerbeer's grand overture, consisting of a triumphal march, a sacred march, and a quick march embodying the national air "Rule Britannia" was in every way worthy of the occasion, and was given with magnificent effect. This was followed by the ode composed by the Poet Laureate for the occasion, sung to Dr. Sterndale Bennett's music by a chorus of 2,000 voices, accompanied by an orchestra of not less than 400 instruments. If the words were not altogether worthy of Tennyson, the music was in every way satisfactory; solemn, lofty, and at the same time simple and melodious; it was a noble specimen of choral music. More instrumental music, and a prayer by the Bishop of London; this was succeeded by the Hallelujah Chorus, and the National Anthem. The Duke of Cambridge now proclaims the Exhibition open; a flourish of trumpets, and the reverberating plaudits of those close at hand, taken up by those beyond, announce throughout the building to the assembled thousands, that the ceremony is concluded. The barriers which had guarded all but the main avenues are removed, and the visitors are soon swarming in every nook and corner of the Exhibition.

Nevertheless, the interior is far from being completed. Many of the departments, the French especially, are a simple chaos, and are surrounded by a cordon to preserve them from inspection at present. A few weeks will certainly elapse before anything like completion is attained. In most of the departments something remains to be done; but the very best had been made, within the last twenty-four hours, of the interior. To those who visited it a day or two before, it seemed impossible that it should be even accessible to the public on the first of May. At ten o'clock on Wednesday morning the building was cleared of contributors and their assistants, and the work of cleansing and putting in order commenced. The result obtained in the few hours that followed was as amazing as satisfactory.

It is impossible to form any definite or comparative estimate of the Exhibition at present. Our own coviction, from the hurried glance amid the excitement of the opening day, and former inspection during the course of progress, is, that as a display of art and industry it has not been rivalled. The sense is almost overwhelmed in attempting to comprehend so much of beauty. The picture galleries alone contain a collection of all that is excellent in modern art, such as the world never before saw. Regarding photography we cannot say much at present. The English photographic department was not opened, a barrier being placed across the doorway. Effecting a breach, however, we passed up the steps piled with dirt and rubbish into the deserted room. A glance at the contents made us hopeful: the pictures are all hung, and comprise some excellent photography. The display of apparatus was not complete, and we shall not at present pass any comment upon it. We may remark, that we were glad to see that Mr. Breese has contributed two tables of stereoscopes, containing his exquisite instantaneous transparencies, and one or two moonlight pictures. Those interested in the discussion which our notice of some of these pictures aroused, will have an opportunity now of forming their own conclusions.

The display of photography in the French department will be very fine, especially in solar camera pictures. In these we fear that our own department will be surpassed, whilst we shall excel in landscape. In figure photography generally, we conceive our own photographers will learn something from their French neighbours. Italy contributes some very fine, large architectural photographs. We must leave this subject, however, for further attention.

The photographic arrangements of the London Stereoscopic Company were, we believe, very complete. Small towers were erected in five different places, commanding views of different parts of the ceremony. These were under the charge of Mr. England, Mr. Russell Sedgefield, Mr. Stephen Thompson, Mr. Taylor and others, and we understand that a variety of fine negatives, instantaneous and otherwise, stereoscopic and ten by eight, were secured, prints from which will be in the hands of Her Majesty probably by the time these pages have reached the reader.

The prices of admission will not reach their minimum until the end of the present month, after which the admission on the first four days of each week will be a shilling. It will be gratifying to those of our readers whom it may concern, to know that if they wait for this period, the arrangements will by that time be just about complete, so that the loss is not great in doing so. The admission on the 2nd and 3rd of May is £1 each person; from the 5th to the 17th, 5s. each; from the 19th to the 31st, 2s. 6d. each. So that those who wait the cheapest period will find the Exhibition in the most perfect and complete state.

## THE CONTRACT FOR PHOTOGRAPHY IN THE INTERNATIONAL EXHIBITION.

We briefly intimated last week that the London Stereoscopic Company had secured the permission to photograph within the International Exhibition during the time it may remain open, and we expressed a hope that for their own sakes they had secured some modification in the conditions originally announced in the form of tender issued by Her Majesty's Commissioners. Since then we have obtained some additional information on the subject, from which we ascertain that the weakness and incompetency on the one hand, or the unfairness and disregard of good faith on the other, which have characterized many of the acts of the Commissioners, have been strikingly illustrated here.

Let us guard ourselves against being misunderstood at the outset. We regard with complete satisfaction the fact that the contract has fallen into the hands of a house pre-eminently well qualified to execute it, and on terms, which whilst very heavy, the well-known enterprise and unlimited facilities possessed by the firm, may render remunerative. Perhaps there is no establishment in London, in which the art is conducted as a commercial enterprise, that has issued so much thoroughly good photography, or that will be better able to do justice to the mass of art-treasures which, in spite of mismanagement, will be brought together at South Kensington. We feel satisfied that the art, the exhibitors, and the public, will, so far as the Stereoscopic Company is concerned, receive entire justice. Nor do we conceive that a shadow of blame can attach to that company, because, rightly appreciating the weak and vacillating character of the Commissioners, their ignorance of the conditions they ought to impose, and their uncertainty of what they really intended to enforce, a tender was sent in, which practically pooh-poohed the regulations proposed, or boldly ignored their existence, in effect saying: "this is really all nonsense; these conditions are impossible; we tender, therefore, on conditions which are tenable, and on none other."

Well qualified to execute the contract worthily, as the Stereoscopic Company undoubtedly is, shrewdly and wisely as it has undoubtedly acted in disregarding ridiculous conditions, the Commissioners are not the less guilty of a gross injustice to photographers generally. When they announce that no preparation or development of plates is to be permitted inside the building; that the hours during which photography shall be allowed will be limited to a period which shall be regulated by their pleasure, or caprice; and that no sale of photographs will be permitted within the building, photographers not familiar with the character of the men with whom they are dealing, naturally conclude that the conditions are binding; that dry plate photography, during limited morning hours, when much of the Exhibition would be in a state of dishabille, is all upon which they can calculate; and as the amount and value of the work which can be done will be limited at best, and its value curtailed still more by the fact, that they cannot sell their productions inside the building, they, of course, limited the amount of their tenders accordingly. Our readers will be somewhat surprised, however, to hear that in the tender accepted all these conditions are set aside; that wet-plate photography, with all proper facilities for the preparation and development of plates in the building, is to be permitted; that the operators are not to be confined to the hours before ten in the morning, but on all legitimate occasions; and finally, that the pictures produced *are* to be sold within the building. All these changes are perfectly right, and such as common sense would dictate; but before they were made, common justice demanded that the persons whom they concerned should have been informed of them. Not a word of such changed intention, however, was published, not a word of it reached those who were tendering. The fact that changes so natural and reasonable were made at all seems to have been simply due to the good sense and business ability of the firm who secured the contract, who were strong enough to quietly over-ride the fatuous decisions of the Commissioners.

Of course there was a reason for this concession. The reason was a golden one: the Stereoscopic Company offered a most handsome sum, and made a most tempting proposal. Their tender for the privilege of photographing in the building, unfettered by foolish conditions, was a sum of fifteen hundred guineas down, together with a certain share of the profits of photographs to be sold in the building. The prospect of "going snacks" was too much for the virtue of the Commissioners: the published conditions were waived, and the tender was accepted; and the Company have secured the right to photograph, and to sell their productions in the building without let or hindrance. Next in amount to the tender of the Stereoscopic Company was that of Messrs. Day and Son, lithographers, who sought the photographic contract for the aid it would afford them in delineating by their own art the contents of the building. Messrs. Negretti and Zambra, also, we believe, ran somewhat closely in the race for the contract.

The management of the photography in the building has been placed by the Company, we understand, under the superintendence of Mr. England, whose instantaneous and other views of America and Paris have won a world-wide celebrity. Arrangements are, at the time we write, in course of progress for securing negatives from different points of view of the opening ceremonial, copies of which will at once be forwarded to Her Majesty. We have no doubt but that the results will be in the hands of the Company, and their skilful representative, completely successful in a photographic sense; we trust they may not be less so commercially.

## THE SOIREE OF THE PHOTOGRAPHIC SOCIETY.

The Annual Soiree of the Photographic Society was held in the large hall of King's College on Friday evening last, the 25th ultimo, and was, as usual, satisfactory and successful. Although the attendance was not so crowded as to constitute the inconvenient crush experienced at some scientific evening receptions, it was large—numbering about five hundred persons, and comprising many names famous in science, art, and letters. It would be out of place to individualise here, but we may remark that the presence of some of the oldest photographic experimentalists and discoverers, such men as Mr. Fox Talbot and the Rev. J. B. Reade, were not amongst the least pleasant associations of the evening.

Although the Society had held no exhibition this year, and was consequently without the facilities which the exhibition has formerly presented, for decorating the room with photographs, the hall was, notwithstanding—thanks to the influence and exertions of Dr. Diamond in beating up contributors—well supplied with choice illustrations of the art. M. Claudet was a large contributor, and exhibited specimens of all kinds, from the life-size portrait of Faraday, coloured in oil, to enamels for lockets and brooches, executed, we believe, by the process of Camarsac. Amongst M. Claudet's contributions which attracted most attention were several enlargements by the solar camera from *carte* negatives, the prints being about 21 by 17. Many of these were very fine and had received but little aid from the pencil, being simply, as M. Claudet happily phrases it, "corrected." Conspicuous in quantity, and in many instances in quality also, were the prints of the Amateur Photographic Association, which excited a good deal of attention. Messrs. Caldesi and Co. contributed a series of very fine and large photographs of the Elgin Marbles, and other antique art treasures. A number of the exquisite vignette heads, in the style which at once identifies them as the productions of Mr. T. R. Williams, were much admired, as were also several coloured portraits of the same gentleman. Some of these struck us as amongst the very finest oil-coloured photographs we have seen. A portrait of Mrs. Windham, who recently enjoyed a temporary celebrity and "bad eminence," was a marvel of fine colouring; exceedingly brilliant, it was at the same time soft, delicate, and harmonious in the highest degree.

A series of large reproductions from Turner's pictures, by Mr. Thurston Thompson, to which we have before referred, excited much attention and admiration. The attempt to reproduce by photography the paintings of Turner might have been conceived a hopeless task, but in Mr. Thompson's hands it has become a successful fact. Many of the pictures, even in the monochrome, are rich in the peculiar excellencies exhibited by Turner's pictures generally, the unmistakeable presence of atmosphere, the rare distances, the perfect composition. The celebrated "Carthage" is one of this class, which scarcely seems to need the charms of colour to render it a perfect picture. Some few which depend, in the originals almost entirely upon colour for their value, are not so successful; but, as a whole, the series will worthily find a place in the portfolio of the amateur and connoisseur, as well as amongst the choice studies of the painter.

Mr. Rejlander was not extensively represented, nevertheless he had contributed some very fine pictures, of which one—a glass positive of a beautiful model in the garb of a nun—excited especial attention and admiration; and, because it possessed so much of art, many observers, after examining it, exclaimed, "Oh, a copy of an engraving!"

Mr. Robinson had contributed "Lady of Shalott," "Elaine with the Shield of Launcelot," "Early Spring," and various other pictures, all of which were much admired. Mr. Wilson had a frame of charming instantaneous and other pictures, 7×5. Mr. Heath, Mr. Mudd, Mr. Stephen Thompson, Mr. Mayall, the London Stereoscopic Company, McLean and Melhuish, and others, had sent some excellent pictures.

Several stands of stereoscopic transparencies were contributed by Messrs. Murray and Heath and others. Messrs. Horne and Thornthwaite exhibited some novelties in apparatus, a table of microscopes, and some very choice specimens of chemicals, which attracted much admiration. Mr. Solomon had also a table containing some excellent apparatus. Mr. Ross sent a complete set of panoramic apparatus, of large size.

A series of vases ornamented with photographs were exhibited, but without label or anything indicating the mode by which the photographic ornamentation was effected: we presume they were by a process recently patented for photographing on uneven surfaces.

Mr. Durham had sent a few sculptured sketches in clay: a pair, consisting of boys engaged in cricket, were charming little studies.

There were doubtless many other pictures, works of art, and notable inventions, which we have not noticed, as the crowded state of the room with charming living pictures rendered it a matter of some difficulty to give undivided attention to matters simply photographic. The assemblage generally seemed highly delighted with the occasion, if the animated countenances and the constant hum of pleasant voices were a fair indication. Refreshments were served in the library of the college. Taken as a whole, the soiree was decidedly successful.

## Scientific Gossip.

Improvements in the Oxy-hydrogen Light—The Magnesia Light—Arborescent Crystallization on Photographic Plates—New and Important Spectrum Discoveries—Examination of Coloured Glass in the Spectroscope.

Some improvements have recently been made in the oxy-hydrogen light, which cannot fail to be of value to photographers. One objection to the employment of this light for photographic purposes, is the very feeble amount of chemical rays which it emits when evolved by the ordinary means. The earth lime is universally employed as the body which is to be rendered incandescent by the heat, and this is about one of the worst agents for actinic purposes which could be employed. Mr. Fryer has lately been making a series of experiments with this light, with a view to determine what substance, when made incandescent, produces the greatest amount of light. He has operated on various salts of calcium, magnesium, strontium, barium, and also upon some other substances. The best results were obtained from magnesium compounds. The sulphate of magnesia, when baked, was found to yield a bright light, but was decomposed by the heat; and the sulphurous acid escaping, was very unpleasant. Calcined magnesia succeeded the best of all; but when the powder was used, the gases blew it away. When the powder was mixed with water and afterwards dried, the cake was friable; and when the dry powder was pressed into a mould, by means of hydraulic pressure, the cake split up into laminæ when subjected to the current of ignited gases. After many experiments with the materials in different proportions, it was found that sulphate of lime one part, and calcined magnesia two parts, mixed with water and modelled into a cake and dried, produced the best results. This, however, is not all that could be desired, as in time the cake becomes cracked and fissured by the gas. The illuminating power is exactly double that of lime, the ratio being, pressure and volume of gas being equal, as 54 is to 27. The experiments were conducted with oxygen, and the coal gas supplied to Manchester. The jet used was a form supplied by Mr. Dancer, a jet of oxygen being surrounded by an annular jet of the coal-gas. Mr. Dancer has further improved the jet by allowing the oxygen pipe to project beyond the hydrogen, and by not contracting the aperture of the hydrogen, or coal-gas pipe. At the last meeting of the Manchester Literary and Philosophical Society, Mr. Fryer exhibited this light; its effect is said to have been very striking.

Some remarkable appearances of crystallization have been noticed by Mr. Petschler in the preparation of glass plates with bichromate of potash and gelatine, for photographic purposes. The striking peculiarity is, that the inorganic salt in contact with the organic matter produces vegetable forms; specimens on glass plates representing mosses, ferns, and algæ in beautiful ramifications, which vary in many ways, dependent upon the strength of the solution, temperature, state of the atmosphere, and other causes. The plates were prepared in different ways. Some were first coated with collodion, on the surface of which a hot mixture of gelatine and bichromate of potash was poured, and then allowed to cool and dry spontaneously. In a few hours the crystals began to form and ramify themselves over the plate. The gelatine mixture was composed of three parts of gelatine and water, twenty grains to the ounce, to one part of a saturated solution of bichromate of potash. Several other plates were prepared in which the order of application of the ingredients was varied, or some of them omitted, all of which gave beautiful, tree-like crystalline forms. The great variety and beauty of these vegetations must be seen to be appreciated, as they can with difficulty be represented by drawings. Mr. Petschler believes that no chemical combination takes place between the salt and the gelatine, but that the latter acts simply as a medium. The gelatine, when firm, retains a certain quantity of water; but when the moisture is driven off by heat, the crystallization is suspended. There is great similarity in appearance, and there is, possibly, some connection in cause between these arborescent crystallizations and the ramified form in which the salts of some metals are found naturally in agate, slate, and even trap rock, where the oxide of manganese is frequently found to have assumed similar forms. Mr. Mosley has suggested that the arborescent appearances might, perhaps, arise from the density of the solution, from the resistance of the gelatine to allow of crystallization in the usual rhombic form, and possibly to the subtle electrical or galvanic action supposed to be excited during crystallization. He has stated that some years ago he obtained from a solution of bichromate of potash, tree-like forms with spreading branches and pendent rhomboids, which, under the polariscope, appeared like a tree with gems of rich colours for fruit.

An important discovery has been made in spectrum analysis. It has hitherto been thought that the luminous bands and lines characteristic of a metal were always invariable, whatever the temperature of the incandescent vapour which evolved the light. Now, however, it has been found that this is not the case. Professors Roscoe and Clifton have made the discovery that certain broad luminous bands in the spectra of calcium, strontium and barium, and which are usually considered to be characteristic of the metal, entirely disappear at the high temperature of the intense electric spark, and are replaced by fine lines. The new lines which supply the place of the broad bands, are generally not coincident with any part of the band, sometimes being less, and sometimes more refrangible. Thus the broad band in the flame spectrum of calcium, named Ca $\beta$, is replaced in the spectrum of the intense calcium spark, by five fine green lines, all of which are less refrangible than any part of the band Ca $\beta$; whilst in place of the red or orange band Ca $\alpha$, three more refrangible red or orange lines are seen. The total disappearance in the spark of a well-defined yellow band seen in the calcium spectrum at the lower temperature, is strikingly evident. The Professors have also assured themselves by repeated observations that in like manner the broad bands produced in the flame spectra of strontium and barium compounds, especially Sr $\alpha$, Sr $\beta$, Sr $\gamma$, Ba $\alpha$, Ba $\beta$, Ba $\gamma$, Ba $\delta$, Ba $\epsilon$, Ba $\eta$, dissappear entirely in the spectra of the intense spark, and that new bright non-coincident lines appear. The blue Sr $\delta$ line does not alter in intensity, or in position, with the alterations of temperature thus effected, but, as has already been stated by the authors, four new violet lines appear in the spectrum of strontium at the higher temperature. This most interesting branch of scientific enquiry is at present almost too incomplete to enable them to do more than suggest a possible cause for such phenomena as the disappearance of the broad bands, and the production of the bright lines. They, however, venture upon the supposition that at the lower temperature of the flame, or weak spark, the spectrum observed is produced by the glowing vapour of some *compound*, probably the oxide, of the difficultly reducible metal; whereas, at the enormously high temperature of the intense electric spark these compounds are split up, and thus the true spectrum of the metal is obtained. The professors have observed that in none of the spectra of the more easily-reducible alkaline metals (potassium, sodium, or lithium) can any deviation or disappearance of the maxima of light be noticed on change of temperature.

A specimen of glass has been forwarded us by "F. R. W." for examination in the spectroscope; it is one of the deep orange kind, with that peculiar mottled appearance which is characteristic of a silver coloured, flashed glass. In the spectroscope it is seen to cut off in the most perfect manner all the chemically active rays, even those affecting bromide of silver. The glass is one of the most perfect we have ever seen, and could with safety be used for glazing a window with any aspect, as even the direct rays of the sun would be almost entirely shorn of their chemical activity by passing through this glass.

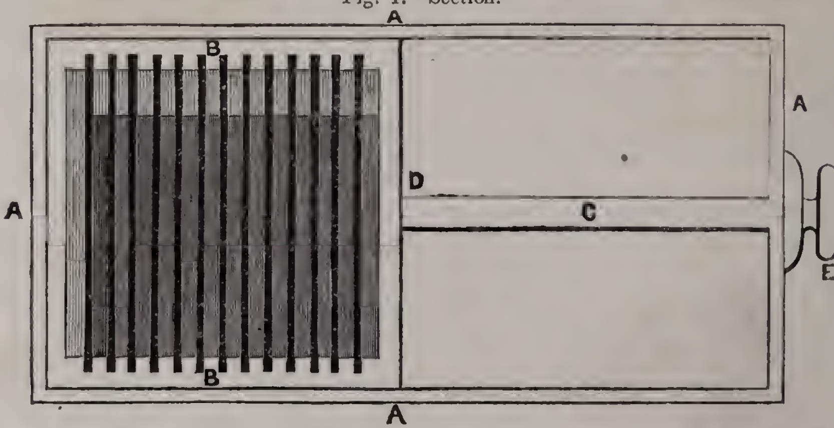
## A TOURIST'S CAMERA.

### To Expose Twelve Dry Plates without Extra Backs.

Dear Sir,—I will endeavour to describe the apparatus for taking stereoscopic views on dry plates, which I had the pleasure to show to you, and I hope with the aid of drawings to make it intelligible to your readers.

I shall begin with the plate-box, which I believe to possess some originality. It consists of a box of ¼-inch mahogany, 11½ inches long, 8¼ wide, 5¾ high, A (fig. 1), in which slides a sideless box B, made of rather stouter

Fig. 1. Section.

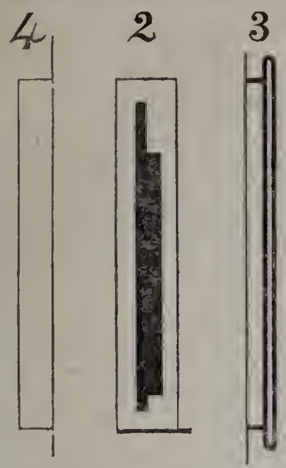



wood, especially the top and bottom, which should be about ½ inch thick having thirteen corresponding groves cut in them, in which the slides are placed, one for focussing, and twelve for the dry plates; midway at D, on both sides of the outer box, and exactly opposite, portions should be cut out, say ½ inch wide, and pieces of wood pierced, as in fig. 2, and ¾ inch wide, should be fastened on, so that a kind of shutter of wood, or, what would be better, tin, and shaped like the plate slide to be hereafter described, can be pushed through against one of the slides brought opposite to it by the bar C taking the place of the slide when it is pushed into the camera, and preventing any light touching the plate behind it.

The shutter should project about an inch from the plate-box; when occupying the place of the slide, the piece of wood where it enters, should project about ⅜ of an inch from the side of the outer box, with a flange, as in fig. 3, so that a black silk bag, lined with yellow, in which the shutter is placed, may be fastened to it by an elastic band; the opposite piece of wood, through which the slide passes *out*, should project about ⅜ths of an inch (fig. 4), and fits into a corresponding opening cut in the side of the camera, the centre of which opening is 4½ inches from the front.

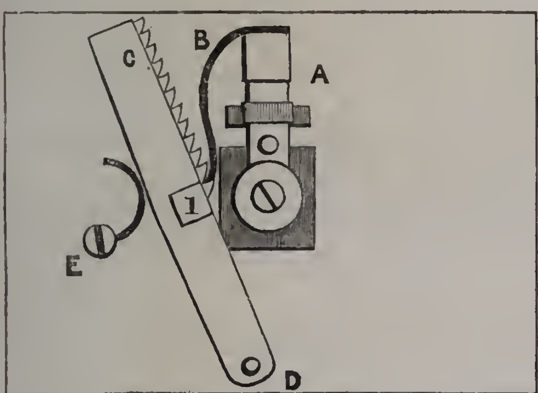
The bar which slides the inner box (C, fig. 1) should enter the outer box at the front, and have a wooden knob E to draw it out; each slide in succession, beginning with the focussing-glass, shaded dark in fig. 1, should be drawn out opposite to the openings on each side of the outer box, and when the shutter passes freely through, pushing out the slide, a notch should be made in the bar C when the bolt of wood A (fig. 5) comes down, and numbered 0 for the ground-glass, 1 to 12 for the plates.

In pushing down this bolt, after each plate has been passed into the camera, a register of the number of the plate



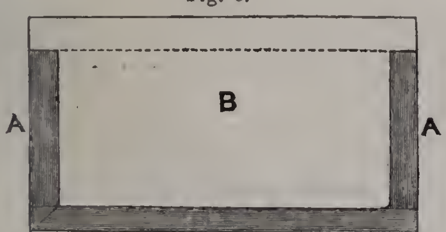

*last* exposed is made by the contrivance shown in fig. 5. To the top of the wooden bolt A is attached a piece of metal, B; a piece of wood C (hollowed out for a piece of metal to slide rather tightly, having teeth cut in it), is attached by a screw on which it can move as a pivot at D, and is kept up to B by the spring at E. It has a small square cut out to show the numbers, which are marked on the toothed piece of metal, 1 to 12, on card or paper fastened to it. It follows

Fig. 5




that when the bolt A is pulled up from the bar, the piece of metal, B, passes into the next tooth, and when the bolt is pushed down again it registers the next number; of course the bolt must never be pushed down until the next plate has passed into the camera. The plate-slide (fig. 6), for a plate $6\frac{3}{4}$ by $3\frac{1}{4}$, is made of stout card, and pieces of wood A, to confine the plates, are glued on; the side pieces

Fig. 6.




are partly cut away at an angle to allow the plate B to slide in, so as to keep it close to the back and resting on the bottom piece, beyond which a small portion of the card projects to slide into the grooves cut in the inner box. The outer edges should be slightly rounded to prevent catching the sides of the opening in passing in and out of the box, the inside edge of the openings should also be rounded. I think *tin* would perhaps answer better than card for the slides, and would be more durable.

The slides, as well as every part of the interior, both of the camera and plate-box, should be blackened with lamp-black stirred into a hot solution of gelatine, and the slides should be numbered.

Sufficient of the back of the slide in which the ground-glass is placed should be cut out to allow of focussing.

A piece of wood, shaped as in fig. 7, must be made to fit into the camera from the back (with a groove A at bottom and top) to correspond with the grooves in the plate-box, so that when the plate-slide is pushed out by the shutter, it may pass smoothly into the camera, and after exposing the plate and putting on the caps of the lenses, the slide is returned back into the plate-box by a stout piece of wire, B, which passes through a hole in the camera and in the piece of wood (7). It should *not* be drawn quite out of the camera when in use, but should be attached to the plate-box by a piece of elastic band, and when not in use is secured through loops on the top of the box.

Pieces of metal should be screwed to each side of that part of fig. 7 where the pin passes through at C C, and a portion of the wood cut away and the cavity filled with cotton wool, which answers as a stuffing. A piece of card or tin slides in at the front of the camera, and goes into two

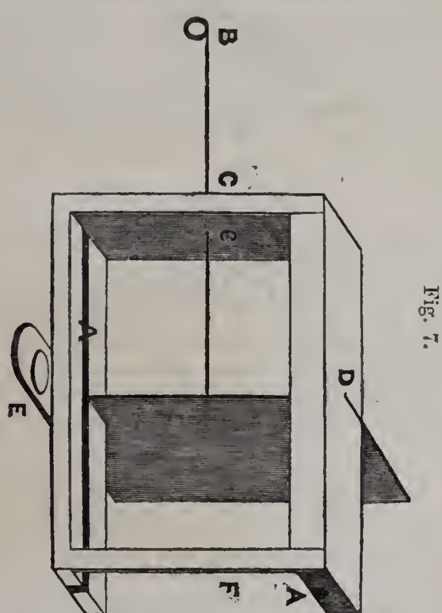



Fig. 7.

notches as at D to separate the lenses; a screw at E passes through the camera and screws into the table, and the side F is cut out for the projection in the plate-box.

The *table* is *hinged* to fold up to the side of the plate-box when the camera is removed. It has a rim of wood round it, and when the camera and plate-box are attached they should fit exactly as regards width, and in the plate-box in length also. The table is made rigid by the camera being screwed down, and by a piece of wood underneath, which moves on a screw from one side of the division, and is screwed down to the other side.

The tripod legs are attached to iron eyes fastened on the table, two of the eyes being on the piece of wood just described. The camera is a folding one, 9 inches long, 8 wide, $6\frac{1}{2}$ high, and is adapted for taking larger pictures by having another front for a view lens and double dark slides.

When in use for stereoscopic pictures a black bag is fastened on to the back with elastic, and draws close with double strings. This serves for a focussing-cloth, and in the event of any hitch of the slides within the camera, the hand can be introduced through a piece of elastic which is passed over the opening.

In packing, the camera is folded up, and the table turned up to the side of the plate-box and put into a case (the front upwards), made either of leather or of the glazed stuff used for umbrella covers, lined. The case should have a foundation of thin wood.

The camera and the front for the twin lenses pack against the top of the plate-box. The piece of wood (fig. 7), and focussing-cloth *on the front*, now *uppermost*, over all is put a square of the same glazed material as the case, large enough to cover the whole of the apparatus, *and the lenses* when in use, and two leather straps, enable the package to be carried either by a handle of wood, as a knapsack. The straps should be buckled over the covering when the apparatus is set up as they prevent its being blown away, and by taking off the tripod legs, the whole can be conveniently carried short distances.

The size of the package is about 12 inches high, 10 by 8½, and weight about 11 lbs., exclusive of the lenses which may be carried separately.—Your truly, THOMAS BARRETT.

P.S.—I should recommend the plates to be packed in numbered dozens, in the following manner:—Cut two pieces of card the size of the plates, and fasten to the ends pieces of paper folded in and out, so that a double piece about ⅛-th inch broad may separate each plate. The last plate must face the next, and may be always No. 12. A description of the view taken may be entered in a memorandum-book, as 1, 2, &c. of No. 1 dozen, &c.; and if they are put into the plate slides as they are arranged in the packet, and returned in the same order, there can be no mistake as regards the number.

*Red Hill, Reigate, April*, 1862.

## THE NEW PICTURE GALLERIES.

BY A. CLAUDET, ESQ., F.R.S.

[WE have recently been favoured with an eloquent and able letter from M. Claudet, in which he administers an effective rebuke to the writer of an impertinent article which recently appeared in the *London Review*, entitled the "New Picture Galleries," a portion of which was reprinted into our pages, and commented upon at the time. The following are some extracts] :—

If the writer of the article on "the Picture Galleries" had been content to criticize the unsuccessful attempts of inapt practitioners, he might have found ample ground for exercising his wit, and would have been perfectly justified in endeavouring to deter incapacity from meddling with photography. In doing so, he might have rendered a signal service to the art. But he has generalized his remarks, striking, not the failures, but the art itself and its principles, accusing it of all the miserable productions of those who are incapable of understanding it; and he has arrived at this strange and absurd conclusion, *that no true likeness can be taken in this way.*

Does this conclusion agree with the remarkable fact, that every one has his likeness taken by photography in preference to any other process? For, notwithstanding its supposed defects, it is the surest way to obtain likenesses perfectly true and characteristic, and in this respect more satisfactory than those which are embellished by the portrait-painter, which, according to our critic, are "*the result of study and generalization, qualities lacking in an ordinary photograph.*"

Still, there is a class of persons who instinctively hate photography as heartily as socialists hate aristocracy—those whose features are either common, ugly, or unmeaning, and those of both sexes who recollect, naturally not without regret, the time when they did not wear a wig or dye their hair. We may well imagine what their feelings are when they look at themselves in their toilet-glass; and, surely, if these fragile manufactures were a new invention, they would be likely to receive more destructive blows than praises for their catoptrical performances. It is, indeed, for this numerous class that portrait-painting is *more true than photography*, and that *photographic likenesses are nothing but caricatures.*

If so many have obvious reasons for being dissatisfied with their lot in the dispensation of the graces of nature, it is not surprising that they should generally complain of their appearance in a "*carte de visite.*"

We find that our photograph is ugly, therefore we have been disfigured by the artist, or rather by his camera. To convince ourselves that it must be so, we look at the likenesses of our friends; and as we have a great number of friends who, like ourselves, are exceedingly plain, we exclaim, in delight, "Oh! it's no use to deny it, photography can only produce *caricatures.*" Of course, if we have been ill-treated, it is the fate of every one and the fault of photography. Decidedly this art is detestable; let us turn it into ridicule!

Our task will be very easy. We have only to stop at certain shops in Regent Street, where are exhibited for sale the most heterogeneous assemblage of "*cartes de visite*" of emperors and empresses, kings and queens, princes and princesses, the Pope and his cardinals, bishops, generals, ambassadors, ministers, orators, philosophers, preachers, actors, dancers, acrobats, pugilists, and gorillas, all in a row of perfect "*égalité, fraternité.*" Are not the greater number of them miserable specimens of photography, printed in a horrid gingerbread tint, "*some out of focus, the generality badly posed, and standing or sitting in the centre of perfect chaos. Panels of walls, doors, jars of conservatory flowers, tables, and other articles of furniture, lean, roll, and tumble about the apartment, as if spirit-rapping was going on, in every position out of the perpendicular. The central figure may be in focus and straight; but even if she escape with no distortion, such as a monster hand or foot, or a cheek that seems afflicted with the mumps, all her 'entourage' is reeling about her, as if she had been taken in the saloon of the big ship during the great storm.*"

I suppose that this lively and most picturesque description is perfectly correct, and I have no doubt that the critic of the *London Review* has seen such hideous photographs, and has not exaggerated their defects for the mere pleasure of appearing witty; but what has all that to do with photography? Is it absolutely necessary or unavoidable that the camera should produce pictures *distorted and out of focus; that the persons should be badly posed, and standing or sitting in the centre of perfect chaos, and surrounded with pieces of furniture, leaning, rolling, and tumbling about the apartment, &c.?*

If these defects are the result of bad instruments, and of the ignorance and stupid management of clumsy photographers, it is perfectly ridiculous to accuse the art of being their cause. Nevertheless, such a theme has been thought a subject fit for a serious paper, and an intelligent man has not found it an ungenial task to disparage an art so beautiful and so perfect as photography, for the poor satisfaction of running down what is generally admired. At all events, it was unworthy of the *London Review* to have permitted the publication of such diatribes against the greatest feat of modern philosophy and ingenuity, and one of the most marvellous discoveries of our age.

In stopping before the shops exhibiting photographic "*cartes de visite,*" you have seen nothing but *caricatures*. Be it so. But is it owing to the ugliness of the photographs, or to the ugliness of the persons represented? It may be either, or it may be both; but whatever it is, that has nothing to do with photography.

If, after a walk along Regent Street, you had chosen to describe the strange diversity of the perambulating multitude, would you have found much to say in praise of the refined expression of countenance of every one you had met—of the beauty of form of every individual, male and female—of the distinction of their bearing, the elegance of their manners, and the taste of their dress? I rather think that you would have returned home very little charmed with your physiological study.

Among those who had passed before your eyes, judging only from their external appearance, might you not perchance have mistaken a nobleman for a farmer, a legislator for a publican, a bishop for a schoolmaster, a clergyman for a waiter, a Russian prince for a commercial traveller, a banker for a tea-dealer, an eminent writer for a toast-master? But if, instead of the reality, you had seen only the photographs of these persons, with their distinguished names written at the foot of their "*cartes de visite,*" would you not exclaim, "Oh! these cannot but be *caricatures*; it is just what might be expected from photography?"

In plain truth, photography caricatures because it represents too faithfully the individuality, and because too many individualities are nothing but caricatures of mankind. No doubt a clever painter might be able to represent the same individuals in such a manner that they would all appear gifted with the mien appropriate to their mind, rank, and station: the nobleman aristocratic in his bearing, the legislator exhibiting the mind of a Solon, the bishop venerable and dignified, the clergyman evangelical and modest, the Russian prince noble and elegant, the banker important and grand, the writer full of thought and inspiration.

Photography represents people as they are; and painting, as they ought to be, or as they would like to be. The last may be more agreeable to the persons represented; but the first is more satisfactory to those who want the truth, and do not care for the fiction of poetical treatment. In description there is nothing like good, plain, and intelligible prose. For truth there is nothing like a mirror: and is there anything more resembling a mirror than the camera of the photographer?

Ask a mother, whose son is travelling in distant lands and seas, which likeness she prefers—the "*carte de visite*," or the painted portrait of her dear boy? She may be proud of the latter in its splendid frame, and in showing it to her friends she may exclaim, "Don't he look handsome! what an agreeable and distinguished expression!" But depend upon it, when alone, that mother, with tears in her eyes, will be thinking of her son: she will look for him, not on the wall of the drawing-room, but in *that elegantly bound album containing some thirty or forty "so-called likenesses*," and, in her case, very justly so called, for among them she finds the real and truthful image of her absent son. With what rapture at the end of twelve mouths will she open a letter from the young man containing another "*carte de visite*" taken at Calcutta, Hong Kong, or New Westminster, showing him with a grown beard, in his new garb adapted to the country, looking full of health and spirits! Imagine, on the other hand, the pleasure of the son when, in return, his beloved mother has enclosed him in a letter her own "*carte de visite*," and, perhaps, that of an equally dear sister. I can guess what will be the first and irresistible impulse of his heart: in transport he will press these precious "*cartes de visite*" to his lips! And thou, cold sarcastic critic, hast no other name for photography than *caricature?* "*Mais vous n'êtes donc qu'un barbare!*"

Have you ever understood what is photography? Have you studied the beautiful and unerring principles upon which it is based? If you had, the most imperfect photographic production would be a source of admiration to you. The great Newton himself would have been in ecstasy had he had the good fortune to witness such an unexpected result of some magic property unknown to him of that light he had profoundly investigated during his life, and the principles of which he had so successfully unfolded.

We see the forms of all the works of creation by the light they reflect. The rays being refracted through a lens that nature has placed in front of that wonderful instrument called the eye, form on the delicate membrane of the retina the image of all external objects. The eye, in reality, is a camera obscura, and photography is nothing else; the only difference between the two is, that in the eye each separate ray communicates on the retina the particular colour belonging to it, while in the photographic camera only one ray, called the actinic, can act upon the photographic surface; consequently, the retinal image has all the colours of nature, and the photographic image has no colour, being only like a mezzotint engraving. In every other respect the result is the same, the forms, proportion, and perspective in the camera being as perfect as those depicted on the retina.

Now the science of optics teaches us how to construct lenses producing an image as perfect as that formed by the lens of the eye. If so, why should a photographic picture be distorted more than the natural one? Therefore, let the photographer procure a perfect lens, and, if he knows how to use it, he will produce a representation of objects in their exact forms. With such a lens, and operating upon a very highly sensitive preparation, he will be able to take a portrait in a few seconds, and, in truth, even instantaneously, catching the fleeting expression of the moment. Therefore, if he has the skill and taste to light his model artistically, to place it in a natural and becoming position, waiting only for a suitable and pleasing expression of the countenance, he will produce, not a caricature, but the most satisfactory portrait, and by careful management, I have no hesitation in asserting, a flattered likeness of every one.

Notwithstanding the remarks of our critic, the features of women can be photographed as successfully as those of men. Of course, in bad photographs, out of focus and improperly lighted, the strongly marked and hard outlines of men may, without losing all their character, bear a greater amount of defects than the delicate forms of youth and gracefulness. But the apparatus, chemical manipulation, and artistic arrangement which are capable of producing a perfect photograph of men, will do ample justice to the most refined and beautiful features which may grace the other sex. In fact, photography, which can represent the cylindrical curve of a marble column, or the roundness of an ivory ball, only by means of an almost imperceptible gradation of tint, can also by the same means delineate the softness of youth and grace with a perfection which no painter is able to approach by the most delicate touches of his brush.

We have to consider photography as any other art—in its capabilities of perfection, and not as the performance of those who do not understand it. Would it not be the height of absurdity to condemn music because all the day long we hear shrieking songs and the horrid whistling of ragamuffins, as to condemn photography because at every corner we see disgusting photographs? Music out of tune is as intolerable as photographs out of focus. But we must submit to the annoyance to which we are exposed, not only in our walks, but in the drawing-room, where, after having been treated with the sight of the elegantly bound album of "*cartes de visite*," we are invited to listen in silence to the screaming song of the young lady of the house with an accompaniment upon her piano out of tune. If so many desire to be musicians, why not as many desire to be photographers, when to be so they have only to buy any instrument?

If we wish to hear good music, we go to the opera and the concert-room; and if we want to have and to see good photographs, let us go to some respectable gallery, and not to the "dusky abode" of some miserable charlatan. Probably there are in London photographic establishments fit to receive good company, where the art is practised with skill and taste, and where correct and pleasing portraits are exhibited.

Our critic has adopted another course, if we may judge from the following description he has given of his photographic trip:—"*Which of us is so fortunate as not to be able to recall sufferings in the inferno of some eminent photographer?—to recollect how, while waiting our turn to pass into the dusky abodes beyond, we surveyed, in all the misery of protracted anticipation, the shadowy forms of those who had before passed under the operation, searching, like bereaved relatives in a Mosque, for the disfigured appearance of a friend.*"

Certainly the writer must be pitied; but has he not richly deserved his fate, if, wishing to have his portrait enshrined in his friend's album, he has selected for the operation such a strange place as the *inferno* of a photographer?

How can we explain his bad fortune? except by supposing that, having only the Sunday for leisure time, he has been obliged to choose, among the numerous suburban anti-sabbatarian "artists," *an eminent photographer* of Wapping, *to portray his features by his painful process, and while waiting for his turn in his dusky abode*, he has seen *the portraits of some fair creatures as vulgar as clowns at Bartlemy fair!—almost all having a cast in the eye, others having an unmeaning grin, or a silly smile, or a surly frown; one of the young ladies looking saucy, another melancholy, and another having that dangerous look that Petruchio himself would not dare to marry her.*

Perhaps, after all, if the critic has got a bad photograph, he has been a most fortunate man, and may be congratulated about his Sunday photographic trip. I am sure he did not leave his heart in the dusky abode of Wapping, in looking at the portraits of the fair creatures exhibited in the "saloon" of the artist. At the same time, wishing a lucky chance to all "fair creatures," we warn them, if they wish to be married, never to risk themselves in any dusky abode, or to visit the *inferno* of the eminent photographer in which our critic had to endure such dreadful sufferings.

107, *Regent Street, 25th March*, 1862.

## FESTIVAL AT M. VOIGTLANDER AND SON'S ESTABLISHMENT.

We extract the following interesting account of a festival at the establishment of M. Voigtlander and Son, from the *Deutche Reichs Zeitung* of February 26th:—

In the large hall of the "Odeon," we had occasion to witness a festival on the 22nd of February, which, as to its importance to German art and industry, may worthily be placed side by side with the celebration which Mr. Borsig, of Berlin, gave to his workmen on the occasion of the completion of the 1000th locomotive engine. In the optical institution of Messrs. Voigtlander and Son, the 10,000th photographic instrument had been completed already towards the end of the past year, and in celebration of this event, the head of the firm, M. Voigtlander, regaled his workmen with a splendid supper, followed by a grand ball, which was kept up till a very late hour, and was in all a very happy affair. The 10,000th instrument had been retained for the occasion, and stood finely decorated in the hall, surrounded by Austrian and Brunswick flags, transparencies, &c., headed by a portrait of M. Voigtlander. At supper, a large silver cup was presented to M. Voigtlander by the oldest workman, and an appropriate address made by M. Rossing, also one of the oldest men. After the ball, M. and Madame Voigtlander were serenaded at their residence.

As we spoke of the importance of this celebration, we owe, perhaps, a proof of it, which will be the more welcome as nearly everybody is greatly interested in photography. When Daguerre made his famous invention, he was confined to take lifeless objects, for, as is universally known, at that time only lenses with weak power of light were used; but when Voigtlander came out with his double lenses, made according to the calculations of Professor Petzval, it was possible to take portraits. The grand achievement was then universally applauded, and the inventor rewarded by a medal, struck expressly for this purpose in Paris. It is natural that owing to the great success of Voigtlander, many manufactories of such lenses were opened in all countries; but up to the present day the lenses of Voigtlander have preserved their old fame, the least proof of which is the 10,000th lens, and the fact that they are found in all the first establishments in the world. The manufactory of Messrs. Voigtlander and Son has recently been vastly enlarged, and yet it is impossible to satisfy the daily increasing demands; and they count on making 2000 lenses this year, whilst the 10,000 have been produced in twenty years, an average of 500 a year. Besides these lenses, the institution produces also a very large number of opera glasses, which they also made first with achromatic lenses. These are principally bought in England, where they are universally known by the name "Voigtlander," and at races will be found in the possession of every gentleman. It would occupy too much space to enumerate all the different branches of the establishment, and we will only mention, that even twenty-five years ago, M. Voigtlander produced telescopes, which, according to the judgment of Gauss, Schumacher, and others, were found equal, and even in some respects superior, to the renowned Frauenhofer telescopes. The present proprietor of the establishment, which was founded one hundred years ago by his grandfather, was always on the alert to extend the business as much as possible, and succeeded in doing this principally by his connections with other countries. Thus we meet here with the rare combinations of artistic efforts and commercial enterprise. We conclude this report, which we felt ourselves bound to make, with a hearty wish that we may soon be able to congratulate M. Voigtlander on the completion of the next 10,000 lenses.

## CARD PROCESS FOR ALBUMENIZED PAPER.

BY A. SINCLAIR.

*Silvering Solution.*

| | |
|---|---|
| Nitrate of silver ... ... ... | 800 grains |
| Water .. ... ... ... | 10 ounces. |

Dissolve the silver in the water, then take two ounces of the solution, add aqua ammonia fortis (not concentrated) until the precipitate is just redissolved; then add nitric acid, until it is just *neutral;* mix this with the rest of the solution, the six ounces plain silver, and filter: float the paper three to four minutes.

The paper should be white and fine. I have, with thin negative paper, succeeded well with a sixty grain solution, but for ordinary paper I think eighty grains more reliable.

Print deep. Wash clean from free silver, first in clean water, and then in a solution of one ounce of salt to one quart of water; rinse in clean water and tone.

*Toning Solution.*

| | |
|---|---|
| Chloride of gold ... ... ... | 15 grains |
| Carbonate of soda... ... ... | 150 ,, |
| Water ... ... ... ... | 15 ounces. |

Dissolve the gold in one half of the water, and the soda in the other, and keep in separate bottles in the developing room.

To use it, take one ounce of the gold solution, and add it to four ounces of water and one of the soda solution, then add the other four ounces of water, and mix all together, making ten ounces of toning bath. Use tepid, and tone a little deeper than the colour required, as it will come back a little in the fixing bath. A little practice is necessary to obtain the correct tint, which may be varied from a rich chocolate brown to a deep blue black.

Rinse in clean water, and fix in—

| | |
|---|---|
| Hyposulphite of soda ... ... | 1 ounce |
| Water ... ... ... ... | 6 ounces. |

A strong solution of soda destroys the tone entirely.

Great care must be taken to keep the fingers perfectly free from soda, as the least grain of it getting into the toning solution would entirely spoil it. If the toning solution grows weak while using, add more gold and soda. This bath can only be used once, but the fixing solution may be used as long as it remains clear, and works in twenty to thirty minutes.

This is the cheapest toning process I know of, as two grains of gold make ten ounces of the toning solution, sufficient to tone five or six dozen cards.

*Rochester, January 18th,* 1861.

[We should think it advisable in the above silvering solution to add alcohol (some find ether good), to secure a more perfect coagulation of the albumen; a preliminary heating of the paper would probably effect the same purpose. Mr. Sinclair and his pupils, however, have had excellent success.]—Ed. *American Journal of Photography.*

## TO HOLD THE MIRROR UP TO NATURE.

Mr. Edward L. Porter communicates to the editors of *The Scientific American* of March 22nd, the following:—

"Suggestion to Photographers.—A radical defect in nearly all likenesses taken by the new method now in use, arises from the fact that the sitter being in a novel situation, unconsciously assumes a constrained and unnatural expression of countenance, and having no means of correcting this, it is of course repeated in the picture. Hence, so few sitters are entirely satisfied with their photographs. The improvement we suggest, is designed to obviate this defect, by attaching to the camera an ordinary plane mirror, so adjusted that the sitter, instead of staring into blank space with a feeling of what a ridiculous part he is playing, shall look at his own reflection in this glass during the entire operation. He will thus be enabled at once to assume and retain his ordinary expression of countenance, or take any other that best pleases himself. The picture will be an exact reproduction of the image in the mirror, and cannot fail of being perfect in every respect."

Our correspondent, Mr. E. K. Hough, informs us that he used a mirror in the manner above proposed, in North Carolina, about two years since. The practical effect was that the sitter put forth extraordinary exertions to look handsome and wise; the picture was the exact reproduction of the image in the mirror, and did not fail of being an exceedingly comical caricature. Mr. Hough's experience will be fully endorsed by almost every practical photographer. The great and very difficult art of the operator at the camera, is to distract the mind of the sitter from thoughts of "how do I look?" and "I must have a smiling countenance," &c.

Most of the awkwardness and unnaturalness of photographic portraits, come from these silly attempts of people to assist or improve nature: the human face never assumes a more ridiculous expression than when the mind is filled with vanity and affectation of beauty and smartness. Very few photographic portraits, indeed, are wholly free from this kind of blemish. Fortunately, the evil is diminishing, for people are getting used to sitting for their pictures, or more careless, or know better how to avoid awkwardness of expression.—ED *American Journal.*

## AMMONIA-NITRATE FOR ALBUMENISED PAPER.

PHOTOGRAPHERS generally seem to be persuaded that there are peculiar virtues in the ammonia-nitrate of silver, for photographic printing. The use of ammonia-nitrate for plain paper has become universal, and now when the albumenised is rapidly superseding the plain paper, all are anxious that means may be devised for reinstating our favourite sensitizing solution. Most of the methods to accomplish this end, which have come partially into practice, are the more or less objectionable and chiefly on the ground that the-so called ammonia-nitrate solutions contain little or no ammonia-nitrate at all. The two following processes, however, employ the genuine and unadulterated article.

*First process.*—Soak the salted albumenised paper in ninety-five per cent. alcohol, in order to coagulate the albumen, and then, after thoroughly drying the paper, silver with ammonia-nitrate by any of the known methods. I have tested the process in only a few experiments, and in these the ammonia-nitrate was ninety grains to the ounce, and the solution was poured on, and spread with a glass rod.

*Second process.*—Silver the paper in the usual way with plain silver. When the paper is dry, or nearly so, expose it to the fumes of concentrated ammonia. In the experiments the ammonia was poured on some cotton placed at the bottom of a half-gallon wide-mouthed bottle. Above the cotton the silvered paper was hung, the bottle worked up, and all left so for about five minutes. After removal from the bottle the paper was exposed to a current of air till the odor of ammonia was removed.

*Remarks.*—Comparative tests by the ordinary process were made by printing at the same time and from different parts of the same negative on pieces of paper prepared with plain silver. Thus, a peice of paper silvered with plain paper, was cut in two, and one half exposed to the ammonia fumes, and both were then printed and toned in the same manner. These tests showed plainly, that the ammonia-nitrate paper was more sensitive, and was toned with greater facility.

Probably, when ammonia-nitrate is used, the quantity of salting and of silver may be materially reduced. I believe that one or two grains of salt for the ounce of albumen, and a forty-grain strength of silver will be found to answer. The paper I used was salted with ten to twenty grains, and thus acquired a strong silver solution.

The alcohol to be used in the first process should itself be salted, if the salting of the albumen is weak.

The above processes are founded on suggestions first published in this Journal. The use of alcohol was first recommended by the editor, and the ammonia fumes by Mr. Campbell of Jersey City. Mr. Campbell's article was published in July, 1858, and had in view only the plain paper. For ammoniating the paper a whole size daguerreotype coating box was recommended.

In using the second process great care must be taken that the ammonia fumes do not reach the collodion room.—*American Journal of Photography*

# Proceedings of Societies.

## AMERICAN PHOTOGRAPHIC SOCIETY.

THE regular meeting of the American Photographic Society was held at the New York University, April 14th, 1862. Vice-president RUTHERFORD in the chair.

After some minor business, and the election of six new members, the subject of hot-water development was called up by the Chairman.

Col. PIKE found it worked well with all dry plates. He seldom used more than 80° of heat, however. He found that very hot water blurred the lines of the negative.Four seconds was the longest exposure he gave his plates. He had used a sherry-coloured solution of caramel in place of tannin, and taken quite good instantaneous pictures by using a drop in the exposure. He avoided the use of a new collodion, as it had a hard surface, and was not so easily impressed in the camera as a film that is powdery when examined under a microscope. He considered collodion as unfit for use if less than 6 months old. He used a sample of waste collodion from a gallery where it had stood a year.

The CHAIRMAN thought a neutral bath was not the best for tannin plates and hot water development. His had occasioned many failures.

Mr. THOMPSON kept a very acid bath for tannin plates expressly, and found no trouble with it.

Mr. HULL, by request, gave his formula for collodion :—

| | | |
|---|---|---|
| Collodion. | Alcohol ... .. ... | 4 oz. 95°. |
| | Ether ... ... ... | 4 oz. |

Dissolve it in 56 grs. gun cotton.

| | | |
|---|---|---|
| Iodizer. | Iodide Potass. ... ... | 36 grs. |
| | Bromide Potass. ... ... | 12 grs. |
| | Iodide Cadmium ... ... | 12 grs. |
| | Water, enough to just dissolve. | |

Add this solution to 4 oz. *absolute* alcohol.

Mix above together, making in all 12 oz. of finished collodion, and add *tincture of iodine* till it is sherry-coloured. Instantaneous pictures of waves, vessels in motion, &c. &c., had been taken on tannin plates with the above collodion. He never poured his tannin solution over his washed plates, but always used a dip bath, using the same tannin over and over again. He did not recollect when the solution was made up.

Mr. THOMPSON used six vertical baths; the first containing the silver bath; the second, third, fourth, and fifth, water; and the sixth, tannin solution. He placed his plates in each successive bath, and found they were sufficiently washed before they reached the tannin bath. He usually prepared one dozen stereos per hour in this apparatus, and then changed the water, saving of course the silver by precipitating.

Mr. HULL found that his savings in this way by computation paid for his pyrogallic acid.

Dr. LEEDS showed some prints on gallate of iron, and explained his process:—Immerse the paper eight minutes in bichromate of potass, saturated solution, and dry. Expose two and a-half minutes under the negative to bright sun-light. Wash in the dark room for half an hour. Immerse in solution of sulphate of iron, 1 oz. to 24 of water. Wash thoroughly, and immerse in saturated solution of gallic acid. Wash and dry.

Mr. CAMPBELL said the addition of gelatine to the bichromate of potass. would preserve the whites, and add brilliancy to the prints.

Professor SEELY showed some samples of buff-coloured cotton from Central America, supposed to be a species of Nankeen cotton. He would make pyroxyline of some of it, and report. He also spoke of surgical photography. A patient without any nose was photographed to-day, and then a piece of flesh taken from his arm, and put into shape as a nose; when healed, another picture will be taken, and the two exhibited to this Society.

Mr. RUTHERFORD called attention to the fact that Emerson's Stereoscope, as manufactured by E. Anthony, entirely corrected all distortion in viewing geometrical figures, by closing or separating the lenses. He showed the effect on a picture of the moon, which could be made to seem concave, flat, or correctly round.

Mr. JOHNSON exhibited some very beautiful experiments with various gas-burners, so arrayed as to have circular or other motions by the force of gas. By means of four revolving burners, throwing illuminated figures on a ground-glass screen the figures all had motion, and the effect was very beautiful.

On motion, adjourned.

F. F. Thompson, Secretary.

## Correspondence.

### NEUTRALIZING THE SILVER BATH WITH CARBONATE OF SODA.

Dear Sir,—Allow me to make a few observations on Mr. Blanchard's statement respecting the negative bath.

When carbonate of soda is added to a bath containing acid, it does not make it alkaline, on the contrary, the bath remains *acid*, carbonic acid being substituted for the acetic or nitric, as the case may be: The carbonic acid gas only being thoroughly expelled at a boiling heat, this done, the bath is then *neutral*. I have always prepared my bath by adding carbonate of soda to it after iodizing—when simply filtered, it is then in first rate condition for negatives; but for a positive bath a *trace* of acetic, or preferably nitric acid should be added. With the bath so prepared for negatives the addition of the $\frac{1}{10}$ part of a drop of ammonia will cause a reduction all over the plate thus showing that the solution was either faintly acid or neutral, as so small a quantity of alkali is sufficient to make it alkaline and useless, whilst in that state, I am convinced that it is impossible to obtain a negative by iron development in an *alkaline* bath, test paper may fail to show acid, but there must be a *trace* of acid, however weak, to obtain brilliancy in the shadows; a chemically *neutral* bath showing a slight trace of fog. I make these observations with all deference to Mr. Blanchard's opinion but they are the result of numerous experiments.

I can quite confirm the statement of Mr. England as to the value of a large proportion of bromide in collodion. About 3 years ago I was engaged somewhat extensively in the manufacture of collodion. Many of the persons who tried it were astonished at the quickness, cleanliness, and keeping qualities it possessed. The iodizer was compounded as follows:—

| | |
|---|---|
| Alcohol ... ... ... ... | 500 parts |
| Iod. ammon. ... ... ... | 25 „ |
| Brom. cadmium ... ... ... | 25 „ |

Add 60 parts to 500 of the plain collodion. I am, respectfully yours, H. C. Jennings, Jun.

### TO ASCERTAIN THE EQUIVALENT FOCUS OF A LENS.

Sir,—As you lately published an article on finding the focal length of a compound lens, will you permit me to describe another method, which is better adapted to ordinary cameras, and lessens the amount of error in computation.

Mark off two inches on the ground glass of the camera by a pencil line; cut a strip of printed paper exactly to the length of 15¾ inches; cause the picture of the strip of paper to fall on the focussing glass. If the picture is longer than the space marked off, move the paper away from the camera; if smaller, bring it nearer, until the length of a sharp picture of the piece of paper is exactly two inches. Measure the distance between the paper and the ground glass of the camera: the tenth part of that distance is the focal length of the combination. I am, yours, &c., X. P. R.

### AN EFFICIENT DRY PROCESS.

Sir,—If you think the following formulæ, for a good dry process, quick, simple, certain, and very satisfactory, worth a place in your journal, it is much at your service.

Wash the sensitized collodion film well in good common, spring, or pump water (hard), if from the chalk it may be *too* hard perhaps, without previous boiling, but from lime stone and most other sources I prefer it to rain or soft water, on account of its alkaline reaction on the sensitized film, or otherwise soda must be used to produce this effect. Give a *last* washing by pouring fresh water over the plate from a jug; the *first* washings from the sensitizing bath may be all in the same water in a hand basin. Drain for a minute from one corner, and pour on a drachm or two of the warmed gelatine solution, two or three times off and on, and drain from the same corner, on a piece of blotting paper, to dry for use.

The gelatine solution is made as follows:—

| | |
|---|---|
| Gelatine ... ... ... ... | 20 grains |
| Gallic Acid ... ... ... | 20 „ |
| Water ... ... ... ... | 4 ounces |

Dissolve in a hot-water bath, and strain for use. A piece of camphor in this will keep it good, and it is better than spirits of wine, which is apt to leave some irregular markings in the skies, &c.

Exposure in the camera from half-a-minute to four or five minutes (*extremes*) according to light and subject.

To develop, pour over the film hot water enough to moisten it completely, particularly at the edges. Then pour on the developing solution of plain pyrogallic acid, without any acid, two or three times off and on, when a red picture shows itself very quickly. Now add a few drops of an acid nitrate of silver solution to the pyro, to bring out the picture thoroughly and completely.

The pyrogallic solution is made with 20 grains of pyrogallic acid, dissolved in 1 ounce of spirits of wine, three or four drops of this are added to each drachm of water necessary, according to the size of the plate. The nitrate of silver solution consists of 30 grains of nitrate of silver, dissolved in 1 ounce of Beaufoy's acetic acid. Fix with cyanide of potash and wash, &c.

These pictures are very clean all over with good skies, and dense enough for all good printing effects. With all the conveniences and advantages of a dry, over a wet collodion process, this is only deficient in two of the essentials of the latter, in not being instantaneous, and in not giving a visible certainty on the spot, of a good negative being made; gelatinized films never move under the developing, fixing, and washing of them. If the picture is thought to be not dense enough after fixing, &c., it may be made quite sufficiently so by a little more pyro and silver. I can say nothing yet of the keeping qualities of these prepared plates, beyond a few weeks this spring, when they were not deteriorated in that time.—Believe me to be very truly yours,

*East Lothian, Scotland, April 21st*, 1862. E. T.

### RAPID DRY PROCESSES.

Sir,—It is curious to notice the opinions formed from experiments in photography; two persons in search of particular results may arrive at opposite conclusions. Mr. Sutton seeking a rapid dry process, lays down as a *sine qua non* of extra sensitiveness in dry plates, that there must be free nitrate of silver retained in the film, and there being none in my process, (not having seen the *Notes*, I do not know if it is the alkaline gelatine, or the morphine process, or both, to which he alludes), "he cannot encourage any hope of good results" from them, now my experience with them leads me to marvellously opposite opinions, and I have received testimony of their efficiency from correspondents. A sentence such as the above, from Mr. Sutton's pen, is received as coming from a standard photographer, and carries weight with it, nevertheless, the fact is undisturbed, viz., that the sensitiveness in both formulæ is so great, after the removal of all free nitrate, that the plates will bear instantaneous exposure, and I have negatives of landscapes taken by them with the usual wet process exposure, prints from which will be shown at the Sydenham exhibition taken on wet unwashed collodion, on wet washed collodion, and on washed and dried collodion (morphine process), more convincing than all the argument possible, and as there are no special precautions in their preparation, nor complex solutions required, it is in the power of all to succeed with them as easily as myself. If Mr. Sutton has tried the formulæ, I cannot imagine how such an expert chemist and photographer failed; if he has not done so, and states his opinion from theory, I hope he will do me the justice of testing them. I am sir. yours respectfully, WILLIAM BARTHOLOMEW.

[The most sensitive dry plates known commercially, are those of Dr. Hill Norris, described as extra sensitive, and these he states to have no free nitrate. ED.]

## INTENSIFYING DRY PLATES.

SIR,—Can you or any of your readers supply me with a good formula for intensifying dry plates? I find that the several strengthening solutions recommended for plates by the wet process, will not all answer for the dry, and that the attempt to gain intensity by their use has lost me several negatives, which were good in all other respects. I find also that negatives obtained from Fothergill and malt plates require different intensifying agents to those prepared by other processes. At first I employed Mr. Blanchard's method, by pouring over the wetted film a solution of 4 grains iodide potassium, and 2 grains iodine, to the ounce of water, and when the image was converted into yellow iodide, poured off, washed, and treated with citro-pyrogallic and silver. This last operation was wholly ineffective, as the colour of the film remained unchanged. Several plates were treated in this way, and to test one of them, a saturated solution of hypo was poured on after redevelopment, when the film was immediately dissolved. In no one case have I found this method successful with dry plates.

Having been compelled to abandon Mr. Blanchard's formula, I adopted the one given by you at vol. iv. p. 13, and dissolved 20 grains of bi-chloride of mercury in an ounce of water, to which I added iodide of potassium until the red precipitate became dissolved. Half of this and half of water acted admirably upon plates prepared like Fothergill's, with the exception that the albumen coating was *not* washed off; and after treatment with citro-pyrogallic and silver, satisfied me in every respect. But with ordinary Fothergill plates, as with those by the malt process, I found myself no better off than with Mr. Blanchard's solution. The film became converted into yellow iodide, and resisted all subsequent attacks from the redeveloper. In one case, indeed, there was slight blackening, and in one stereo plate, part intensified while the rest would not. When the image came out as a positive—as several of the plates did—I was in every instance obliged to abandon the attempt to intensify as hopeless.

This morning, as a last resource, I prepared the solution so strongly recommended by Mr. Brothers, of Manchester, PHOTOGRAPHIC NEWS, vol. v. p. 167, by dissolving 30 grains of mercury and 30 grains of chloride of ammonium in 10 drachms of water, and a second solution of 1 drachm of liquor ammonia to 10 of water. On treating a plate with the former of these, the film did not assume "a rich cream colour," but blackened very unequally, without further change. At the end of one minute the solution was poured off, the film washed, and the ammonia solution applied, when the image at once vanished, leaving me to the unpleasant conviction that I had been completely "sold."

I should state that all the plates referred to were exposed, developed, and fixed last autumn, and that never having before obtained a negative from a dry plate that required intensifying, I have had no experience in the matter until within the last fortnight. The strengthening solutions I have mentioned may succeed well enough with their iron negatives by the wet process, but they seem to me to be unsuited to dry plates. I shall be glad to find that some more reliable means can be suggested than those which have proved so unsatisfactory in my hands, and that if I have committed any error in the manipulation, you will kindly point it out.—Yours very respectfully, AMATEUR.

[The fact that want of density or vigour is not a common characteristic of dry plates, has rendered unnecessary much attention to the best modes of intensifying them, and the conditions are consequently not well understood. It is quite certain that those processes of intensifying which are successful with wet plates, are by no means necessarily so with dry plates, the presence of organic matter in the latter materially modifying the result. The best mode of dealing with dry plates, which show tendency to thinness, is to continue the intensifying with pyro and silver whilst the plate is still wet after fixing. Any plate, by either wet or dry process, is difficult to intensify a few months after development, irregular patches almost invariably occurring. If bichloride of mercury be used, it should be much weaker, and remain on the plate a shorter time than for wet plates, or the image will be actually weakened. If the solution of iodine, to be followed by pyro and silver be used, the result will be better if it be removed, and the plate well washed before the image has been coverted into the yellow iodide of silver; on first applying the solution, the film assumes a dark greyish colour: wash the plate at this stage, and then use pyro and silver. It should be borne in mind that the application of hypo or cyanide to the plate at any stage after it has been treated with iodine is dangerous, as much of the image which consisted of reduced silver, having been again converted into iodide of silver, is easily soluble. Possibly sulphide of potassium would be found useful in intensifying dry plates: it is much in use amongst American operators for wet plates, and it appears likely that it might be more applicable to dry plates than many intensifying agents. Perhaps, if any of our readers have had occasion to experiment in obtaining additional vigour in dry plates, they will give us the benefit of their experience.—ED.]

## Photographic Notes and Queries.

### REMOVING VARNISH FROM PLATES; MEALINESS, &c.

SIR,—In the last number of the PHOTOGRAPHIC NEWS, a correspondent wishes to know a method whereby he can clean glasses that have been varnished. I have always found that benzine will take the black varnish, and that for white spirit varnish, nothing is so good as pure wood spirit (naphtha).

Some time since, having some varnished glasses, I tried many things to clean them; amongst others, soaking them in strong alcohol, with no effect, until I tried the naphtha, and that answers admirably. I merely apply the spirit the same as though I was coating with collodion, and let it rest on the plate about half a minute, and then return it to the bottle, afterwards rubbing the plate with cotton wool; when the collodion is all off, I wash in two or three waters.

A great deal has been said and written about mealiness in toning. My strong impression is, that we must look to the albumenizing for the trouble; for let anyone now troubled with it prepare a sample of paper with albumen, simply using albumen, water, and chloride of ammonium, and sensitize upon a 60-grain silver bath, without the addition of acid or any other substance, and I am sure they would no longer meet with the difficulty; for I always prepared my own paper. until the rage for cartes de visite compelled me to buy it, owing to not having the time to prepare my own, when I got mealiness in its worst form. I tried many samples, sometimes without and sometimes with it, always using the same silver bath (60 grains), and the same toning (carbonate of soda 5 grains, chloride of gold 1 grain, water 6 ounces). If I got a paper free from it, I could not get the tone I desired.

I now use Marion's Highly Albumenized, and am very well satisfied with it, although I would rather have my own preparation; and even all of Marion's is not good, for I have had some very bad.

A sample of paper I obtained from one house smelt very strongly of acetic acid; this I could do nothing with; the pictures were smothered with mealiness.—I am, sir, very respectfully yours, K.

*April 24th*, 1862.

## Talk in the Studio.

Photograph of the Eye.—At the meeting of the American Photographic Society in February, Dr. Henry D. Noyos exhibited a negative showing the optic nerve and interior of a rabbit's eye. The impression was obtained by a newly invented instrument devised by himself and Mr. Grunow, a practical optician. Such a photograph had never been obtained before in America, although it is said to have been done in France. The interior of the eye, namely the retina and optic nerve, has been disclosed to observation in the living person, by an instrument invented in Germany, called the opthalmoscope. This has been in use for ten years, but it is only now that the interior of the eye has been photographed. Dr. Noyes explained the working and principles of the new opthalmoscope, by the aid of diagrams and the presentation of the instrument itself. Through it diseases of the eye can be studied with greater facility, and scientific records of them kept. The instrument displayed, in its elegant and finished workmanship, the highest mechanical skill. The discourse of the doctor was listened to with close attention, and the audience expressed their approbation by applause.

Mayall *v.* Higby.—This case was again heard at the Court of Exchequer on April 24, before the Lord Chief Baron, and Barons Martin and Wilde, sitting in Banco. Mr. M. Smith said the action was brought by Mr. Mayall, the photographic artist in Regent-street, against the defendant, who also pursued a similar calling. Mr. Mayall entrusted to Mr. Tallis, the publisher of the *Illustrated News of the World*, a considerable number of photographic portraits of eminent men, with a view to engravings from them, issued in connection with that journal. Mr. Tallis became a bankrupt in April last year, and these photographs were sold by the authority of his assignees at 5s. each to the defendant, who took copies of them in a reduced size, and sold them to the public. Mr. Mayall then brought his action. The first count of the declaration stated that the defendant wrongfully and unlawfully kept possession of the plaintiff's goods while they continued to be the property of the plaintiff, and raised the question whether there was any copyright in photographs; the second count was for the detention of the goods. Upon the first, the jury found a verdict with 1s. damages for the plaintiff; and on the second also a verdict for the plaintiff, with £20 damages. By leave of the learned judge, the learned counsel now moved to enter a verdict for the defendant on the first count. Rule nisi granted.

Colour of Water.—A long memoir has been lately published by Wittstein, on the colour of water. He establishes—1. That pure water is not colourless, but blue. 2. That the mineral matters which a water may contain, do not affect the colour. 3. That the variety of colour in water depends more on the organic matter in solution. 4. The organic matter is held in solution by an alkali. 5. The amount of organic matter in solution depends solely on the amount of alkali. 6. The smaller the amount of organic matter, the less is the colour removed from blue: as the organic matter increases, the colour goes from blue to green, and eventually to brown. 7. Periodical changes in the colour of the same water do not depend on changes in the organic constituents, but on rest and atmospheric appearances. 8. It may be universally accepted as a rule, that the browner a water is, the softer it is; and the nearer the colour approaches blue, the harder it is. The difference does not depend so much on the amount of organic ingredient as on the amount of alkali. There is nothing very new in this. Experienced water testers have for some time judged or guessed the amount of organic matter from the colour of the water.

## To Correspondents.

J. Garnett.—The proper colour for "touching" prints must entirely depend upon the tone of the picture. A mixture will generally be required; the following colours in different proportions, or some of them, will generally answer: warm sepia, madder brown, English ink, or Indian ink, neutral tint, and sometimes a little burnt carmine. If the print be on albumenized paper, a little gum should be added to the colour to prevent the touched parts showing dull on the albumenized surface. For touching out spots in negatives we know of nothing which answers the purpose so well as cadmium yellow.

A. Gun.—You will generally obtain intensity sufficient in copying engravings by using an old red sample of collodion. Or by the use of a more sensitive collodion, and a nitrate bath containing acetate of silver. A bromo-iodized collodion is not necessary for this purpose. If you obtain some of the collodion of the maker you name, "with usual iodizer," and add to that you are using, you will probably obtain intensity enough without difficulty.

X. Y. Z.—Your questions are put somewhat indefinitely. You ask what is the use of tincture of iodine in albumen, and of a chloride in albumen, without saying anything about the purpose to which the albumen is applied, whether for the dry albumen process, preparing paper, or for the collodio-albumen process. We presume you mean for the latter. We do not recommend either of these additions to the albumen, but they have been recommended by some operators for especial objects. The addition of tincture of iodine had been suggested to prevent any tendency to fogging, and would be equivalent to adding a trace of acid, nitric acid being liberated on the contact of iodine with nitrate of silver. The addition of a chloride is supposed by some to aid the double purpose of producing cleanness and sensitiveness. The formula which in our hands is most successful, is that of Mr. Mudd. Exemption from blisters depends on the use of a suitable collodion in the first instance, and in drying the semi-prepared plate thoroughly before the final sensitizing.

J. B.—The negative arrived smashed to pieces, so that we can form very little idea of it. From examination of some of the fragments it appears much under-exposed.

W. A. Y.—We should imagine from your specimens, some of which have very good qualities, that you would have very little difficulty in obtaining a situation in London. 2. The salaries of operators in London vary, and depend entirely upon the standing of the establishment, and the ability of the operator. We should say the amounts vary from 30s. to two or three times that sum, and upwards. 3. There are no facilities for exhibiting the specimens of advertizers at our office. 4 Demand and supply are about equal as regards photographic assistants; perhaps at the present moment the demand for first-rate men exceeds the supply.

A Tyro.—The paper to which you refer is a highly albumenized *Rive* paper, and will not tone so easily as some samples; but there can be no reason why it should refuse to tone at all if all your operations are properly performed. It sometimes happens than rain water which has stood some time is unsuitable for making a toning bath. Try the use of distilled water, that will probably remove your difficulty. A toning bath is generally best a day or two after it is mixed.

J. M.—Your friend is right in characterizing your picture as under-exposed and over developed; the use of more sensitive and less intense collodion would have answered the same purpose. The collodion you are using appears somewhat too intense, and is probably the cause of the defect you describe in your glass positives. Less light over head, more side light, and longer exposure, will improve your results. The difference in the exposure necessary between single and double combinations, will entirely depend on the respective foci and apertures. We cannot advise you as to the best mode of adding to the height of your room. A stop of about an inch and a quarter will enable you to get sufficient definition in a standing figure with the lens you name.

J. F.—If you wish to separate your two lenses which are now connected and focussed by means of one pinion, the simplest plan will be to cut the rod, and be content afterwards to focus them separately. Any method of coupling them by a loose piece would be likely to get out of order and work imperfectly. 2. We are uncertain as to the conduct of the Custom House officers on the Continent in reference to prepared dry plates. The safest plan would be to have a box with an inner covering of orange glass, which would permit the plates to be seen without exposing them to light. 3. A landscape camera intended for use with one lens, or lenses of the same focus, may be rigid, if the lens have means of adjustment. The advantage of sliding or bellows bodies is that they permit of the use of lenses of different focal lengths. 4. Crown or sheet glass may be used with propriety for small sized negatives, but it is a wise precaution to try each plate first by screwing it down in the pressure frame, so as to make sure of not subsequently destroying a good negative by breakage in printing.

T. G.—The toning process used by the late Mr. Lacy was not one of mixed hypo and gold, but one of the alkaline gold formulæ. We shall be glad at any time to hear from you.

Nitrate.—So far as we can judge by the sample sent, the decomposition in your ammonio-nitrate bath has simply arisen from contact with organic matter, as you have probably floated your albumenized paper on it. If there be any trace of free ammonia, decomposition would be apt to ensue.

J. T.—We are at all times anxious to assist our readers, but the general question of the best mode of building a glass house is too indefinite to enable us to give any information or advice of value, as everthing must depend upon the requirements and means of each individual. If you have space and means, you will find the following dimensions give good results: 30 ft. long, 12 ft. wide, 15 ft. high at the loftiest part, and 8 or 10 ft. at the lowest part. 7 or 8 ft. dark overhead, and the rest of the roof glass; as much side light as you can get, and no front light. Let the sitter face north, and take especial care to have the roof watertight.

H. Schaw.—We are obliged by the paper, which shall have our early attention.

Private Letters.—We receive from time to time letters to which answers by post are requested. Our time is generally so closely occupied with pressing duties that we have not time for more private correspondence than absolutely belongs to such duties. Where we can, however, we do occasionally write; but can only do so at convenient times. We have at the present moment an accumulation of such letters, waiting for a leisure day or two in which they may receive attention. Correspondents who shape their questions so that they can be answered in the News will generally receive the earliest information, as a specific time is devoted every week to answering such communications. We hope those of our readers who can, will take the hint.

Several correspondents in our next.

Erratum.—We are requested to state that in our report of the last meeting of the North London Photographic Society, a slight injustice is done to Mr. Ross, who, in answer to a question from the Chairman, is made to say that he did not know much about the microscope. As the firm of which Mr. Ross is the principal enjoys a well-earned celebrity for the manufacture of microscopes, as well as all optical instruments, this remark will not mislead many of our readers. It may be desirable to state, however, that his remark was rather intended to apply to the practical details of microscopic photography than to the microscope itself.

# THE PHOTOGRAPHIC NEWS.

Vol. VI, No. 192.—*May* 9, 1862.

## HOT DEVELOPMENT FOR DRY PLATES.

A singular discrepancy appears to exist in the experience of different photographers as to the value of hot developers, especially in their application to tannin plates. For years past, heat has been used by Mr. Mudd and some others with collodio-albumen plates; but in the hands of the majority of photographers using other processes, it has not been universally, or even, we believe, generally successful. In our hands, with collodio-albumen plates, it has been completely satisfactory, as it has in all cases of which we have any definite information; but have no reason to believe that it has been largely adopted.

The announcement of its amazing effect on tannin plates in America has given a fresh impetus to experiments in that direction, and the results, as we have stated, present considerable discrepancy. Mr. Sutton recently tried hot development with tannin plates, and states that the films split up, entirely spoiling the negative. Mr. England, some weeks ago, stated a similar result as attending his efforts with hot development. More recently he informs us that, getting over that difficulty, heat in his hands always produces fog. Amongst the American operators there are some who state at their meetings that they have utterly failed in obtaining the results described, whilst the majority, however, have been entirely successful. There can be no doubt that for these discrepant results there is a cause, and the conditions have varied in some way at present unexplained. We have been during the last few weeks experimenting at intervals with hot development, and have arrived at some conclusions which may be of service to our readers in their own operations.

We may remark at the outset, that we have been somewhat disappointed in the results. We have found unquestionably that the time of exposure may be considerably reduced when hot developers are used, but there are other difficulties which go far to nullify the advantages. The splitting of the film we have found no difficulty in obviating by the use of suitable collodion; but we have found in all cases that where great heat is used, and free nitrate of silver is present, that there is considerable tendency to fog or surface reduction, and that in the conditions in which we have worked, this difficulty was sufficient to nullify the value, in other respects, of heat. This is a difficulty which we have no doubt can be met, but a little care and further experiment will be necessary to settle the precise conditions.

The first plates on which we operated in our recent experiments were prepared with caramel, and forwarded to us by a correspondent some months ago. We obtained with them fully detailed pictures with a very short exposure; but in all cases there was a certain amount of red fog, which appeared chiefly at the edge where the plate had drained. We concluded that some traces of free silver had been left at this edge, and that as the plates had been kept about five months, decomposition had set in. We have since been led to the conclusion that this result was considerably aided, if not entirely caused, by the effect of heat.

We have since then tried hot development on simply washed plates; plates treated with gallic acid; plates treated with gallic acid and honey; and plates treated with tannin and honey. In each of these cases heat has proved a decided accelerator, but it has also, unfortunately, produced more or less of fogging, or general surface reduction. The fog thus produced may easily be removed, it is true, by means of a camel-hair pencil, as it lies loosely on the surface of the picture; but this is a makeshift which ought not to be needed. We have a full conviction, however, that this is to be avoided entirely without losing the advantages of hot development, a conviction which we hope to verify shortly by further experiments.

We may just briefly hint here, what appears to us to be the source of the discrepancy between the successful and unsuccessful experiments in this direction. In the various incidental allusions of the successful operators in America to the conditions under which they work, we find that very old collodion, with plenty of free iodine, and an acid silver bath are used. These, as we know, are very potent agents in preventing fog. In our own experiments we have used a variety of collodions, some new and colourless, some a few months old, and one two years old; but all sensitive and not containing more free iodine than is indicated by a lemon tint: and the silver bath has been nearly neutral, having only the faintest trace of acetic acid. Mr. England's operations are, we believe, conducted with chemicals in similar condition. He, moreover, redips the plate in a silver bath before development, and the application of a hot developer under such circumstances, is almost certain to produce at once the surface reduction to which we allude, and when that is commenced, development rarely progresses favourably. It is probable, that in the use of an old collodion and an acid silver bath, the conditions will be found which admit of the successful application of hot developers.

## THE HONEY AND TANNIN PROCESS.

Some experiments we have recently made with tannin and honey have been most successful and gratifying, both as regards the quality of negative, and the sensitiveness and certainty of the process. In sunlight, an exposure of seven seconds, with a lens of six inches focus and half-inch aperture, has produced a good negative of buildings and foliage. The negatives are of very fine quality, and the prepared plates, notwithstanding the use of honey, quite dry and free from stickiness. In the preparation of the plates we followed Mr. England's instructions, but tried a variety of different collodions, the results of which we will briefly state.

We first made a collodion of the pyroxyline used by Mr. England, a sample of which he had favoured us with. It is evidently made at a low temperature, three grains giving a collodion of quite sufficient body, which yields a tough, skinny film, easily removed from the plate without tearing. This was iodized with three grains of iodide of ammonium, and three grains of bromide of cadmium. The plate became in the silver bath very creamy, and worked exceedingly well at once in the wet state, giving a clean, brilliant, dense negative with very short exposure. When prepared with the honey and tannin, it yielded good negatives with an exposure of about eight or ten seconds in sunlight. The film had a tendency to loosen, but with care was not lost.

We next tried a sample of commercial collodion of high repute for the wet process, which is generally believed to be iodized with cadmium, and to possess no bromide. This gave a clean, good quality of negative, but was much slower; with an exposure of twelve seconds it was not more than half done.

A sample of collodion prepared by Mr. Sebastian Davis, according to the formula he recently described at a meeting of the South London Society. This gave exceedingly satisfactory results in every way, and was scarcely inferior in sensitiveness to the first mentioned

We next tried some plates with a sample of collodion made by ourselves about two years ago; the pyroxyline was made by a formula we have often described; it contained equal portions of the iodides of potassium and cadmium, about two grains of each, one grain of bromide of cadmium. This yielded the best result, giving a good negative with seven seconds exposure. It adhered well to the glass, and behaved well in every way, allowing, moreover, of the use of slightly exalted temperature in development without fogging.

The silver bath, as we have stated, contained only the faintest trace of acetic acid. The plates received no preliminary coating. In some cases there was a tendency to leave the glass, but this was easily obviated, even when heat was used, by running an edging of black varnish around with a camel-hair pencil. The washing was effected by placing the excited plate in a dipping-bath of distilled water, containing a little acetic acid; it remained there until another plate was coated and immersed in the silver bath, and was then washed with from a pint to a quart of common water, poured slowly from a jug. The honey and tannin, fifteen grains of each dissolved in an ounce of water and filtered, was then poured over the plate, the first quantity drained off, and the plate again covered, and set to dry spontaneously. The development was tried in various ways; but the following was found best:—the plate was moistened with water at a temperature of about 80°; a solution of pyrogallic acid, containing about one grain in five ounces of water, was then applied, and in a minute or two a faint image appeared. The plate was again washed, and a two-grain solution of pyrogallic acid, containing half a grain of citric acid, twenty or thirty minims of acetic acid, and a few drops of a thirty-grain silver solution, applied until the negative was fully developed.

Whether the honey plays a chemical or mechanical part in the operation, we cannot say; but it certainly seems to be an important auxiliary, and it is somewhat singular that simultaneously with Mr. England's announcement of his use of the mixture here, Col. Pike announced at the American Photographic Society that he always added sugar or rock-candy to his tannin solution. The result is, we think, certainly an improvement on tannin alone. The plates develop nearly as rapidly as wet collodion, and they are very clean, and very brilliant.

Mr. H. P. Robinson, of Leamington, observes to us in a recent private letter,—"I have been trying Mr. England's tannin and honey process, on fifteen-inch plates, with wonderful results. Exposure a trifle more than for wet plates; results as good or better than wet." Mr. England is making some further modifications, by which he states a still further augmentation of sensitiveness is attained, so nearly, indeed, is the exposure to instantaneity, that he contemplates competing for the Marseilles prize; in which case he will scarcely be at liberty, to communicate further on the subject at present. Major Russell has, we understand, made some further improvements in the tannin process proper, which will doubtless appear in a new edition of his work. In the meantime we recommend strongly to our readers a trial of tannin and honey.

## THE PHOTOGRAPHIC GARRET.

We have tried hard to feel satisfied with the position assigned to photography by the Commissioners in the International Exhibition. We have tried to believe that probably photographers generally, in common with ourselves, attached an importance to our art which it did not possess in the eyes of the world, and that we were a little over-exacting in our estimate of its claims: that men of far-reaching vision, of large experience in the world, in science, and in art, probably saw photography, and all pertaining to it, in their just proportions, and would assuredly assign the art its right position. We received personal assurance from one high in authority, that Her Majesty's Commissioners never intended any slight to the art, but were desirous of doing it all honour; that finding it in a doubtful position, they resolved to give it a fair field on which to win its spurs, and that a separate department would be devoted to it: we accepted the assurance with all thankfulness, and hastened to announce the glad tidings.

Every visit to the building increases our mortification, however, and our conviction that British photographers have ground of bitter complaint. A separate department, indeed, they have obtained; separated with a vengeance, from all probability of attention or interest on the part of visitors. We venture to state that nine-tenths of the persons who visit the Exhibition will never see the department at all, and that the majority of them, if they think at all about it, will come to the conclusion that British photography is not represented. The first day, as we have before stated, the department was closed. The second day we found it open, and the rubbish partially cleared away: two solitary individuals had found their way there. A melancholy-looking foreigner and a boy. Let the Commissioners look out, or suicides will be committed there! The solitude of the place is a temptation.

The small, uninviting doorway, or opening in the wall at the right hand, immediately before entering the British Picture Gallery, has not, at present, even any announcement that it leads to the photographic gallery, and might readily be supposed, by any one not better informed, to be a private entrance to a clock tower, or ventilating department. The adventurous person who, passing through the doorway, begins to ascend, will not have his conviction altered by the shabby appearance of the winding flights of steps; and it is only on reaching the top that he will find that he is in the British photographic department, where, as a daily journalist has recently euphemistically phrased it, photography "is allowed to hover over the confines of art, more as an attendant than as a companion."

If all the photography in the Exhibition were in the same position the matter would be more tolerable. If the photography of the world had been gathered into one vast apartment, however remote its position, we could have been content. A large portion of the public would have enquired for it, and sought it out, however toilsome the journey. But the photography of other countries is placed in the most accessible and prominent positions; in the main aisles or avenues, in the courts leading out of the nave, in the main galleries. Let the visitor turn where he will, even in the most listless general examination, he meets time after time with displays of foreign photographs. Amongst the first things to catch the eye in the main body of the building, are the large architectural photographs in the Roman Court. Amongst the most noticeable things in the main gallery are the large French photographs. And so, wandering through the building, we find photographic contributions from Canada and India, from all parts of Continental Europe, and from Africa, all hung in more or less accessible positions. Photographs from Jersey, even, find a place in the main body of the building. Is it probable, then, that the general visitor will ever think he has missed *the* photographic department?

England is the birthplace of photography as now practised: it is the birthplace of photography on paper and collodion. It has the largest amateur photographic population, we venture to assert, of any country in the world. Photography in this country is not only under the immediate patronage of royalty, but is practised by royal hands. England invites the world to a friendly tournay of science, art, and industry; and having done this, thrusts photography into a garret or attic. Whether their productions be considered the offspring of science, fine art, or industrial art, British photographers, we repeat it, have bitter reason to complain of their treatment.

## DECOMPOSITION IN COLLODION.

BY AUG. TESTELIN.

Photographic collodion is a mixture of many substances which readily react upon each other, giving rise to spontaneous decompositions which effect great changes in the composition of this valuable photographic agent.

The principal elements of collodion are ether and alcohol; the former, especially, constituting the greater portion of it. Ether being a very unstable compound, it is easily decomposed by the action of the air, hence it follows that collodion is also altered under similar circumstances.

On the other hand, prepared photographic collodion contains salts, with bases almost always alkaline, whose presence singularly hastens this alteration; moreover, these bases are combined with a metalloid (iodine), which also exercises, in another direction, and under the influence of light, a decomposing action upon ether and alcohol. Lastly, the products resulting from these successive decompositions act injuriously upon the pyroxyline, which forms the most delicate part of collodion. It is this series of complex reactions which are the primary causes of the variability of photographic processes, where the solution of the pyroxyline serves as a basis, and as the medium of the sensitive agent, that we propose to study in this present article.

We now proceed to carefully analyse the changes that take place through the contact of air with these various substances, and the reactions which these latter exercise upon each other.

1. The presence of air in the bottles in which ether is kept, changes it partly into water and acetic acid; this latter combines slowly with another portion of the ether, not yet decomposed, and forms acetic ether, but under the influence of light the action is much more vivid and complex.

When the ether is in contact with an oxydisable metal, such as zinc, cadmium, lead, iron, &c., the alteration is more profound, the absorption of the oxygen proceeds more rapidly, and in this case a metallic acetate is produced, and then the reaction is always accompanied by the producton of formyle, which immediately produces a formiate of oxide of ethyl, and a metallic formiate.

2. The anhydrous salts with alkaline bases are for a time without action upon pure ether at ordinary temperature; but when moist air has access, the ether appears reddish brown by transmitted light, and after the lapse of a certain time, acetates and formiates of the same bases are found.

When the alkaline salts are not anhydrous, as is the case in collodion, this reaction always takes place, and in a much more evident manner when the ether is in presence of alcohol, which furnishes water in a state quite favourable to the reactions, either by decomposition, if it is anhydrous, or in ceding its water of hydration if it be less concentrated.

The brown tint which the ether then assumes is not remarked in the collodion, the iodides of which have alkaline bases, because it is concealed by other simultaneous reactions, which also give rise to a more intense colouring. Besides this brown tint, due to the decomposition of aldehyde, evolved in these several cases, cannot be very apparent in collodion where the alkaline substances exist only in very small quantities.

3. When the ether contains an iodide or a bromide in solution, and it is in this condition that we must always regard the ether of the collodion, the spontaneous changes developed are always more numerous; and if a slight decomposition has already commenced by the absorption of oxygen, the reactions proceed rapidly, although they take place nevertheless with an ether at first very pure.

Besides most of the iodides and bromides, as well as some chlorides, by dissolving in ether, are partially decomposed, disengaging according to the nature of the salt, iodine, bromine, or chlorine, the contact of which, with ether, always determines the decomposition of this latter, by producing corresponding acids, which themselves act upon the ether to form other products (acetic acid, formic acid, for nitrate of oxide of ethyl, aldehydic acid, &c.).

Under the influence of light the iodine and bromine of the iodides and bromides dissolve, the contact of hydrogenous organic substances (ether and alcohol) partially decomposed these matters by removing their hydrogen, with which the iodine and bromine have a great tendency to combine, there is formed on the one hand an oxide of the base as first united to these metalloids, and this oxide combines with the acetic acid, which, in the first place, existed in the ether, and which is also produced in a quantity proportionate to the oxygen disengaged during this reaction, there results then an acetate, while, on the other hand, the iodine or bromine, removing the hydrogen from it, produce hydriodic or hydrobromic acid, which, in the nascent state, is in its turn decomposed by the ether, forming water and hydriodic and hydrobromic ether.

Iodine or bromine, added directly to the ether, produce hydriodic and hydrobromic ether (corresponding, we might say, with formic acid), iodized or bromodized compounds, formyle, a body resembling heavy chloric ether, and lastly, a product analogous to chloral. In distilling the liquid by a gentle and gradual heat, we obtain all these products in succession, with the exception of the periodide of formyle, and liquids analogous to chloral, which remain in the retort, mixed with a variable quantity of heavy bromic ether.

4. Iodine dissolves in alcohol, absolute or diluted with water, and colours it of a very deep red; but it does not appear to cause any very evident reaction; nevertheless, if we add to this liquid some hydrate of potassa, or of soda, the colour completely disappears when the liquid is warmed, and quicker in proportion as the solutions are more concentrated. Here is, then, produced some iodide of potassium or of sodium, according to the base added, some formic acid, formiates of the same bases, and periodide of formyle, if the potassa or soda does not remain in excess. This reaction is produced in the same manner, and almost as quickly, with the oxides of most other metals. Fragments of zinc, cadmium, iron, lead, &c., produce the same effect, and in every case where we deprive an alcoholic solution of iodine of its colour, by introducing slips of metal, there is formed, among other products, a certain quantity of iodide of formyle. The greater part of this iodide is deposited, on straining, in an extremely light granular form, which disengages a very pungent odour when isolated from the mixture.

Upon gently evaporating the liquid, in proportion as the alcohol becomes volatilized, crystals of iodide of formyle are deposited, which a slight washing with pure water separates from the metallic iodide and the formiates which have appeared during the reaction.

5. When we leave to itself a mixture of alcohol, ether, iodine, and monohydrated nitric acid, in a bottle that is not quite full, or slightly corked, beside the formation of all the bodies we have instanced, we remark, at the expiration of a certain time, a deposit of yellowish white needle-shaped crystals. Sometimes it happens that this deposit consists of a heavy oily liquid, but the latter is produced when the mixture is prepared with bromine instead of iodine. The composition of this substance is unknown to us; its instability, even when kept under water, only admits of our ascertaining that the influence of light colours it brown, and appears to decompose it into iodine and a gaseous substance, the odour of which is similar to that of chloral.

If we mention these facts, which, perhaps, may appear foreign to the question, it is, on the contrary, because we find their application in all the reactions which take place during the different phases of the alteration which photographic collodion undergoes.

For, in studying, for example, the reactions to which a mixture of iodine, alcohol, ether, and nitric acid give rise, we shall succeed in accounting for, in a manner as precise as circumstances permit, the changes which take place in the composition of a collodion prepared with acid pyroxiline, either on account of insufficient washing, or on account of the decomposition it undergoes, in certain cases even after its solution.

Thus, a simple collodion to which we have added iodine, with the intention of changing the latter into an iodide by means of slips of metal, becomes altered in the course of a few months, so that it disengages nitrous fumes, and manifests a very acid reaction, and the sides of the bottle become covered with a quantity of small red crystals.

Having had occasion to observe the simultaneous changes produced by time in alcoholic and ethereal solutions of iodine and nitric acid, we have only been able to refer the cause of this singular effect to the decomposition of the pyroxyline, the only body which can furnish the oxygen elements of the nitrogen.

However, we have never observed similar results in nitric cotton; but the facts which Mr. Hardwich recently published on the decomposition of this body, confirm us in our first supposition.

(*To be continued.*)

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

Baths and Dippers (*continued*).

*Dippers for Vertical Baths.*—Dippers are so essentially part of the vertical baths they are exclusively used with, that I will first say a few words respecting them before turning to the subject of horizontal baths.

It seems to be generally admitted that the question of dippers is rather a sore point, and on turning over the leaves of this journal or other publications devoted to photography, we see frequently repeated complaints of the caprices and misdemeanors of these instruments, as well as many suggestions of devices to correct their shortcomings. I am rather inclined to think, however, that they scarcely deserve all the ill that has been said of them, and that many mischances have been laid at their door which could be more appropriately attributed to other sources, and oftener than not, I fancy, to the photographer himself.

A dipper is intended to hold the glass plate when it is plunged into the vertical bath, and to draw it out again. It must clearly be of such a form that no part of it can touch the front of the plate upon which is spread the delicate collodion film. For this reason they are made like a flat hook, the plate being allowed to rest against the back and on the bottom only.

Dippers are made of plate glass, glass rod, silver wire, porcelain, and gutta-percha.

Plate glass dippers are probably more used than any of the others. They are formed by cementing a small slip of thick plate glass on to the bottom of another strip of plate glass of the same width a trifle longer than the depth of the bath. The small slip of glass forms the lip or hook upon which the plate rests: it should, therefore, be thicker than any of the plates that are likely to be used, and before being cemented on to the dipper, the edge of the lip should be ground on a stone so as to form an acute angle with the back piece, (fig. 17); this forms a groove which offers the plate a firm seat, and if the lip be formed of sufficiently thick glass there is no danger of the plate slipping off. The great vice of this kind of dipper appears from the complaints of several photographers to be the tendency of the cemented lip to come off, and as this naturally always happens at critical moments when the plates are being placed in the bath or taken out, it would be sufficient to condemn the instrument entirely, if the charge were, well founded, or the fault without remedy. Such an accident has not happened to me since the early days of collodion photography, when the proper way of making the various instruments was not

Fig. 17.

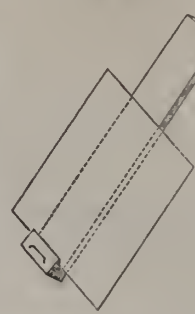
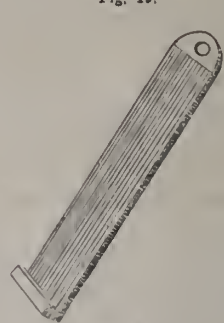


Fig. 18.

Fig. 19.



at all decided by experience, and unsuitable cement was often used for this purpose, but now I think they may generally be relied on. Still it would, no doubt, be better to increase the security by the addition of a silver rivet such as are employed to repair broken china, &c., which would render a disaster of this nature impossible except in the case of breakage.

It would be well if this kind of dipper were made a little wider than is usual, that the plates may have a more substantial support, and also the lip is seldom made of sufficiently thick glass to form a deep groove in which the bottom edge of the plate can lie securely, so that it can only rest *on* the lip, and a little cause is sufficient to make it fall off. Want of a proper attention to this detail is the principal cause of the glasses getting off the dipper in the bath, which necessitates one of the most disagreeable kinds of fishing that I am acquainted with; if the dipper be properly made in this respect, and the bath slightly inclined from the perpendicular, as mentioned above, no fear need ever be entertained of such a misfortune.

If from the flatness of the surfaces the dipper is found to adhere inconveniently to the inside of the bath or to the back of the plate, one large drop of cement upon each side of it will remedy this entirely, as it will prevent the dipper from lying perfectly flat against either of the surfaces.

Another objection to glass dippers has been made, that they are apt to break the bath by striking with violence against the bottom. I do not think any remark is necessary on this point, except to recommend more careful manipulation to those photographers to whom such an event has occurred, as it can only be the result of a want of ordinary attention.

Porcelain dippers are, in my opinion, preferable to those constructed of plate glass, as last described; they are made all in one piece, therefore the lip can never give way unless by breaking, and it can be made of a more convenient form. When of the same thickness they are, I think, equally strong, and equally cleanly. It would be an advantage if they were made wider than is usual, especially those intended for large-sized plates. Another improvement would be to make them corrugated, or slightly grooved on both sides nearly to the top; this would add to their strength and also prevent all

* Continued from page 196.

chance of their adhering either to the bath or to the plate (fig. 19).

Some glass dippers have lately been made for sale in one piece, like the porcelain dippers, the lip being turned up instead of stuck on. These are better in principle than those which are of two pieces cemented together, but the specimens I have seen of them were not of a satisfactory form, the top of the lip being turned inwards, which would inevitably touch and tear the collodion film.

Metal dippers are made of a loop of silver wire, or an iron wire coated with gutta percha, bent into the form shewn in fig. 18; they are useful for large plates which might be too heavy to trust upon a dipper of glass or porcelain, but their cost is too great for them ever to come into general use for ordinary work.

Dippers are sometimes constructed of glass rod bent into the same shape as the above, but they are not to be depended on, and should only be used with very small plates except on an emergency.

Gutta-percha dippers are made like porcelain dippers, but these also should only be used for small plates. When a dipper is made of such a flexible material as gutta-percha it is apt to bend under the weight of a heavy plate, and force it off the lip.

A dipper intended for carrying about in a portable bath should always be made specially for it, with the head cut into a diamond shape, (fig. 20) so that it may lie diagonally inside the bath when the water-tight cover is screwed on; and

Fig. 20

if this be well devised the soft gutta-percha cover will press lightly upon it and keep it from shaking about and getting broken. The top of the dipper will of course get wetted with the nitrate of silver splashing on it when carried in this manner, and must be wiped with a piece of filtering paper or rag, before being used.

Generally speaking, the vertical baths and dippers are very convenient for plates of moderate size, and present no difficulties in practice; but for large plates their use is not unattended with risk from the fragile nature of the dipper, and the excessive, as well as rather awkward handling a plate has to undergo. Also, the great quantity of bath liquid such baths require, when very large plates have to be sensitized, is a serious consideration for amateurs especially; and in my opinion it will be found more suitable for such purposes to have recourse to a horizontal dipping bath, the construction of which I propose next to examine.

(*To be continued.*)

## PHOTOGRAPHIC CHEMICALS:

### THEIR MANUFACTURE, ADULTERATIONS, AND ANALYSIS.

*Sulphides* (concluded).—Few of the other sulphides possess any interest to the photographer. Sulphide of gold is obtained from the toning baths, either mixed with, or free from silver, according to the kind of solution employed, and, therefore, a brief account of its properties may not be out of place. Formed by precipitation, it is a heavy black powder which very readily decomposes with separation of metallic gold. At a gentle heat the sulphur goes off, and if left in contact with the atmosphere in a moist state the gold is likewise separated with formation of sulphuric acid; the oxygen being absorbed from the atmosphere. Ignition, either *per se*, or with the usual mixture of carbonate of soda and nitre used for decomposing the sulphide of silver, at once reduces it to the metallic state.

Platinum is sometimes used for toning pictures, instead of gold; it is a valuable metal, and would also be recovered in the form of sulphide. Sulphide of platinum is a black, heavy powder, decomposed by heat and fusion with nitre, but not so readily as sulphide of gold. When exposed to the air in the moist state it becomes oxidised, and then contains a quantity of free sulphuric acid, along with platinum-black. When this compound is heated in contact with the air, it takes fire and burns with a hissing noise and violet flame, continuing to glow with evolution of sulphuric acid.

*Nitrites.*—A brief account may here be made of some of these salts. Nitrite of silver, along with nitrate of silver in the sensitising bath, communicates several curious properties to the collodion plate, which deserve further investigation.

In order to facilitate this promising branch of research, if any of our readers feel inclined to pursue it further, we will briefly describe one or two of the most important nitrites.

*Nitrite of Potash.*—This salt is formed in the following way:—Heat nitrate of potash in a crucible, and keep it at a red heat for a long time. The extra equivalents of oxygen in the nitric acid gradually go off, and there remains nitrite of potash, mixed, however, with a considerable excess of undecomposed nitrate. Dissolve the mass in boiling water, and allow to crystallise by cooling. The undecomposed nitrate of potash crystallises out first. On concentrating the mother-liquor, neutralising it with acetic acid, and then mixing it with twice its volume of strong alcohol, crystals of the nitrite are deposited, which must be collected on a filter, washed with alcohol and rapidly dried. It forms a white crystalline deliquescent salt, without alkaline reaction.

*Nitrite of Soda* is prepared from nitrate of soda in exactly the same manner as the potassium salt. The only reason for its being referred to here is, that it is not deliquescent (according to Gmelin), and is, therefore, a much better salt to work with than the potash nitrite, which is generally used.

*Nitrite of Silver.*—This is the most important of the nitrites for photographic purposes. It may be prepared in several ways. If an aqueous solution of nitrate of silver is boiled for several hours with finely divided silver, the metal is dissolved with formation of a light yellow liquid, which, when evaporated down to a density of more than 2·4, solidifies after some time, on agitation. If this mass is extracted with water, a basic salt remains undissolved, in the form of a yellow powder. Cold water or alcohol, likewise throws down this powder from the yellow solution. Some time ago, we remember mention having been made of some valuable properties which were communicated to a nitrate of silver bath, by boiling it with finely-divided silver for a few hours. We are not aware that the subject has been pursued further, but it is evident from the above that this process would give rise to a certain quantity of basic nitrite of silver in the bath to which the properties would be due. Nitrite of silver, in the basic form, blackens when exposed to the light: it dissolves readily in ammonia, but only sparingly and partially so in water, flakes remaining behind.

A monobasic nitrite of silver may also be prepared, by mixing together aqueous solutions of crude nitrite of potash or soda with nitrate of silver. The precipitate is filtered, washed, and then dissolved in boiling water, filtered from the precipitated oxide, and allowed to cool. The salt thus prepared forms long and slender needle-shaped prisms, having a wavy lustre; they are colourless when immersed in the liquid, but acquire a slight sea-green tint when taken out. It requires three hundred times its weight of cold water to dissolve it, but is more soluble in hot water; it is insoluble in alcohol.

According to Proust, the yellow liquid obtained by boiling finely-divided silver with an aqueous solution of nitrate of silver, contains both the above nitrites of silver. The liquid has the following properties:—When boiled down by itself it gives off a small quantity of nitric oxide gas, then fuses and yields a yellow sublimate. The mass treated with water, when cold, yields nitrate of silver, and leaves a mixture of metallic silver and a yellow powder. The yellow solution oxidises when exposed to the air, and deposits crystals of nitrate; the same result is produced by heating it with nitric acid, the liquid being then decolorised, and giving off nitric oxide gas. Hydrochloric acid added to the liquid, throws down white chloride of silver. Ammonia precipitates black pulverulent silver, and retains oxide of silver in solution. Potash forms a brown precipitate of suboxide of silver, which is converted into the protoxide on exposure to the air, but if immediately dissolved in cold dilute nitric acid, again gives a black precipitate with ammonia. Cold water added to the yellow liquid throws down the yellow basic nitrite; but on dropping the yellow liquid into boiling water, the precipitate changes colour from yellow to red, and is then converted into black metallic silver, which forms a specular deposit on the sides of the vessel. So long as the precipitate remains yellow or red, it disappears on the addition of nitric acid; but after it has become black, nitric acid no longer dissolves it. Alcohol, likewise, throws down the yellow powder, and the liquid filtered from it leaves on evaporation a residue of nitrate of silver and metallic silver. Tincture of sulphate of indigo is decolorised by the yellow liquid with precipitation of silver.

Nitrite of silver is also formed when nitrate of silver is heated for some time above its fusing point: it is certain that some of this salt is formed when nitrate of silver is fused in the ordinary process of preparing the fused nitrate; and it is probable that the increased intensity noticed when fused nitrate is used in preference to the crystallised salt, is due to the presence of a small quantity of nitrite.

If the presence of any nitrite be suspected in the nitrate of silver, and it be desired to be got rid of, the best plan is to boil an aqueous solution of the fused salt with a little pure nitric acid, and then evaporate down on a water bath. The nitrous acid is driven off by the nitric acid, and the slight excess of the latter remaining with the dry nitrate after evaporating down, may be removed by heating it just short of its fusing point.

Nitrite of silver is capable of forming a double salt with potash and soda. The potash salt is obtained by adding nitrite of potash in excess to nitrite of silver, and evaporating over sulphuric acid. It forms yellowish rhombic crystals, which are permanent in the air.

## The International Exhibition.

### PHOTOGRAPHY.

The contributions to Class XIV., "Photographic Apparatus and Photography," are, so far as we can glean from the present incomplete arrangements, scattered over something like five-and-twenty different places in the building. The number of contributors, so far as we can gather from the not very perfect official catalogue, is nearly four hundred. Of the number of pictures contributed, it is still more difficult to form an estimate, as the catalogue affords no indication whatever, all the contributions of each person being included under one number, without any intimation whether that number embraces one or twenty pictures. From a roughly-made calculation, we judge there are not less than two thousand frames, some of these including many pictures.

In the British department there are about one hundred and fifty-six contributors, and of these about thirty-six exhibit apparatus and chemicals, leaving one hundred and twenty as exhibitors of pictures. It is somewhat singular that this is just the number of exhibitors at the last exhibition of the Photographic Society. The number of pictures now exhibited, or, rather, frames of pictures, is between eight and nine hundred: the number at the last exhibition of the Society was six hundred and twenty-two. On the quality of the pictures now exhibited it would be unfair at present to make any remark, as the glasses are for the most part covered with a thick coat of dust, which renders any correct judgment impossible. The department is indeed, at present, incomplete; and workmen are still engaged in connection with it. An awning has to be erected over the glass roof, but not in immediate contact with it: this will lessen the glare of heat and light, and with some ventilating arrangements, will, we trust, make the apartment more tolerable. Cases of apparatus, &c., and stands of stereoscopes, which are at present enveloped in linen covers, will then be displayed, and the apartment being put in order, fair description and criticism will be possible. Already, as we anticipated, Mr. Breese's moonlight pictures are exciting much discussion, and a bet of fifty pounds to a farthing was recently offered, on the question of their genuineness. We have reason to believe that the question will engage the careful attention of the jurors in this department, and will, we doubt not, issue in confirming our convictions, expressed nearly twelve months ago, of Mr. Breese's perfect good faith in using the term, "photographs by moonlight."

As we have stated, the catalogues give no information as to the number of pictures forwarded by each contributor, and, as necessarily follows, no clue to the subject, and little guidance as to the process; and as the various pictures of the same contributor are not all hung together—the exigencies of the space demanding that they should be arranged so as to fit—the task of examining and comparing the pictures will require care and attention. We intend, as far as possible, when everything is in order, to make our description and criticisms serve to some extent as a hand-book to the various photographic collections.

In the French department, which is not yet, however, completed, the catalogue gives a list of about one hundred and eighteen exhibitors, of which twenty-eight contribute apparatus and chemicals. The pictures, or frames of pictures already hung, are between four and five hundred. The number of contributors at the last French Exhibition, in Paris, were upwards of one hundred and sixty, sending upwards of one thousand three hundred pictures. The space devoted to photography in the French department is, so far as we can judge without actual measurement, about twice as large as the especial room devoted to British photography, and much more conveniently arranged, being a long gallery, admitting of a series of small transverse screens, each of which are, in many instances, devoted to a single contributor. Life-size pictures, by the solar camera, and as described in some instances, taken direct, form an important feature in this department, from their number and excellence. Some carbon prints and some enamels, by Carmarsac, are especially good. Some exquisite photographs on white silk, with ample margin, showing as well by transmitted as by reflected light, are curious and beautiful. Amongst the finest landscapes in the French department are those of our countryman, F. Maxwell Lyte, who figures in the catalogue as "Maxwell, L." Some large instantaneous pictures of shipping, water and clouds, by M. Varnod, of Havre, are unsurpassed, if equalled, by anything we have seen.

Canada sends some very good pictures: the once United States none, so far as we can ascertain. Rome sends very fine large architectural subjects. Spain nothing. Of other contributors in Continental Europe, we may mention Belgium, Denmark, Austria, Bavaria, Prussia, Saxony, Greece, Italy, Norway, Portugal, Russia, Sweden, Switzerland, &c.; amongst British colonies, and other foreign countries, we may mention India, New South Wales, Tasmania, Jersey, Natal, Brazil, &c. Some of these are not yet hung, and none we believe, quite completed; we will, however, give each detailed attention in due course.

We may mention another noticeable feature in connection with photography in the Exhibition, that in many instances it occupies a conspicuous and creditable position in illustrating manufactures and art designs. In one instance, half a dozen excellent photographs fill panels in one of the erections in the nave, somewhat unmeaningly called "trophies." These six pictures are about 18 by 15, and exhibit the interiors of workshops and tan-yards, with groups of workmen engaged upon the various processes in connection with tanning, currying, and leather-dressing, as conducted in the establishment of Messrs. Bevingtons, of Worcester. These are good as photographs, and capital as illustrations of the operations. The depth of definition is surprising. They were produced, we understand, with the full aperture of a triple lens, by a son of one of the partners.

## MAYALL *v.* HIGBY.

This case, which was tried before the Lord Chief Baron at Guildhall, when a verdict was found for the plaintiff, leave being reserved to the defendant to move, was finally heard on Tuesday, before the Lord Chief Baron, Mr. Baron Martin, Mr. Baron Bramwell, and Mr. Baron Wilde, sitting in Banco.

The declaration alleged that the defendant had wrongfully taken and kept possession of certain photographic portraits of eminent persons belonging to the plaintiff, and copied them and sold them, and thereby depreciated the value to the plaintiff of the originals, and the declaration also claimed an injunction to restrain the defendant. The second count was in detenue.

The plaintiff and defendant are photographic artists. The former some time past lent to Mr. Tallis, late proprietor of the *Illustrated News of the World*, a considerable number of photographic portraits of the celebrities of the day, for the purpose of having them engraved and published with that paper. Tallis became bankrupt, and the messenger of the Court sold the photographs to the defendant, who took reduced copies of them and sold them.

Mr. M. Smith, Q.C., moved for, in pursuance of leave reserved and obtained, a rule to set aside the verdict and enter it for the defendant, on the ground that the right alleged, and the right to the injunction were not proved.

Mr. V. Williams, in showing cause against the rule, said, No question of copyright, either at common law or by statute, arises here. The plaintiff complains that his right of property in the photographs has been interfered with without his consent. That right has been defined to be *jus utendi et fruendi.* The defendant, getting possession of the portraits wrongfully as against the plaintiff, had multiplied copies of them in a reduced form, and afterwards sold them. He had obtained from a Mr. Bennett £100 for some, and it was quite clear that the plaintiff's property is depreciated in value in exact proportion to the profit made by the defendant. Those persons who had purchased copies from the defendant were not likely to purchase from the plaintiff. The latter is, therefore, entitled to substantial damages, although he has been content to take a verdict for nominal damages as sufficient to sustain the injunction granted by Baron Bramwell at chambers. Baron Parke, in "Boosey *v.* Jeffreys," the great case on copyright, 4, *House of Lords Cases*, said, "The author of a literary composition has an undoubted right at common law to the piece of paper on which his composition is written, and to the copies which he chooses to make of it for himself or for others. If he lends a copy to another his right is not gone; if he lends it to another under an implied undertaking that he is not to part with it, or publish it, he has a right to enforce that undertaking." And Lord Chief Justice Erle in the same case says, "The author has remedies for the wrongful abstraction of copies; he may prevent publication, he may acquire back the copies wrongfully made, he may sue for damages if any are sustained." In these passages (continued Mr. V. Williams), pictures may be substituted for literary compositions, as is shown by the case of "Prince Albert *v.* Strange," 18 L. J., in which Lord Cottenham applied the same principles to the case where copies of the Queen's and Prince Albert's etchings were surreptitiously obtained, and the publication of them advertised.

Baron Bramwell: Suppose, Mr. Williams, a man discovered some inscriptions upon stones and brought them home, could another take casts of them without his consent and publish them? By so doing the value of the stones would be greatly depreciated.

The Court then called upon

Mr. M. Smith, who argued that the plaintiff was not entitled to damages on the first count, or to an injunction, and that the plaintiff had not shown that he had the exclusive right of publishing copies of the portraits. He had lent them to Tallis for the purpose of their being engraved, and after that any one could copy and publish them.

Mr. Aspland followed on the same side, contending that the plaintiff was not entitled to an injunction to the extent prayed, as it would prevent the defendant from selling negatives which were his own property, and because the plaintiff had recovered damages in respect of that very matter.

The Court decided that, although the negatives continued the defendant's property, the selling of them would be an act of injury to the plaintiff, and therefore, apart from any question of copyright, the sale of them would be actionable; therefore, the injunction might issue under the 79th section of the Common Law Procedure Act, 1859. The Court also said that it might have been otherwise if the plaintiff had received full damages in respect of the sale of all the negatives, but the actual damages were nominal only in respect of the right.—Rule discharged, and injunction to go.

# Proceedings of Societies.

## London Photographic Society.

The usual monthly meeting of this Photographic Society was held in King's College, on the evening of Tuesday last the 6th of May. Peter Le Neve Foster, Esq., in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the society:—Messrs. W. H. Warner, of Ross, A. B. Brown, of Gibraltar, L. Caldesi, of Pall Mall, Hanson, of Leeds, and J. B. Brown, of Birmingham.

A large number of the prints of the Amateur Photographic Association were laid on the table, and received considerable attention.

Mr. Glaisher called the attention of the meeting to some curious photographs in colours, which had been produced by Dr. Diamond. One was taken in the year 1851, and gave a very decided approximation to the natural colour of the objects depicted. The sky was blue, the roof of a house a reddish brown, an outhouse a similar colour, a little lighter in tint, the tree was green; each object was in short in its proper colour. No explanation could be given of the cause. All Dr. Diamond could state on the subject was, that it was produced in the course of some experiments, and was not at that time an uncommon circumstance. The collodion it appeared, contained, in addition to the usual iodides, arseniate of quinine, and the developer formic acid. Another picture was on a stereoscopic plate, and was recently produced with an ordinary collodion and iron developer. In one half of the picture the lights were red, and in the other half blue. He took the opportunity of expressing his pleasure that the hint he had thrown out at the last meeting, as to bringing specimens, had been taken, and the noble array of the Amateur Photographic Society, now before the members, would well repay examination.

Mr. Vernon Heath asked the indulgence of the meeting whilst he gave a verbal description of his method of operating in enlargement, a press of unexpected engagements having prevented him from preparing a paper. He had during the last three months taken not less than 250 positives, and 300 negatives with a view to satisfactory enlargement. He would very briefly and simply state his experience, with a view to aid others in achieving what he had been attempting. He believed that the future of photography would lie very much in this direction—the production of very small pictures, and by subsequent enlargements producing absolutely better results with less trouble than were now obtained with large apparatus. Those who had experience in landscape photography by the wet process, knew well the trouble and anxiety caused by the enormous bulk of materials and apparatus they had to carry into the field. Last year, in going to Scotland, he had to pay for 330 lbs. excess of luggage. He now believed that with a good lens and good manipulation, results might be obtained which, by skilful enlargement, would render this excess of field apparatus entirely unnecessary. In his first connection with the wretched case "Mason *v.* Heath," he had been asked to try if the negative could be reproduced. He said he had no doubt that by a little practice it might be done nearly equal to the original. His first experiments disappointed him much. He found there was much to learn in the matter. Photographers would readily comprehend when they examined the circumstances; when they remembered that in enlargement, owing to the length of focus and small aperture necessary to be used, an exposure of ten minutes would be required, and the result of such an exposure totally differed in character and intensity from that produced by a short exposure. In reference to the negative of which he had just been speaking, two of his operators had been engaged upon it, and they made not less than 200 positives, not one of which in his estimation came up to the mark. The proper character of positive he had found, was one without intensity, but possessing every trace of detail, such as he now exhibited to the meeting. He would now explain his method. He did not use the solar camera, but copied in the ordinary camera, taking first a transparent positive from his original negative, and from the positive another negative. He used a lens made for him by Mr. Dallmeyer, to whom he must in justice say, that he had taken great interest in the matter, and had furnished him with the exact equivalent focus of the lens. This lens was attached to an extending bellows camera. To this also was attached a scale, divided into 10ths of an inch, the zero of which corresponded with the equivalent focus of the lens. By the aid of this he was enabled to dispense entirely with focussing; he simply calculated the distance the camera required to be extended on one side of the lens, and the box or camera holding the picture to be copied on the other side. Notwithstanding that he did not focus, he invited attention to the pictures he exhibited, which would be found to possess the most perfect definition. He thought he had succeeded in producing the proper character of positive, but he was not quite sure that he had produced yet the best possible character of negative, and he now invited gentlemen present, of experience and ability, to give their aid and carry the matter further. In his manipulation, he used any good bromo-iodized collodion; he had tried several which answered very well, but he thought he gave the preference to that with which he produced his landscape negatives. He developed with five grains of iron, and a large proportion of acetic acid. With the positives he did nothing more. With the negatives he proceeded in the same manner, but it then required some amount of intensifying, and he was not quite sure as yet which was the best method. At present he used bichloride of mercury after fixing; but he was not quite satisfied with the amount of intensity. He believed that if photographers generally, and amateur photographers especially, were to confine their attention to the production of small pictures, and either get them enlarged, or do it themselves at their leisure, they would save themselves much trouble, and obtain better results. He would conclude by showing some specimens which had been sent to him by Mr. Warner, of Ross, who enlarged by the same process which he had just described. In reference to them, he might observe that Mr. Warner had stated that he had been using hitherto a lens which had not quite satisfied him, but that he had procured one from Mr. Dallmeyer, with which he was much better pleased.

Mr. Heath exhibited his apparatus and a variety of transparent positives, negatives, and enlarged prints, in the course of his remarks. An enlarged head of the late Prince Consort, amplified between two and three times, was much admired, and considered by many as superior to the original.

M. Claudet asked Mr. Heath how he lighted his picture?

Mr. Heath said invariably from the north: he never used direct sunlight. The apparatus was placed at an angle of 45° to the northern sky.

M. Claudet asked what exposure was necessary to produce an image the same size as the original?

Mr. Heath said, using a small diaphragm about 45 seconds. Mr. Warner had informed him that he used direct sunlight, placing a piece of ground glass a foot in advance of the negative. He then gave a long exposure so as to avoid anything like chalkiness.

Dr. Diamond exhibited a negative of fine intensity having a blackish tone. This he said was originally a somewhat thin positive: the only mode of intensifying used was to leave it for about twelve hours in an old hypo bath, which, by sulphuretting the image, produced the amount of intensity now seen.

M. Claudet asked Mr. Heath how he found the equivalent focus of his lens?

Mr. Heath said Mr. Dallmeyer, who had made the lens for him, had given him the equivalent focus, and he found in practice it was absolutely correctly stated. He had consequently only to measure by means of his scale for any amount of enlargement, and the result, without any focussing, was always correct. Suppose, for instance, the lens to possess an equivalent focus of eight inches, if he wished to produce an image the same size, he simply extended the camera and the negative 16 inches at each side of the lens.

M. Claudet asked from what point he regulated the equivalent focus?

M. Dallmeyer said, he might perhaps explain that the lens was one of his triple achromatic lenses. He had calculated the exact equivalent focus, and upon the lens he had marked the places from which to measure, from which, as a centre, Mr. Heath calculated the necessary extension on either side. The amount of extension necessary was regulated by the ordinary law of conjugate foci.

After some discussion as to the exact application of this law, in which M. Claudet, Mr. Shadbolt, and Mr. Dallmeyer took part.

Mr. Shadbolt asked Mr. Heath for the results of his experience in the use of parallel or converging rays for enlarging.

Mr. Heath would mention some of his earliest experiments. He had at one time made an aperture in the roof for his negative, and having fixed his lens, and a table for the paper beneath, attempted, with such light as he could get, to print the image on to albumenized paper. This he found hopelessly long. His conviction was, that the north light was best.

M. Claudet asked if the direct light of the sun was not better?

Mr. Heath thought not.

A conversation followed, in which M. Claudet expressed a conviction that the direct light of the sun and the use of a condenser, as in the solar camera, would give better results, as in that case only the centre of the lens, on which the image of the sun was brought to a focus, was used, and thus much aberration avoided.

Mr. Shadbolt objected to the solar camera, because of the dispersion suffered by the rays falling obliquely on the negative, and because a chromatic condensing lens could never produce an achromatic image.

M. Claudet said the image was not produced by the condensing lens. He thought, however, that an achromatic condenser would be an improvement.

Mr. Shadbolt said that would only palliate, not cure, the evil. It would not get rid of the dispersion.

Mr. Dallmeyer agreed with Mr. Shadbolt, and entirely differed from M. Claudet. The dispersion and confusion alluded to, or, more correctly, perhaps the diffusion, appeared to him to produce in all the solar-camera pictures he had seen a certain fuzziness. Mr. Heath's productions were, he thought, free from this, and possessed the perfect definition and sharpness of the originals. In reference to the long exposure to which Mr. Heath had referred, he had been engaged for some time in making a lens expressly for enlarging, which would possess much greater intensity than the triple. Mr. Williams had been trying it, and one of the results was on the table for the inspection of members. There were also two or three specimens at the International Exhibition. In this country, where direct sunlight was so uncertain, he thought the solar camera could not be worked with advantage.

M. Claudet said that the solar camera would produce the results now referred to without sunlight.

Mr. Dallmeyer said he might observe that Mr. Warren De la Rue had found, in enlarging his astronomical photographs, the northern light was most satisfactory.

Some further conversation resulted in a challenge from Mr. Heath, in which he offered, if M. Claudet would bring an untouched print enlarged four times by the solar camera, he would bring one enlarged four times by the process he had described. This challenge was accepted, and it was agreed that each should bring a specimen enlarged from the same card negative.

Mr. Fry said his experience entirely corroborated that of Mr. Heath. He was in the constant practice of enlarging in the way described, using one of Mr. Dallmeyer's triplets, and with the most complete success. Some specimens he had so enlarged were now in the International Exhibition.

The Chairman said he did not remember Mr. Fry's name as an exhibitor.

Mr. Fry explained that they were exhibited by Mr. Swan, as illustrations of an improved stereoscope in which one small and one large picture was used.

Mr. Heath wished to remind the meeting that all the specimens he had brought where in their rough untouched state, and results of experiments in a bad season of the year. He thought it would be very interesting to have some statistics as to how many days of the year the solar camera could be used, the percentage of successes and failures it produced, and the expenses of working it.

M. Claudet asked if Mr. Heath had tried the solar camera?

Mr. Heath: No; but I have seen your results.

Mr. Claudet: I have tried both, and I think the solar camera best.

After some further conversation, in which Mr. Heath stipulated that the specimens for comparison at the next meeting should be untouched, the discussion terminated.

The Chairman, in proposing a vote of thanks to Mr. Heath, said that the subject had elicited much interesting discussion, and he trusted that the friendly challenge which had arisen out of it would prove conclusive and satisfactory. The thanks of the meeting were accorded by acclamation.

A paper on subjects arising out of the discussion, by Mr. Claudet, was announced for the next meeting, and the proceedings terminated.

## THE CARTE DE VISITE.*

[There is so much that is true, mixed with a few misconceptions, in the following article, that we have pleasure in presenting it as a contrast to some of the would-be clever articles which have recently appeared in journals devoted to miscellaneous literature.—Ed.]

There are probably few pairs of eyes turned towards this page which have not been directed before now to some nob, or moulding, or keyhole, or door-handle in a photographic studio, and so have remained fixed in a delirious stare till the *carte de visite* was an accomplished fact. It is commonly a very heavy blow when one first sees the result of that operation which we have so many of us gone through. We explain ourselves in our different ways when we have the first interview with our own portraits after they come from the photographer's. If we are of a demonstrative nature, and besides have not been bred at the Court of St. James's, we exclaim "Lor!" when we first see ourselves. Some again will utter a mere unintelligible exclamation of surprise or grief; others will bless themselves; and truculent and hot-livered persons will invoke upon the head of the artist that which is not a benediction. There remains yet a class of well-bred and undemonstrative individuals who confine themselves to a speechless examination of the newly-arrived cards, merely expressing their agony by an eloquent silence, by twisting the work of art first this way and then that, holding it now at a distance, and now near, and anon upside-down.

We get accustomed to the portrait after a time, are able to face it, to see it on our drawing-room table in a small frame, or in an album, or even in the books of our dear friends and acquaintances. If we are public characters (and it is astonishing how many of us now find that we are so), we are actually obliged at last to get accustomed to the sight of ourselves in the shop-windows of this great metropolis. Our shepherd's-plaid trousers, our favourite walking-stick, our meerschaum pipe, meet our gaze turn where we will.

We do not all come out of the photographic studio alike unhappy. There are those to whom the process does justice, as well as those to whom it does injustice; nay, there are some on whom it confers actual benefits, and who show to greater advantage on the *carte de visite* than in their own proper persons. I have myself sat on two occasions for one of these portraits. On the first I was simply occupied in keeping still and presenting a tolerably favourably view of my features and limbs to the fatal lens; but the result was so tame and unimposing a picture that I determined on the next occasion to throw more intellect into the thing, and finding a richly gilded curtain-tassel convenient to my gaze, I gave it a look of such piercing scrutiny, and so withered and blasted it with the energy of my regard, that I almost wonder it did not sink beneath the trial. That look has, I am happy to say, been reproduced faithfully, and no one could see the portrait without giving its original credit for immense penetration, great energy and strength of character, and a keen and piercing wit. It is difficult to lay down rules of general application, but it may be safely said that the people who come out of the photographic struggle the best, and who are least injured in the engagement, are people of ordinary appearance, from whom we do not expect much. It is common to hear some lady who is generally acknowledged to be pretty, urged by her friends to sit for a *carte de visite.* "You really *ought* to have it done," they say; "you would make such a charming portrait." The portrait is taken, and is, after all, not charming. On the contrary, it is sufficiently the reverse to make the dearest of the victim's female friends happy.

Those to whom this process does the greatest justice are people the proportion of whose faces are well balanced, whose features rather err on the side of smallness than largeness, and who are not generally considered to be beautiful. It is possible to have symmetrical features and a well-proportioned face, and yet to fall very far short of beauty; and it is equally possible for a countenance to be wrong in some of its proportions, and yet leave an impression of beauty on our minds. But any one in this last case will be a great sufferer in going through the photographic process. As the two likenesses appear side by side in the album they will astonish all who look at them. They thought the one was such a much plainer person than she here appears, and the other so much prettier.

There are many beauties of colour and expression which cannot be rendered by the agency of the camera. Colour of of hair, colour of the complexion generally, of the lips, the cheeks, the eyes, all these go for nothing; and as to expression, the most expressive countenances suffer most invariably: a little happy touch of expression is a phenomenon one hardly ever remembers to have seen caught in a photographic portrait. If the face be left to take its chance—so to speak—a heavy or mournful look is the usual result, and if any particular expression be attempted, it is almost sure to look like a grimace; a truth of which we constantly see illustrations in the portraits of those engaged in the theatrical profession, when some special expression has been attempted. People of mediocre abilities, as people of mediocre beauty, will come off best in sitting for their photographs. They will astonish us by looking so clever, as the others by looking so pretty. Real genius and real beauty will often astonish us the other way. It is as difficult to give a man's outside, with all we know of it in a portrait, as to produce a fair representation of his mind in a biography.

There are, however, very many motives which all work in consonance to make us patronise this very thriving business of photography. First of all there is the appeal to our vanity. You yourself are the subject of your own especial consideration and that of one or two others for some considerable space of time. What a delightful thing that is. Whether you are good-looking or ugly you like that, depend on it. Then, the portrait done, you have the opportunity of distributing yourself among your friends, and letting them see you in your favourite attitude, and with your favourite expression. And then you get into those wonderful books which everybody possesses, and strangers see you there in good society, and ask who that very striking-looking person is?

Those albums are fast taking the place and doing the work of the long cherished card-basket. That institution has had a long swing of it. It was a good thing to leave on the table that your morning-caller while waiting in the drawing-room till you were presentable, might see what distinguished company you kept, and what very unexceptionable people were in the habit of coming to call on you. But the card-basket was not comparable to the album as an advertisement of your claims to gentility. The card of Mrs. Brown of Peckham would well to the surface at times from the depths to which you had consigned it, and overlay that of your favourite countess or millionaire. Besides, you could not in so many words call attention to your card-basket as you can to the album. You place it in your friend's hands, saying, "This only contains my special favourites, mind," and there is her ladyship staring them in the face the next moment. "Who is this sweet person?" says the visitor. "Oh, that is dear Lady Puddicombe," you reply carelessly. Delicious moment!

Yet, sitting for one's photograph is, after all, not a pleasant performance to go through. Of course it is a mere nothing to what one used to endure in sitting for a regular portrait in a gloomy apartment in Newman or Berners Street. Many of us

* From *All the Year Round.*

remember that operation vividly enough, and some even of the new generation can call to mind what they have suffered as children in the artists' quarter just named. They remember the dismal house with the curious window on the first-floor cut up so as to encroach on the second. They remember the dirty servant of all work who opened the door, and who ushered the victims into that dingy dining-room which was too suggestive of dentistry to be pleasant. As in the dental dining-room, so in this of the artist, there was a wonderful impossibility of identifying the apartment with eating and drinking. It would be impossible for anybody to enjoy either food or wine within its precincts. A few very old periodicals, a very fat and dirty volume of the Every-day Book of Hone, and some one or two books of amateur poetry, were on the central table, and as to works of art these abounded at the dentist's as at the painter's, but with this difference: at the first they would be engravings by different hands, and bearing affecting inscriptions in pencil, that made one's grinders shake in their sockets. "To Mr. Lipscrush, with the artist's *grateful* remembrances," or, "from a grateful patient," or, "in commemoration of many professional *favours* conferred on the artist." In the Berners Street dining-room the works of art were without such inscriptions. The pictures which hung round the artistic dining-room—and many of which had no frames—were ordinarily of elevated subjects: Titania with Bottom wearing the ass's head, Ophelia hovering over the book, Ugolino gaunt with starvation, Virginius sacrificing his daughter, and other exhilarating companions to the dinner table. There they hung, a perpetual monument to the want of taste of the British public, and there hung some of the portraits which the artist had been driven to paint, when he found that high art left his dining-table with nothing more eatable upon it, than an army list or a number of Blackwood. Among these latter works would be included "Portrait of the Artist," painted evidently at the Ugolino period, glaring round at society out of hollow, sunken eyes. The artist's father, his mother, and a general officer, who bore a strong resemblance to the artist himself in a Nathanic red coat and epaulets.

What wonder that one should go up from such a dining-room expecting to hear in a soothing voice the words "Open, a little wider," with an accompaniment of rattling instruments in a drawer? And what a place was the Studio itself when you reached it. That window observed from outside as encroaching on the second-floor was blocked up as to the lower half, so that there was no chance of seeing anything of the street unless it was the garret-window and the parapet of the house opposite, with an old flower-pot, a dangling fragment of clothes-line, and a row of hideous distorted chimneys, showing their gnarled and twisted arms against the dull grey sky. To spend an afternoon looking at such a prospect was not hilarious. Nor was the interior of the room much better. The half-finished pictures leaning against the wall, the studies from nature or copies of the old masters—old enough to have grown up into misters one would think by this time—the plaster casts of nude arms doubling themselves up so as to bring out the muscles in a very unnecessary manner, for nobody ever said they were *not* muscular, the antique heads, with noses on which the blacks and dust had gathered loweringly; their hollow parts and sunken lines protected by the nobbier portions, relieving with a white and brilliant glare the bits of old tapestry, frouzy costume, and improbable armour—all these matters made up an interior which if it was picturesque (which it wasn't) was infinitely dismal and disheartening.

You were seated on a throne, too, which to persons not of the regal class was in itself disconcerting. Some question of perspective, or points of view, rendered it needful that you should be raised on high, and so you were perched up on a green-baize throne. You sat on a cut-velvet old-fashioned chair, whose timbers creaked responsive every time you sighed, and more old-fashioned chairs were placed about the room, which might have reminded one of ancient times, if they had not been so much more suggestive of Auction Marts and nosey brokers.

What an afternoon's entertainment! If the artist talked, you felt he was not minding his business; if he worked, he was apt to be silent; while, if he tried to connect labour and conversation, his talk would be characterized by the Remark unconnected and the Reply inappropriate, and the afternoon's labour would very likely result in that disastrous phenomenon, an unrecognizable likeness.

Now what is the photographic ordeal after this? Nothing. Absolutely nothing.

But, just as the sufferings which we are called on to undergo have in this age been reduced, so also, alas! have the powers of endurance, and so the same human being, who once bore a journey of three days and nights by coach, grumbles at a two hour's whirl by railway; and he who has known the horrors of a month or so of sittings, finds that to wait an hour or so in a photographer's gallery, going right through all the portraits on the wall and table, exhausts his patience. When at last he is released from the waiting-saloon and mounts to the operating-room above, that he is in the worst possible cue for the performance in which he is to take a part. He feels at once dazzled and oppressed by that glare of light above his head. It makes him blink, it closes up his eyes, it gives him a sense of having been up all night. The properties about the room, too, are bewildering. There are all sorts of things appropriate to all the different professions which different sitters may be expected to follow. There is a piece of complicated wheel-work for a mechanician, a pair of globes for a geographer, a nautical compass for the mariner, and a pair of compasses for the civil engineer. There, too, is a palette and an easel for the artist, a book for the divine, an empty brief for the lawyer, an hour-glass for the philospher, and an inkstand and a pen with a tremendous feather in it for the author. Lastly, there is a wretched painted scene which is intended to take the public in as a landscape-background, but the honest instrument will never fall into the scheme, and hating the landscape always proclaims it for the sham which it is. The background is intended for private and non-professional persons, and there is also a pillar and a curtain—but who are those for? What is the profession of that unhappy and misguided wretch who is supposed to pass his life in a perpetual environment of pillar and curtain? There may have been persons so situated once, but now we turn our pillars into letter boxes, and the curtain draperies into ladies' cloaks rich in festoons of crimson.

The thirty seconds which the light requires to take a likeness are so utterly exhausting, that if there were one more necessary I believe no human being could go through with the thing. The horrible necessity of keeping motionless is an incentive, of almost irresistible force, to violent action. Terrific are the temptations of those thirty seconds. You feel that you must make a face, yell, spring up, and cut a frantic caper. You say to yourself: "Suppose I were to sneeze, to choke; suppose I were to burst out into a rude guffaw? I will, I must! Suppose I were to squint; I think I *am* squinting. The brass knob on which I am told to fix my eyes is getting muzzy; it is huge in size; it revolves; I can't see it. My hands are tingling, swelling, bursting. All is dizzy before me—I shall explode!"

(*To be continued.*)

## Correspondence.

### KEEPING DRY PLATES AFTER EXPOSURE.

Dear Sir,—I have long had a suspicion that plates prepared by the tannin process, and its modifications, though the keeping qualities before exposure seem almost unlimited, should be developed in a moderate time after exposure, in order to secure the best results.

My experience has shown me that plates kept only a few days after exposure have lost much of their strength and vigour, coming out slowly as grey and weak negatives. This suggested to me the necessity of making an experiment to decide the question beyond a doubt, and I carried it out in the following manner:—

I prepared a tannin plate with a collodion containing bromide; in fact, an old mixture I am now working for this process; exposed to a good light in a bi-lens camera, cut the plate in half, developed one half the same day, and kept the other before developing for 15 days.

The difference between the two halves is, as you will see from the print enclosed, so great that one might be supposed to have been taken at mid-day, the other at midnight.

As I have seen assertions that tannin plates have been developed weeks after exposure, an interesting question arises. By what change is the image removed, and under what circumstances is it possible to keep plates without injury for a reasonable time after exposure?

Perhaps you or some of your correspondents can give the desired information; at any rate, the above fact may be useful to some of your readers in guarding them from one source of failure.—Yours truly, G. S. Penny.

*Cheltenham, May 3rd*, 1862.

[The specimen received is an interesting illustration of the experiment described. One half of the picture is brilliant and well detailed; the other ono universal grey, sky and foreground alike, without detail, and the barest iudications of objects as seen through a dense fog. It would suggest a plate which had not received a twentieth of the proper exposure, which had by pushing development given some traces of an image, and then become buried and veiled in general reduction, in which, however, there was no density. Dr. Hill Norris states that his plates if kept too long after exposure, before development, gradually lose the image, and in time return to their original sensitiveness. He also states that the acetic acid or its vapours will remove the latent image impressed by light. In order correctly to investigate the subject, we are brought again to the interesting but ill-understood question of the exact operation of light in producing the latent image. Dr. Norris believes it to be what he terms an excitation, an action set up in the molecules, which, if not continued by the action of a developer, gradually subsides, and the *status quo* is restored. Apart from the question of theory, however, the fact described is an important one, which our readers will do well to mark.—Ed.]

## INTENSIFYING DRY PLATES.

Sir,—I am much obliged to you for your observations on my communication in last week's News. You have hit the right nail on the head. The best mode of dealing with dry plates which show a thin image is to re-develop immediately after fixing. Since I wrote to you, I found I had two plates which had not been fixed. Having cleared these and washed well, I applied a 20-grain solution of nitrate of silver to the film, and proceeded to gain intensity with citro-pyrogallic in the usual way. The result was satisfactory, no further treatment being requisite. I can also confirm what you state as to the expediency of employing a weak solution of iodine, or of iodide of mercury. If the solution be too strong, or be kept too long on the film, the image becomes almost obliterated. This was the case with a stereo plate, one of the first I had endeavoured to strengthen; the iodide of mercury having entirely buried one of the pictures, and left but a faint trace of the other. Three days ago I took this plate to the dark room, moistened the film, poured over it a 20-grain silver solution, and finally redeveloped with citro-pyrogallic. The picture, of which a faint trace only was discernible, quickly came out very strongly, but the other did not reappear at all. The former was much too dense, the half tones being destroyed, and the plate rendered utterly worthless for printing. The experiment, however, is instructive as to the results to be anticipated from the employment of too strong a solution of the mercurial iodide.

The great point to be observed in all plates which require intensifying with bichloride of mercury or solutions of iodine, is that the image to be intensified contains a sufficient amount of silver; for if this is not the case, the result can scarcely be other than unsatisfactory. For this reason, redevelopment with pyro and silver should invariably follow the fixing operation; and where that course has been omitted, it should be resorted to prior to the employment of any other means of obtaining intensity. After this, should greater density be requisite, the mercurial iodide will confer it; care being taken that the solution be weak, and that it be poured off the film immediately the blackening of the image has taken place. Should too strong a solution be used, and the film become converted into yellow iodide, the remedy seems to be thorough washing, then pouring a solution of nitrate of silver over the film, and finally redeveloping with citro-pyrogallic. After this, any iodide still remaining on the plate may be removed by hypo, without danger to the image.

I regret having overlooked Mr. Hannaford's method of intensifying, given in vol. v. p. 336 of the News. Had I seen it before I determined to write to you, I should probably not have intruded on your space. On reference to the last edition of Hardwich, p. 345, I find he has detailed the process of strengthening with sulphide of potassium, to which you allude. But my strong impression is that for dry plates, there is nothing preferable to citro-pyrogallic and silver for the purpose, and that the iodine and mercury solutions should only be resorted to when this method fails, as it sometimes will, to bring up the density to the required poiut.

In the present state of dry plate photography, the subject on which I have ventured to occupy your attention is, or will be, one of great importance. If the experience of this year's summer and autumn should prove that dry plates can be so prepared as to be as sensitive as wet, and that they may also be rendered available for all purposes of instantaneous exposure, then the best mode of strengthening them must form an indispensable chapter in future treatises on photography, and the sooner the subject is ventilated and thoroughly investigated, the better will it be for the interests of the art.—I remain, sir, yours respectfully, Amateur.

[We are glad to receive from such an intelligent photographer as we know "Amateur" to be, confirmation of our suggestions on this subject. He rightly observes that it is likely to become a very important one, especially if simply washed collodion plates take the position which some anticipate for them.—Ed.]

Dear Sir,—In reply to the letter of an "Amateur," in which my name is mentioned, I beg to say that the solution I use for strengthening negatives, can be used for dry as well as for wet plates, if carefully applied. Instead of *one minute* being sufficient to produce the "cream colour," it would probably take from half an hour to three hours, depending on temperature and various other circumstances. I would advise your correspondent to exercise a little moro patience in conducting his experiments, he would then perhaps, succeed better, and not hastily condemn processes, which in other hands, produce the best results. In contrast to what an "Amateur" says, allow me to quote the following from the letter of a professional photographer, recently received. He says, referring to other processes he had tried, "So I have come to the conclusion, after much *time* and *trouble*, that there is uone so valuable for its certain results and its artistical qualities as your own; with it I can *always* get any amount of density or delicacy, and by auy of the others I could uot."

I do not claim any originality, as the process is merely a modification of oue used by the late Mr. Archer.—Yours very truly, A. Brothers.

Benzine.—This fluid reaches the point of ebullition at a lower temperature than turpentine, and necessarily at a much lower heat than linseed oil, which in varnish making is combined with it. It volatilizes at a very gentle heat, and forms an explosive gas, in connection with the air, scarcely less dangerous than gunpowder. In the present instance the room was nearly air-tight, and the force of the explosion was equivalent to that of a gunpowder magazine.

Growing of Plants by the Electric Light.—M. Hervé Mangou, of Paris, France, has succeeded in growing the seeds of rye under the influence of the electric light alone. The plants assumed their green tint rapidly and vigorously, and showed no perceptible difference from those grown in ordinary daylight.

## Talk in the Studio.

THE STEREOSCOPIC COMPANY IN THE EXHIBITION.—We understand that the Stereoscopic Company have been very successful so far in the International Exhibition, several fine large pictures as well as stereographs having been secured of different incidents in the opening ceremony. The following day Prince Frederick William, seated on the throne, and his suite, were successfully taken. The *Daily Telegraph*, in its account of the opening day, had some amusing remarks on the arrangements and operations of the company, which we quote:—"Close to the dais, and near that unlucky plaster cast of Lady Godiva, stood a tall, strange-looking parallelopipedon, covered with crimson baize, and having in its eastern face two square apertures. One of those apertures was partially veiled by a yellow curtain; within the frame of the other a human hand was seen from time to time stealthily moving. This curious machine was at first surmised to be either a Fantoccini show or the cognate temple dedicated to the performances of Mr. Punch; but on closer inspection certain lateral placards became visible, setting forth that the London Stereoscopic Company had obtained from the Royal Commissioners—and at a prodigious outlay too—the exclusive privilege of taking views within the Exhibition building. The tall parallelopipedon was, in fact, the monster camera of the London Stereoscopic Company, and the hand belonged to the ingenious operator, making arrangements for taking those photographs of the ceremony of which the very earliest proofs were forwarded, per Queen's messenger, to Her Majesty. We may add that the London Stereoscopic Company, finding themselves somewhat pressed for the proper means for taking the required pictures, had placed at their disposal the whole of the magnificent collection of photographic lenses exhibited by the world-famous opticians, Voigtländer of Vienna. This ready act of international courtesy emanated from Messrs. Voigtländer's agent, Mr. Callaghan, of New Bond-street." That the small temporary erections built for operating chambers, which our contemporary, oblivious of his geometrical studies, styles "parallelopipedons," should be "monster cameras" is funny enough; but that in order to secure stereoscopic and 10 by 8 pictures from half-a-dozen points of view, the "magnificent collection of photographic lenses" in question should be required by the firm who has undertaken this contract is a superlative joke. The same amusing writer says:—"We don't know whether any discreet employé of the London Stereoscopic Company was despatched to the dais, with instructions to whisper a police inspector to whisper an aide-de-camp, who in his turn was to murmur a word of entreaty and advice in the ears of the illustrious party on the throne and in the [illegible]; but it is certain that during the convenient period afforded by the performance of the special music, the distinguished group kept themselves in admirable positions, and under every condition of immobility favourable to having their portraits photographed. The Duke, it is true, had once crossed his legs in a somewhat unpicturesque manner; but he suddenly remembered that unseen monitor within the crimson parallelopipedon, and assumed a more artistic pose. Prince Frederick William of Prussia scarcely moved a muscle for ten minutes together. The Archbishop of Canterbury, in his flowing white canonicals, looked tranquilly venerable. Lord Westbury and Mr. Denison looked as placid, statuesque, and dignified as it seems the privilege of all Lord Chancellors and Speakers of the House of Commons to look. Prince Oscar of Sweden, a remarkably handsome man, of almost gigantic stature, and so exceedingly swarthy as to disappoint some ladies who imagined that all Scandinavians must be fair, till they were told that the Royal Swede was the descendant of the southern Frenchman Bernadotte—the dark Prince never stirred, and seemed as if it would take a blow from Thor's hammer to move him. The only exception to the rule was Lord Palmerston, who was gossiping now with the Bishop of London and now with the Chancellor, and seemed so heartily to appreciate Auber's music as at one time to be disposed to dance to it. Let us not forget among the immobiles the Earl of Derby, who looked every inch the fourteenth Earl, and who, we fancy, regarded the members of the Japanese Embassy, who sat directly facing him, with an expression of haughty disdain, as though he deemed them creatures of an inferior race; and Lord Sydney, who looked so very respectable and so very quiet, that we shall be disappointed if we do not see his benignant countenance and his white staff as Chamberlain developed in the minutest degree in the forthcoming photographs."

## To Correspondents.

A SUBSCRIBER.—We published Mr. England's modification of the tannin process as he gave it. The amount of sensitiveness he describes as equalling that of wet collodion simply iodized and developed with pyro: the lens, aperture, &c., he did not state. The bath, we presume, is not so strongly acid as recommended by Major Russell. See articles on "Hot Development," and on "Tannin and Honey Process" in present number.

REGNAULT.—1. We believe Keene's collodion does contain a bromide, but you can add more if you wish. The bromide of cadmium will answer best. 2. The amount of iodide to complete the saturation of the nitrate bath depends on its strength. A strong nitrate bath will dissolve more iodide than a weak one. One or two grains of iodide of potassium will generally be sufficient for an ounce of silver. Any slight excess of iodide of silver must be filtered out. 3. It entirely depends on the object to be attained whether a solution of gallic acid be made with hot or cold water, and whether or not alcohol be added. An ordinary saturated solution will be made with cold water, and contain four or five grains to the ounce. Some samples are still more soluble. 4. We have seen the best approximation to the dark sepia tone you describe produced by Le Gray's formula, containing chloride of gold and chloride of lime. See PHOTOGRAPHIC NEWS ALMANAC. 5. The reproduction of engravings when exposed in sunlight generally requires a very short exposure.

AMATEUR.—Articles on the tannin process appeared in our last volume: we may especially refer to articles on pp. 121, 135, 198, 217, and 271; and also in the present and several other numbers of the current volume.

H. B.—The general plan of your glass room appears to be very good; but we should have preferred to have it two or three feet wider. Beyond that we do not see any especial need of suggestions. We believe "Early Spring" is ready.

ASPIRANS.—A portrait lens and a single lens both having the same equivalent focus, would not conveniently be worked together in a camera focussed from the back, as the position of the compound lens would require altering at different distances.

A.—The only case of similar spots to those in the prints sent which we have met with, were caused by some citric acid coming in contact with the picture, before the hypo was entirely removed. Has anything of that kind possibly happened with your prints?

C.—The best material with which to stipple your glass roof with, so as to exclude direct sunlight, is white lead and turpentine. The proportions will be easily determined by experiment, but we cannot state them precisely.

R. G.—The sky in the print you forward is of a very good tint indeed, and infinitely preferable to a sky of white paper.

X.—Your negatives are a little too hard at present. Observe carefully the best photographs you see issued by good operators, and strive to equal them. Care and practice will do much.

W. & D. DOWNEY.—We do not know of any first-rate operator at present who is out of an engagement. Should we hear of any we will let you know. Operators of really good ability are much in demand just now; several of our friends in London are in need of such assistance at present.

E. B.—A rack and pinion is chiefly useful in portraiture, but the practice of focussing by means of the body of the camera is now much used, and is more convenient, especially where two lenses are used in the same camera.

ENQUIRER.—When your alkaline toning bath of carbonate of soda and gold is exhausted, do not add more gold solution to it, but use a fresh bath entirely. 2. Double the quantity of solution will tone double the number of prints.

F. B.—A developing solution containing acetate of iron will give a more intense negative than the ordinary developer of sulphate of iron. In our hands, however, we have found it less manageable, and it does not keep well.

ALBUM.—Photographs on albumenized paper may be tinted in powder colours, but only when they are going to be put in a case, or framed, so that the surface may be protected by glass, otherwise the colour would rub off.

G. F. L.—It is generally desirable to print a little deeper than is desired for the finished proof, to allow for loss in toning and fixing. The exact depth must be decreased largely by the quality of the paper, as some samples require more overprinting than others. 2. Card portraits look best with a margin of about one-eighth of an inch at the top and sides, and about three-eighths or half-an-inch at the bottom. 3. Mount with freshly made starch, or good French glue. 4. We cannot offer any opinion as to the question of price. The tendency in photography at the present day seems to be in the direction of producing a large quantity at a low price.

B. F. LEWIS.—It is not desirable in portraiture to work with a stop any smaller than is sufficient to produce sufficient definition over every part of the picture. Rapidity is a great object in portraiture, and that can rarely be secured with a very small stop. Moreover, the picture is rounder and bolder with a large aperture.

R. G.—We see no reason to suppose the failure to be the fault of the shutter, but of the manipulation. You have only partially lifted the shutter, and so exposed only part of the sky. If after shading the sky during part of the exposure you finally lift the shutter entirely, the whole sky may be exposed for the time you require. You may very easily ascertain the exact working by watching the ground glass as you place the shutter in different positions.

STEREO.—Understand thoroughly that good light is necessary to instantaneous photography. With the best lens, the purest chemicals, and the most rapid process, you can scarcely hope for instantaneous pictures in a dull light. Sunlight is best, but there are some very good actinic days without apparent sunlight.

F. L.—Your prints are, to our taste, much overtoned and very inky. With a warmer tone they would have been better pictures. Be more careful to attain perfectly manipulation. Without care there can be no good photography.

L. R. R.—Allow your film to set better before immersion in the nitrate bath: that will frequently remove a tendency to leave the plate. If your bath is very acid it will aid in causing the evil. Dirty or damp plates will sometimes cause it. A new and very collodion is more apt to give a film which leaves the glass than a more porous sample. Care in manipulating will often prove a remedy. 2. When a solution of pyrogallic acid is old and dark coloured it is useless as a developer, and must be thrown away. 3. We prefer hypo for fixing negatives.

M. P.—See Mr. Wall's "Manual of Colouring." A few lessons from Mr. Wall would probably aid you considerably.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 193.—*May* 16, 1862.



## THE EFFECT OF BROMIDES IN COLLODION.

In a recent article on this subject, we endeavoured to show that, whilst, with some theorists and experimentalists, the accelerating influence of a bromide in collodion was still a moot point, its value had received universal recognition by all practical men whose results depended on extreme sensitiveness. We then mentioned the fact, somewhat inexplicable to us, that Mr. Sutton, whose skill and judgment as a practical photographer we generally hold in the highest esteem, had recently been recommending a return to the use of simply iodized collodion and pyrogallic acid development, as giving greater sensitiveness, and producing better results.

Mr. Sutton has recently devoted another article to the subject, detailing some experiments, and enforcing his former position by arguments, which, to us, are inconclusive, and, in some instances, scarcely fair. As the subject is one of the first importance to photographers, and as we have the profoundest conviction of the beneficial action of bromides, as giving rapidity, delicacy, and cleanliness to the negative, we shall quote the experiments and remarks referred to at some length, and offer a few observations, pointing out where we conceive they are fallacious. Mr. Sutton says:—

"The first experiments were made with collodion containing only bromide of cadmium, and no iodide of any kind; and it was used with a new bath of Baily's pure neutral nitrate of silver, of the ordinary strength. The quantity of bromide dissolved in the collodion was eight grains to the ounce. More than this can easily be dissolved, but the collodion must not then give an even film.

"Eight grains of bromide of cadmium contain about 4⅔ grs. of bromine; while 4 grs. of iodide of cadmium (the usual quantity added to an ounce of collodion) contain about 2⅔ grs. of iodine. The bromized collodion used in our experiments would therefore give as much bromide of silver in the film as is contained in very highly iodized collodion, and much more than in common iodized collodion.

"When the bromized collodion film is immersed in the nitrate bath, it assumes at first a pale blue colour, and this very slowly passes to a pale whitish yellow. In order to acquire the maximum degree of creaminess or opacity, and to lose the blue tint, the plate must remain *several hours* in the bath, and even then the film is not so creamy as a common iodized film which has been left a few *minutes* only in the bath. On using a bromized collodion containing only half the above stated quantity of bromide, the film was at first paler and thinner than before, and never became what is called creamy, but always thin and poor.

"In this first experiment we perceive a marked difference between bromized and iodized collodion; for whereas the iodide of silver is quickly formed in the one film, the bromide of silver is very slowly formed in the other. It becomes evident, therefore, that those operators who use a large quantity of bromide in their collodion, and only allow the plate the usual time in the nitrate bath, must expose it with a considerable quantity of unconverted bromide still contained in it, and how that can conduce to the exalted sensitiveness of which these gentlemen speak, we must leave it to them to explain. If collodion containing, say 5 grs. of bromide of cadmium to the ounce, requires a couple of hours in the bath to convert the whole of the cadmium bromide into bromide of silver, the film, after a sojourn of only five minutes in the bath, and while it is still blue and thin, must surely contain some free bromide of cadmium, and if that conduces to sensitiveness it is a new and remarkable fact, which we hand over to those who recommend a large quantity of bromide in collodion to explain."

We may observe here that all Mr. Sutton's experiments are made with a bromide only. Now, no one knows better than he, that in chemistry, the combined action of any two bodies is not necessarily just the sum of the separate action of each; and that the action of an iodide alone, or a bromide alone, is no necessary criterion of their result, when in combination. We may add also, that whilst we are prepared to admit that the complete conversion of the bromide in collodion into bromide of silver, is a slower process than the conversion of iodide into iodide of silver, bromine having less affinity for silver than iodine, we cannot indorse Mr. Sutton's opinion that several hours are required for the process. A plate coated with bromized collodion and immersed in the nitrate bath, and withdrawn in two or three minutes, presents a thin, opalescent appearance; but if allowed to remain five or six minutes it becomes, not creamy certainly, but opaque and white, and we have not observed any further change, if left for an hour. That it should not acquire the same creamy effect which the iodized collodion does is very natural, seeing that the colour of bromide of silver is white, whilst that of iodide of silver is yellow. Let our readers try a very simple experiment: take a solution of nitrate of silver, and add a little bromide of potassium, either in solution or in small particles, and observe whether the process of double decomposition take place at once, or very tardily, they will find, in truth, that it is almost as rapid as when an iodide is used; in a very few minutes if sufficient of any bromide be added the whole of the silver is precipitated in the form of a bromide of silver, which is of a milk-white colour. If, for the purpose of comparing the rapidity of the process, the silver be thrown down in a similar manner with an iodide, the precipitate will be found, as is well known, of a primrose tint, and the difference between the two will readily account for the fact, that the iodized collodion gives a more creamy film than the bromized sample. If, then, as seems probable, the extremely tardy formation of bromide of silver, which Mr. Sutton describes, be the result of some unnoted circumstance, or abnormal condition, and not a well-ascertained general fact, any deduction from it does not affect the question at issue.

Mr. Sutton then further proceeds:—

"Having thus formed upon glass a film of collodio-bromide of silver, thick or thin as the case may be, the next point to determine is the action of the nitrate bath upon it. Is it eaten away, as iodide of silver is, by the bath, or does it remain, like a film of collodio-chloride of silver, apparently unacted on by the bath? Experiment shows that the latter is the case. A fresh 30-grain nitrate bath will dissolve a certain small quantity of bromide of silver, but not enough to affect the appearance of the film after twenty-four hours' immersion in it. The bath does not exercise anything like the same energetic action upon bromide as it does upon iodide of silver. If you coat the two halves of a stereoscopic plate, one with iodized, the other with bromized collodion, and leave the plate twenty-four hours in the bath, the iodized film will be eaten away and reduced to clear glass, while the bromized film will appear to be unaffected. We see here a resemblance between bromide and chloride of silver in the property of resisting the action of the nitrate bath. But it is still certain that the bath does, when fresh, dissolve a *small* quantity of bromide of silver, because we have seen small particles which have been detached from an over-bromized plate disappear in it. Besides which, the constant use of bromized collodion gradually puts a good bath out of order, and causes it to give grey, fogged, and insensitive negatives, as we shall show bye-and-bye.

"The next point to determine is the effect of light upon bromide of silver.

"When the plate is removed from the bath, in any state (that is, either when the film is blue after a few minutes' immersion, or pale yellow after an hour or more), and exposed to direct light, it quickly changes colour and assumes a deeper blue, or slaty tint; its original blue tint becoming deeper in one case, and its yellow tint becoming lead colour in the other. Moreover, the longer you expose it to light, the darker the colour becomes, so that if a negative were laid upon the film, a strong positive could be printed upon it in a few minutes. Few photographers, we believe, are aware of this property of bromide of silver, and it will be interesting to try it in direct positive printing, because it appears to be highly sensitive to direct light, and to blacken rather more rapidly than chloride of silver. But how different is this from the action of light upon iodide of silver. If you expose to light a film of sensitive collodio-iodide of silver it changes colour instantly to a very pale brown, but the change proceeds no further, and the film gets no darker by prolonged exposure. Here, again, the bromide of silver bears a strong resemblance to the chloride, but none to the iodide. Observe, also, that bromide of silver will darken when exposed to light, even with bromide of cadmium in excess, just as chloride of silver will darken with chloride of sodium in excess; but iodide of silver will *not* darken with iodide of potassium in excess, as the insensitive iodized Talbotype paper sufficiently proves.

"If you expose to light a film of collodio-chloride of silver, and then pour over it some pyrogallic developer, you produce a magnificent deep ruby-red deposit, when viewed by transmitted light. If you treat in the same way a film of collodio-bromide of silver you produce a thin olive-coloured deposit, with no richness or density. A film of collodio-iodide of silver treated in the same way yields, like the chloride, a deposit of a rich ruby-red colour. Our readers will already foresee what we shall tell them bye-and-bye of the way in which the admixture of bromide with iodide of silver reduces and enfeebles the fine rich colour of the deposit produced by the developer upon the iodide when used alone.

"It only now remains to compare the sensitiveness of bromide with iodide of silver by exposure in the camera, and development with pyrogallic acid, or with iron.

"In order to treat the bromide fairly, and give it every chance against its rival, we must first expose it in its blue state, and afterwards repeat the experiment when it has become yellow and fully formed. In the first case you simply apply bromized collodion to one half of a stereoscopic plate, and iodized collodion to the other half, excite in a pure nitrate bath, expose both together, and develop either with pyro or iron. The result is a fully exposed negative upon the iodized film, and only a thin, faint grey trace of the sky and highest lights upon the bromized film. In the other case you try an entire plate with a fully formed film of bromide against another with iodide alone, and the result turns out exactly the same as before. Bromide of silver alone is, therefore, proved to be extremely insensitive in the camera. And so, having convinced yourself of this fact, you put away your good bath, and let no more bromide go into it, because a dozen such experiments would ruin it beyond recovery."

We have quoted these observations at length, because they contain much that is interesting and important; but, as regards the question in hand, we entirely deny their relevancy. Bromide of silver alone, we admit to be less sensitive than iodide of silver in its best conditions; but we deny, as we have done before, that any legitimate argument is thence derivable as to the effect of combining the two: each might be easily quite insensitive alone, and yet the two in combination be highly sensitive. Let those of our readers who have the opportunity, try the experiments for themselves; let those who have not time, carefully note the results of the experiments recently tried by Mr. Blanchard, and produced before the South London Photographic Society, the report of which we give in the present number; experiments which, we may add, we have ourselves repeatedly tried before, and with similar results. As regards the influence upon the nitrate bath, let our readers be at ease, we have at this moment a nitrate bath in excellent condition, which has had some thousands of bromo-iodized plates excited in it. Mr. Sutton then proceeds to refer to our own articles on this subject:—

"Our friend Simpson has frequently insisted upon the accelerating effect of a bromide when added *in very small quantity* to iodized collodion. We regret that we cannot follow him in these refined experiments. It has given us frequently so much trouble to establish even the broad leading facts of photography, such as those described in this paper, that we are compelled to accept with hesitation the statements of others on very nice points, which can only be established by long and close observation. Mr. Simpson has also arrayed against us the names of some mighty men in photography, such as Williams, Blanchard, England, and Wilson, who all, he says, agree with him in using bromo-iodized collodion, and find it more sensitive than the other. But we know something of the doings of these gentlemen as well as our worthy friend. About this time last year we had many long country walks and talks with Mr. Williams, and he showed us some of his admirable negatives, but complained that his bromo-iodized collodion was decidedly slow. Mr. Blanchard, in his letter to the *Notes*, complains of the patience required by a photographer, and hints at the many failures and difficulties encountered in his mode of working, Mr. Wilson, in a recent letter to the *Notes*, warns our readers that instantaneous photography requires a peculiarly fine condition of light. Remember, too, that the instantaneous stereograms which we have lately reviewed in this Journal have all been taken in broad summer sun, never in diffused light. Many of the negatives, particularly those by Mr. England, are very thin and flat, and appear to have been taken by twilight or moonlight, rather than by 'the gay beams of lightsome day.' Mr. Williams's negatives were thin, and required intensifying with bichloride of mercury and iodine. Some of Mr. Wilson's, which we saw, were covered with the thick veil of grey fog, peculiar to iron development upon bromo-iodized collodion, and although these were failures, yet they indicated the tendency of the process to produce this sort of failure. There is no evidence, therefore, that any of the instantaneous views to which we have alluded have been taken with a good and rapid collodion, but on the contrary, great reason to believe that the collodion used was decidedly slow."

Now we utterly protest against all this, and we put it to our friend Sutton's sense of fair play if it be not too bad to the gentlemen he names. He has seen some of Mr. Wilson's failures, and he argues thence that the character of the process by which he obtains successes is to give fog, when the truth is, that Mr. Wilson's pictures are generally very brilliant. Mr. Blanchard states that much patience is required in the practice of instantaneous photography, referring to the watching and waiting necessary to secure fine effects of light and atmosphere, and Mr. Sutton argues thence that this is the result of using bromo-iodized collodion. Mr. England's negatives are characterized, unseen, as thin and flat, when the truth is they are very brilliant, although soft, as those who have seen them can testify. Mr. Williams had met with a sample of slow bromo-iodized collodion, but that did not lead him to discard bromides, for he still continues their use.

As to our own refined experiments we cannot help smiling. We have on occasion, we believe, recommended as little as a third of a grain of bromide to an ounce of collodion, and we know that a much less proportion will produce a decided effect. The other day we asked a well-known practical photographer, who has experimented largely in this direction, how small a quantity of bromide he had ever found to be of value; he stated that he had on some occasions found that one-sixteenth of a grain to the ounce produced a marked improvement in the picture. In our own practice we have found that from half a grain to a grain in an ounce of collodion was the best proportion for portraiture, and a little more for landscapes. This gives stability, softness, rapidity, and cleanness. We have tested the matter hundreds of times, in every possible way, and the results have been invariably confirmatory of our convictions.

Mr. Sutton states that he can take instantaneous pictures of waves, &c., with simply iodized collodion and pyrogallic acid development, using a lens of five inches focus, and half-inch stop, in diffused light. We do not doubt it for a moment. We have seen instantaneous pictures of similar subjects taken with a lens of eight inches focus, and a three-eighths stop, with bromo-iodized collodion and iron development. But it must be remembered that these are not the subjects to tax rapidity. The pure light of Jersey is not that of smoky cities. M. Soulier, in a conversation we had with him recently, insisted emphatically on this fact, that street scenes are the real tests of instantaneity. Mr. England's successes have been in the streets of Paris, and some of Mr. Blanchard's in the streets of London, and it is here they test the value of bromides. Mr. England informs us that he has spent many months in experimenting on this subject, and his conviction is that, *cæteris paribus*, bromo-iodized collodion with iron development is three times as rapid as simply iodized collodion with pyrogallic acid development.

Our own experience has led us to believe that there are certain conditions occasionally attainable in which simply iodized collodion and pyrogallic acid development will give as good and rapid results as it is possible to desire; but these conditions are difficult to attain and impossible to preserve; whilst with bromo-iodized collodion and iron development there is no difficulty. Mr. Sutton is a skilful manipulator, he manufactures his own collodion, which is as good as can be made, and he works in a Jersey light: we can understand how it may happen, as we know it does, that he is pre-eminently successful with the iodide alone. As regards the influence of bromides generally, we think he is in error, and we have the universal practice of American photographers, Continental photographers, and the most eminent photographers in this country in favour of our position.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Baths and Dippers (*continued*).

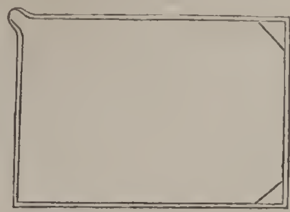
*The Horizontal Dipping Bath.*—The vertical bath which I have just described is so universally used in this country, that I do not think horizontal baths, intended for sensitizing collodion, or other plates, were even manufactured for sale in this country until within a few weeks of the present time; and yet, although they are inferior in some few points, which I will presently investigate, for general business purposes, they have so much to recommend them, especially to the amateur, that it is a matter of surprise to me that their use has been hitherto so neglected.

There are two kinds of horizontal baths. Those in which the plate is placed collodion side upwards, and those in which the plate lies with the collodion side downwards. The description which follows refers solely to the last. The first-named baths, or those in which the collodionised plate is laid film upwards, are convenient, and, I think, to be preferred to the vertical bath, especially for large plates, on account of the small quantity of exciting fluid required with them, but in practice they are found to be inferior to the other kind of horizontal bath, and I shall, therefore, confine my remarks to these latter. I should mention, however, that the first are extensively used on the Continent, for all purposes.

A plate is sensitized in a vertical bath by plunging it *into* a vessel containing the exciting silver solution. In a horizontal bath, on the contrary, it is laid, face downwards, *on* the silver solution, in the same manner as positive paper.

A horizontal bath is a tray about a quarter of an inch larger each way than the plates that are to be sensitized in it, deeper at one end than the other; at the deep end the corners are filled up to the same level as the bottom of the shallow end, so that a plate laid in it may rest horizontally, one extremity upon the bottom of the bath at the shallow end, and the other upon the two corners of the deep end. Sufficient liquid is used just to cover the bottom of the shallow end, and the two corner pieces. Fig. 21 gives the plan of such a bath, and fig. 22 a section of it; the dotted line in fig. 22 showing the level of the bath liquid.

Fig. 21.



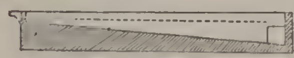
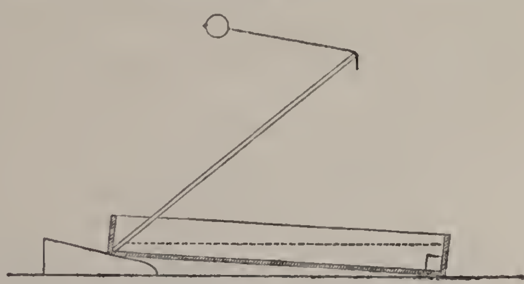


Fig. 22.

A horizontal bath may also be made with the bottom parallel to the edges, but curved, or hollowed out, in the sense of the length, so that a plate, when lying in it, may rest only on the edges of its sides. Practice has, however, convinced me that this is less effective than the one I have just described, as the film has more intimate contact with the bottom of the bath, and has a greater risk of being disturbed than when it merely touches the corners at two unimportant points.

The handy photographer can make a horizontal bath for himself, or, in default of tools, he can have one made by a carpenter in the following manner:—Take a piece of plate glass a quarter of an inch larger each way than the proposed bath, and set it in a wooden frame a quarter of an inch broad and an inch deep, like a boy's slate; only, instead of making the grooves, which are to hold the glass in the side pieces, parallel to the edges, let them be cut so as to give the required inclination to the bottom of the bath (fig. 23).

Fig. 24.



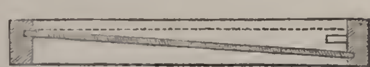


Fig. 23.

These grooves should be about an eighth of an inch in depth. The corners are then to be filled up with a piece of wood fastened in with cement, or, what is better, a silver wire may be fixed across them at the proper level. Lastly, all the woodwork inside and out must be thoroughly well coated, and the joints well stopped with hot rosin cement. Such a bath will cost about one-sixth of a porcelain vertical dipping bath, and is equally efficient.

A temporary horizontal dipping bath may be made with an ordinary washing tray, whether of glass, porcelain, or gutta-percha, by filling up the corners at one end with some substance inactive to nitrate of silver—a piece of sealing-wax is always handy and is easy to fix by heat—and tilting up the other end, by placing a wedge under it (fig. 24).

To use a horizontal dipping bath sufficient silver solution,

* Continued from page 221.

as I have mentioned before, is poured into it just to cover the shallowest part of the bottom and the corners at the deep end. The collodionized plate is placed upright at the extreme shallow end, standing on the bottom of the bath and against the angle, with the collodion side towards the other end, and by means of a silver or horn hook it is gently lowered with one movement to a horizontal position, when the other end of it will rest upon the corners (see fig. 24), the face of the plate being immersed in the liquid.

There is clearly no *necessity* for regulating the quantity of bath solution with extreme accuracy, as an excess would only have the effect of wetting the back of the plate as in a vertical dipping bath; but as the advantage is offered by this kind of bath of only wetting the face, which economises the bath liquid, by the quantity that would adhere to the back if wholly immersed, and also frequently saves it from much impurity off the backs of dirty glasses, it is as well to take the benefit of it.

The objection to a horizontal bath for professional persons who are constantly working with many different sized plates in the course of the day is, that each sized plate requires its particular bath, and it would be in many cases inconvenient to change frequently from one to another, when their vertical dipping bath will take all sizes alike. This drawback does not equally apply to amateurs who generally confine their operation to one particular size for each purpose, and to them it offers many advantages, which I think would amply justify their introducing it into their laboratories.

It is cheaper than any other kind of bath in the same material, whether it is bought or home made.

From its form it is easy to clean, and to ascertain when it is clean; and consequently one made of that most useful material, gutta-percha, is just as good as a more expensive one made of glass.

The quantity of bath liquid required is reduced by at least three quarters. A stereoscopic plate in most vertical baths, requires from 8 to 12 ounces of liquid; in a horizontal bath 2 ounces are sufficient. It is needless to observe that with large plates the economy on this point is very great.

There is no fear of the plate getting off the dipper, whether through breakage or carelessness.

There is no danger of the dipper breaking, as a metal hook is used.

In taking a plate out of a vertical bath it collects on its surface any particles that may be floating on or near the top of the liquid, but from the mode in which a plate is raised in a horizontal bath, all floating impurities are chased down to the extreme end, and are carried off with the first few drips; therefore from this cause the plates are free from spots; also the surface only of the liquid is disturbed by placing the plate in it, consequently all sediment or heavy impurities will remain at the bottom, instead of being stirred up every time as is the case in a vertical bath. This is another important advantage. However long the bath has been standing unused and unfiltered, even when a large quantity of sediment is at the bottom, by passing a strip of filtering paper over the surface, to clear away floating particles or scum, this kind of bath is always ready for immediate use and will produce clean pictures.

For large plates the manipulation is infinitely easier, and they are in consequence less liable to damage from handling. With a vertical bath when a plate is taken out it has to be lifted with one hand, while the dipper is held in the other, and it requires much expertness not to injure the film. With a horizontal bath, the plate is raised with the hook in one hand to a vertical position, and held so until sufficiently drained; it is then inclined further backward, being supported by the other hand touching the back, when the hook being laid aside both hands are free to convey it to the slide, or washing dish, according to the process, without even touching the edges. Small plates are taken between the finger and thumb, the same as from a vertical bath.

Ten minutes' practice will convince a practical photographer, that this kind of horizontal bath is really much *more* easy to use than the vertical dipping bath, for all sized plates above quarter-plate, and that it is also quite *as* convenient for the small sizes. Ever since I first used one from necessity a few years ago, I have adopted them exclusively for all sizes, and the favourable experience I have had of them, induces me to call the attention of photographers to their many advantages, as I am convinced that their being so little known, is the only cause that they are not in more general use.

If manufacturers in porcelain and gutta percha, would produce an article of this kind, like figs. 21 and 22, in the sizes mostly used by amateur photographers; say ¼-plate stereoscope, and 10×8. I believe they would find a ready market directly the public were aware that such a thing was on sale.

The dipper or hook that is used with a horizontal dipping bath, may be made of horn, tortoise-shell, silver &c. The hooked portion should be about ⅜in. long, bent at right angles to the haft. They can be bought in silver ready made, for half a crown. They can be made out of an old comb with very little trouble. The plate must always be held in the angle of the dipper, (see fig. 24), care being taken to avoid touching it with the point,

A horizontal bath will be found eminently suited for several other purposes, besides sensitizing collodion or albumen plates. Among these I may specify more particularly, the facility they offer for developing plates with gallic acid; the film being placed face downwards, and, at the top of the developing liquid, there is less tendency to deposit sediment upon the picture, than when it is laid, as is usual, face upwards, at the bottom of the gallic acid solution.

Also a horizontal bath affords probably the most convenient, as well as the most economical manner of applying the hyposulphite solution to the developed plates; economical, because the solution can in this manner be used without trouble to complete exhaustion, and without waste from spilling by pouring it on and off in the usual manner; and particularly convenient, because hyposulphite residues can thus be kept by themselves, and reduced separately by liver of sulphur, leaving the developing, washing and draining silver residues in a form that can be cheaply reduced to chloride by hydrochloric acid. The mixture of hyposulphite with the other washings, is a very frequent cause of considerable waste, as many photographers, not well aware perhaps, of the large percentage of silver lost by their neglect, throw away the compound residue, rather than take the trouble to reduce it to a marketable form.

## Scientific Gossip.

New Process for Preparing Iodide of Potassium—Comparison with Old Processes—Non-existence of the Periodide of Iron.

The progress of chemical science has caused numerous improvements to have been made of late years in the manufacture of photographic chemicals. Nitrate of silver has frequently formed the subject of notice in these columns, and we now propose to devote some consideration to the preparation of the almost equally important salt—iodide of potassium. The manufacture of this body has lately been considerably improved by Baron Liebig, who has devised a beautiful process for preparing it with readiness in considerable purity. His mode of proceeding is the following:—One part, by weight, of phosphorus is placed in a porcelain basin, rather deep, and about forty parts of hot water poured over it. When all the phosphorus is melted, twenty parts, by weight, of pure iodine are very carefully stirred in, a few grains at a time, the action being allowed to entirely cease before adding a fresh quantity of iodine. Combination takes place with violence. A great portion of the phosphorus passes into the amorphous variety: this, however, in no way interferes with the process, as the amorphous phosphorus acts upon the iodine just as well, although not quite so fast: this may, therefore, be an advantage, rather than otherwise, inasmuch as there will not be so much danger of the violence of combination exceeding due bounds. When the whole of the iodine has been added, and the action has stopped, the liquid will be colourless, and will consist of a solution of phosphoric and hydriodic acids, formed from the ingredients acting upon the elements of water, according to the following equation :—

$$P+5I+5HO=PO_5+5HI.$$

There will also be a trifling excess of phosphorus at the bottom, which will be in the form of dirty reddish-brown flakes. These may be filtered off, and the clear, colourless liquid must be mixed with milk of lime until the mixture, tested with red litmus paper, has an alkaline reaction. (The milk of lime is prepared by slaking good quick lime, and then mixing some of the white hydrate of lime with distilled water, until it has a milky appearance.) The lime will unite with both the acids, forming insoluble phosphate of lime, and soluble iodide of calcium: the whole must be filtered (through a linen filter, as it would be a tedious operation to filter it through paper), the precipitate well washed, and the clear filtrate, consisting of solution of iodide of calcium, boiled down with twelve parts, by weight, of pure sulphate of potash in powder. This decomposes the iodide of calcium, with formation of sulphate of lime and iodide of potassium. When the liquid has been evaporated down to about one-half its original bulk, the whole is allowed to cool and to remain at rest for six hours; the mixture is then filtered, and the precipitate well washed, as before. The solution will now consist principally of iodide of potassium, but it will also contain a little iodide of calcium (owing to the twelve parts of sulphate of potash added, not being quite sufficient to decompose the whole of the iodide of calcium,) and sulphate of lime (from the trifling solubility of this salt in water). The lime is now to be separated by adding a small quantity of *pure* carbonate of potash to the filtrate, and the solution, upon being filtered and evaporated, yields crystals of pure iodide of potassium. This mode of preparation has been found to yield, according to Pettenkofer, almost the theoretical quantity of iodide of potassium from a given weight of iodine. By modifications of this process, we may prepare the iodides of sodium, lithium, barium, strontium, calcium, magnesium, manganese, ammonium, &c.

Dr. W. S. Squire, who has recently brought forward the results of his experience in using this process on the large scale, states that he finds the iodides prepared in this way, very easily acquire a pinkish hue, and that it is very difficult to get them to crystallize properly; what the cause of this is, is not very evident, but the objection has been completely removed, by fusing the salt before crystallization; the iodides after this treatment crystallizing beautifully, and retaining their colour remarkably well. A specimen of iodide of ammonium was prepared in this way from a sample of fused iodide of barium, and it was found to be superior to everything else as an iodizer for photographic purposes; this is perhaps the best test of its purity. With this slight modification, Dr. Squire, considers that the process of Baron Liebig is one of the best ever proposed for the manufacture of iodide of potassium; the potassium salt used is at once the cheapest and best, and the only other item of cost in the materials, is the phosphorus; however, as one ounce of this body is sufficient for the production of one pound and a half of iodide of potassium, the expense of this element amounts only to about one penny for every pound of iodide of potassium manufactured by this process.

It may be of interest as well as use, if we compare this beautiful process with others which have been employed in the manufacture of iodide of potassium. Of the numerous plans proposed, only three have been found practicable. 1. A solution of iodide of iron or zinc, (formed by the direct union of the elements under water), is decomposed by a solution of carbonate of potash. 2. Iodine is added to a warm solution of caustic potash; the colour disappears with formation of iodide of potassium and iodate of potash: the solution is then evaporated to dryness, and heated with charcoal, which reduces the iodate to iodide. 3. Iodine is added to a solution of sulphide of barium; in this case sulphur is precipitated and iodide of barium formed. The solution is then boiled with powdered sulphate of potash; this produces the insoluble sulphate of baryta, which may be separated by filtration, the iodide of barium remaining in solution. According to the first and second plan, purified pearlashes are used instead of pure carbonate of potash, which is too expensive for the purpose. In this way the various impurities of the potashes find their way into the iodide of potassium, or else they must be eliminated by rejecting the mother liquors, and recovering the iodine from them. This is, however, far from being an economical plan. The third process has the great disadvantage that the product is rarely, if ever, free from sulphur compounds, which of course render it in the highest degree injurious when attempted to be employed in any photographic process: it is also rather inclined to blacken when heated. With these exceptions it is a tolerably pure preparation, and is very free from sulphates, chlorides, and other impurities generally found in iodide of potassium.

It has long been a moot point, according to the handbooks of chemistry, whether there exists such a compound as the periodide of iron. Mr. Squire has recently decided this point in a very satisfactory way in the following manner:— A quantity of iodine was divided into three-parts, two of these were combined with iron so as to form a pale-green liquid; the third portion was then added, and the whole boiled so as to promote combination. After the dark-brown solution had cooled, it was shaken up with about three times its volume of ether. In a little time the ether was found floating upon the water, when it was found to have carried with it the whole of the third portion of iodine, leaving the remaining iodide of iron dissolved in the water, from which carbonate of ammonia threw down the white carbonate of iron. This experiment pretty conclusively proves what was asserted by the President of the Pharmaceutical Society, in the *Philosophical Magazine*, in 1836, viz.: that the periodide of iron had no existence, and that the brown solution, obtained by exposing a solution of iodide of iron to the air, was nothing more than a solution of iodide of iron, with some free iodine.

## PHOTOGRAPHY IN AMERICA.

*2, Wall Street, New York, April* 28, 1862.

Dear Sir,—I notice that development of wet plates with protosulphate of iron, seems to be yet in its infancy in England, as the use of pyrogallic acid is here. Most certainly, when properly used, iron is the best developer *to a certain limit*, but when the development is pushed with the same treatment, a flat negative, void of vigour, is the result.

Our most successful workmen in portraiture, take the plate wet from the camera, and flow it with the protosulphate of iron developer, allowing it to remain on the plate until the details are fully out, but no longer. Wash off the solution, and then continue the development with the usual pyrogallic acid developer, adding to each dose two or three drops of a forty-grain nitrate of silver solution: the iron development being to bring out the most perfect detail, and the pyro and silver to give the requisite intensity. This treatment takes time, and herein lies the fault of our professionals. The American characteristic is "hurry up," and everything is done on the lightning-express principle. Our gallery operator in the dark room sees the detail come out in his negative most beautifully, but the iron developer does not give intensity, he thinks of the two or three customers in the waiting room, he "hurries up" the job by flooding the beautiful negative with sulphide of potassium; (or as a friend of mine lables: "stinker odorum,") gives it the requisite *blackness*, and spoils all the delicacy and softness of his resulting prints.

In printing and toning albumen paper, however, we are on the ascendant. The old gold and hypo bath is no more heard of; in fact I do not know a single instance where it is used in a first-class gallery, nor do I know a single amateur who adheres to it. That process is among the things of the past. The printing process now most in vogue is to use thin albumenized paper, not heavily salted: sensitize it by floating one minute only, on a seventy-grain solution of nitrate of silver, made quite alkaline with ammonia, *i. e.*, just alkaline enough to keep itself clear from colour. If floated longer than one minute, the albumen will lose its gloss, and the print sink into the pores of the paper. The silver solution as above will need to be filtered occasionally, and can be strengthened by adding silver when necessary. After first ammoniating it, as long as it keeps clear it will need no more alkali. The toning most used is the ordinary bi-carbonate of soda and chloride of gold bath, to which some salt, 1 grain to the ounce, has been added. We always clear our prints from free nitrate before toning, by washing and then immersing ten minutes in salt water. Fix with fresh hypo, as usual, and wash in an automatic washing trough. Many advertisements in our papers read: "by the *new albumen process*." This simply means that our artists use albumenized paper in place of the old plain ammonio-nitrate process. Its usage is compartively new with us. Mr. Anthony tells us he uses in his paper factory several large barrels of fresh eggs per week, and never has a sheet on hand more than two days old.

A word about the so called "hot water accelerator" for tannin plates. The term "*hot*" water is incorrect, for if the plate is heated above 100° the edges are very liable to turn red, and the development is seldom equal all over the negative. The most certain method of working is to expose the plate the same as for wet collodion, and then put it in a vertical glass bath, containing water at about 90° heat; allow it to remain there until thoroughly soaked, say seven minutes. Take it out and pour on the developer at the usual temperature, the plate being yet warm. The developer is kept best in three stock bottles, as follows:—At least I give my own method not knowing how others do.

*First bottle.*

| | |
|---|---|
| Pyrogallic acid ... ... ... | 24 grains |
| Acetic acid, No. 8 ... ... | 4 drachms |
| Filtered rain-water ... ... | 8 ounces. |

Keep well filtered.

*Second bottle.*

| | |
|---|---|
| Nitrate of silver ... ... ... | 80 grains |
| Filtered rain-water ... ... | 4 ounces. |

*Third bottle.*

| | |
|---|---|
| Citric acid ... ... ... | 320 grains |
| Filtered rain-water ... ... | 4 ounces. |

When ready to develop a lot of plates, I mix in a chemist's dropping-bottle half an ounce each of the 2nd and 3rd solutions. This is my dropping silver solution. If the 2nd and 3rd are mixed together and kept in one bottle for any time, citrate of silver will be precipitated, and great waste incurred; therefore, it is best to mix fresh every day as above.

I then pour into a developing glass enough of No. 1 to cover my plate by flowing, and add one drop only of the silver drops. Flow it quickly on and off the warm plate, keeping it in constant motion. As quick as the solution discolors, throw it away and apply a fresh dose. The picture should flash out quickly, and care must be taken that the development be stopped before it fogs, as it is apt to do. When all the details are well out, wash off the pyrogallic acid and fix with hyposulphite of sodium. After which the negative can be intensified to any degree by a cold application of pyrogallic and silver.

From repeated experiments I learn by experience that for this process an old collodion, very porous and rotten and red with free iodide, is far more sensitive than a new sample. The usual experience of the wet plates is here reversed. The warm water has no other effect on the plate than to thoroughly open all these pores and render the film instantly permeable to the developer. My conviction of this is confirmed by the fact that the picture is *in* the film, and not on the surface when I use old collodion, and they are on the surface when I have tried new samples which worked very well wet. Those on the former are very vigorous and bold with a very short exposure, while the latter develops weak and slow.

A subject which engrosses our apparatus manufacturers now is the best changing box for dry plates in the field. The system of carrying a separate lot of double backs for the camera, each containing two plates, is very good, but exceedingly tiresome to one who, like myself, is addicted to long solitary pedestrian excursions. Some of our New York houses have been getting up changing boxes for stereoscopic plates, but they are all clumsy compared with a little box of British make I have used for two years. It measures eight inches long and five inches high and wide. The box constitutes the camera, and a changing box, carrying one dozen plates, fits inside of it; a leather handle on the top secures the whole. The entire concern, with a pair of Ross's short focus lens, weighs five pounds when filled with prepared plates, and I have repeatedly carried it in one hand during a day's walk of fifteen or twenty miles, scarcely feeling the weight. It has no name of maker on it, so I have no means of telling who deserves the great credit due for its ingenious construction. In my next I will enclose a few samples of the work it does, and will also give in full my method of preparing dry plates at the rate of fourteen per hour.

I intend starting to-morrow for two weeks' driving among the mountains of New Jersey and Pennsylvania, and may have some experience to relate on my return. Until then, farewell! which, photographically speaking, means, may the weather keep clear and well fixed, without fog.—Yours respectfully, F. F. Thompson.

## COPYRIGHT IN PHOTOGRAPHS.

A few weeks back we mentioned the fact of Mr. Mayall having obtained a verdict in an action he had brought for the recovery of certain prints from some of his photographs, which prints he had *lent* for the purposes of engraving. These prints having been erroneously sold, were copied by means of fresh negatives being taken from them by the purchaser of the prints so lent by Mr. Mayall. We likewise pointed out that the result of that verdict did not in any way establish the existence of *Copyright* in photographs. A rule *nisi* having been granted by the Court of Exchequer, calling upon the plaintiff to show cause why the verdict he had obtained upon one of the counts of his declaration should not be altered, it was at first expected that the question of copyright would come under discussion; but the Court afterwards expressly stated that copyright was not the point for consideration, and was quite beside the question at issue between the parties. As, however, it seems to be erroneously supposed by some persons that a copyright exists in photographs, either by the common law or under the Engraving Acts, it may be useful to point out how the matter stands. If any such right is claimable in a photograph *after its publication*, it can only be by analogy to copyright in books, which the House of Lords has, upon more than one occasion, decided does not exist by the common law, but only by statute. These cases were argued in the presence of the common law Judges. Upon the last occasion the Lord Chief Baron Pollock was present, and he expressed a very decided opinion against the existence of copyright by the common law. He said, "I think common law cannot create new rights, and limit and define them, because in the opinion of those who administer the common law such rights ought to exist according to their notions of what is just, right, and proper. Weighing all the arguments on both sides, and looking to the authorities up to the present time, the conclusion I have arrived at is, that copyright is altogether an artificial right, not naturally and necessarily arising out of the social rules that ought to prevail among mankind assembled in communities, but is a creature of the municipal law of each country, to be enjoyed for such time and under such regulations as the law of each State may direct, *and has no existence by the common law of England*. It would follow from this that copyright in this country depends altogether on the statutes which have been passed on this subject." Again, in a recent case in Ireland, which arose out of a photograph having been made from recollection of an oil picture, "*The Death of Chatterton*," the Master of the Rolls in Ireland said, "I apprehend it is clear that by the common law copyright or protection exists in favour of works of literature, *art*, or science, to this limited extent only, that while they remain unpublished no person can print them, but that *after publication* they are by common law unprotected." It is therefore quite certain that the common law affords the author of a photograph no protection in the shape of copyright after it has been published. The question then arises whether any statute affords him such a protection? Unfortunately, in the present defective state of our laws of artistic copyright, there is no authority for saying that any such protection exists: on the contrary, "The Copyright (Works of Art) Bill," which has passed the House of Commons, and is now in the Lords, expressly recites as a fact, "that by law, as now established, the authors of paintings, drawings, and *photographs* have no copyright in such their works." We trust that such an injustice will now be speedily remedied by the Bill being passed in such an amended form as is requisite for the protection of all parties whose interests it affects.—*Athenæum.*

## MASON *v.* HEATH.

THIS case came before the Court of Common Pleas again on the 8th inst.

The plaintiff's counsel had obtained a rule *nisi*, according to the leave reserved at the trial of the case, when the verdict was given for the defendant, and the jury appended to their verdict a recommendation that Mr. Mason should receive one negative on payment of five guineas.

Mr. Hawkins, Q.C., and Mr. Gray showed cause against the rule, on behalf of Mr. Heath; Mr. Montagu Smith, Q.C., and Mr. Maude supported the rule.

Mr. Hawkins informed the Court that Mr. Heath had, immediately after the trial, complied with the recommendation of the jury, and had delivered the negative to Mr. Mason, on payment of five guineas. He then called the attention of the Court to the fact, that Mr. Mason's claim had always been for two negatives, for which he had tendered five guineas, considering that in excess of the sum which Mr. Heath was entitled to receive, which he estimated at a guinea for each negative. He said that it had never been a question of price on the part of Mr. Heath at all, as he would, at any time, have been but too glad to have got rid of the plaintiff, by giving him the negative, if he had been content with the one which the Prince had permitted him to have, but that Mr. Heath had been compelled to defend the action at great expense, owing to Mr. Mason insisting upon his claim to the second negative, the only second negative in existence being that taken expressly for another purpose by the Prince Consort's order. He also called attention to the fact of Mr. Heath's having, at all times, been anxious to refer the matters in dispute, and to Mr. Mason's persistent refusal to refer them, even after Mr. Justice Willes's strong expression of opinion that it was a case which ought to be referred.

Mr. Hawkins was proceeding to comment upon the evidence, when he was stopped by the Court, who called upon Mr. Montagu Smith to state in what manner he considered the Court could give effect to the rule.

Mr. Montagu Smith, in an elaborate argument, contended that the property in the negative passed to Mr. Mason, so soon as the Prince had given directions that that particular negative should be the one delivered to Mr. Mason, and he further contended that Mr. Heath, not having stated the price at which he would deliver the negative, had dispensed with the necessity of the plaintiff tendering any other sum before commencing his action.

Mr. Maude followed on the same side.

Lord Chief Justice Erle said, that, notwithstanding the ingenuity shown by Mr. Montagu Smith and Mr. Maude in their arguments, he could not hold that any property whatever passed in the negative, so as to found an action for trover, and that Mr. Mason's remedy must rest upon breach of contract only. The jury had found distinctly that no such contract as that set out in the declaration had been made at all, and although words had been put into their mouth at his own suggestion, raising the question as to a contract for a single negative, yet that the Court could not amend the record, even if they had desired to do so, so as to enable Mr. Mason to claim a verdict in respect of any such contract. The tender, as proved at the trial, and relied upon, was a tender for two only, and before any effect could be given to the recommendation of the jury, even treated as a finding that the same sum should be paid for one negative, it would be necessary that the jury should find a tender of that sum for one negative, or a distinct dispensation with the tender on the part of the defendant. No such questions, however, had been put to the jury at all, or suggested by the plaintiff's counsel at any part of the case. The rule must therefore be discharged, and verdict for the defendant stand.

## THE CARTE DE VISITE.*

There is, in truth, much that will always be adverse to the production of an agreeable photographic likeness; but at the same time, it is quite as true that a very great deal might be done by a little more knowledge, thought, and painstaking, to render such portraits infinitely more pleasant than they are generally found to be.

People who are considered good-looking, and those even who are beautiful, have a hundred different aspects, and to seize the best one and reproduce it is a function of Genius and not of Chemicals. If you have had a friend whom you have wished to show off to another friend, have you not often been disappointed that the first was "in such bad looks" as really not to look even pretty? The person who was expected to be struck with admiration has wondered at your taste, and you have been obliged to own that there was matter for disappointment. Even in nature, out-of-door nature, this is so. The view which you saw from the hills above the old French town, with the evening sun lighting up the rich plain, making the mountains in the distance amethysts, and the river a line of gold, while the one cloud shadow lay over the old cathedral tower and blackened it, so that all the rest sparkled the more—what is that very same scene when the sky is grey, and the mountains grey too, and plain and river and cathedral are all of one monotonous slate-colour!

But though it may take a Reynolds to do justice to the beauty of the living creature, and a Turner to reproduce that of the mountain and the plain, there is much to be got out of the photographic lens—which it would be wickedness to disparage—infinitely more than it is ordinarily made to convey to us. There are one or two simple matters which might be borne in mind by photographers with immense advantage to their sitters and to their own reputations as well. They do not yet quite understand their trade.

The two great main considerations which should occupy the mind of every photographer are these: What is the best view he can take of his sitter, and what the effect of light and shade which will be most becoming to that sitter's countenance. On these two considerations the success of the portrait entirely depends.

Now as to the question of view there is some tolerable amount of understanding manifested by the great body of photographers. The sitter is generally so placed that the most favourable aspect of his face may come before the lens, and so that the rapid perspective to which he is subjected shall distort him as little as may be. It is pretty well known that if his legs are nearer the machine than his body the first will be disproportionately large for the last; that if his hand is stretched out towards the artist, it will be twice the size it ought to be, and that even the fact of his nose being nearer the camera than the rest of the face will give to that central feature a large and swollen aspect.

Such general rules as these applying equally to all sitters, are then pretty well understood. But this is not enough. The photographic artist who would wish to produce a really successful portrait, should study the special defects and special beauties of the individual before him, and consider in what the faults of such a physignomy will assert themselves least strongly, and the merits show the most. This is the function of an artist, of a man of considerable natural abilities, and immense experience. It is exercised by some of the best French photo-

* Concluded from p. 226.

graphers in an eminent degree, by one—M. Camillo Silvy—who has set up his studio here in England.

M. Silvy—and almost he alone in this country—seems to understand the immense importance of *shadow* as an ingredient in a successful portrait. This is his great stronghold, more even than the taste which he shows in his choice of view, costume, and accessory. These last are great elements in M. Silvy's portraits, but the distinguishing merit of them is the well-chosen light and shade. It is perfectly surprising that this has not been more considered by all photographers. Their process is a thing simply of light and shade. It is the light that makes the portrait come into existence at all. The patches of shade, more or less dark, alone prevent a carte de visite from being a sheet of blank paper. Surely the shapes of those patches of shade are all-important. It is little known—and when it *is* known we have prettier photographs—that a light coming from above the head of the sitter is the most unbecoming thing in the world, and that a face so lighted cannot by any possibility show to advantage. Now, the ordinary photographer's glass-room has a diffused light all over it, but mainly coming from above, so that the eyes show in two dark caverns of shadow, while a black patch appears under the nose, throwing the termination of that feature up to the skies, and making it show as an isolated nob, the full size of which is—and few of us can bear this—done the amplest justice to. This top-light, moreover, scores out relentlessly those baggy marks which many of us have too well developed under the eyes, and which are not characteristics of the human beau-ideal, while—in the case of ladies—a kind of trough on each side of the mouth is joined to the chin-shadow after the fashion of a Vandyke beard.

In ladies' portraits, the elimination of beauty, and not so much of character as in men, is the thing to be borne in mind. Now, the most becoming light is one level with the face, or even, perhaps, somewhat beneath it—it being a great mistake to suppose that the foot-lights on the stage are unbecoming. Such a light as that described above would make any face in the world ugly, and yet it is just such a light which is to be found in most photographer's rooms.

As much as possible, as much as may consist with the action of the photographic process, the light from above should be got rid of in taking these portraits, and a light from the side brought into use. This seems to be understood in a rare manner by M. Silvy. His portraits are very popular, but, perhaps, many of the people who like them are ignorant of the reason which causes their preference. The reason lies, to a large extent, in the softness and size of the shadows which lie in such agreeable masses on the faces which came within the range of this photographer's skill. He has discovered the simple truth, that in an affair in which it is a question altogether of shadows, the distribution of those shadows is a thing of vital importance. Of every face in this town there is a view to be taken, and a light and shade to be selected, which will show it to advantage or disadvantage. To subject all to the same glaring light, descending on all alike, and to all unbecoming, is scarcely the way to produce agreeable results. Yet we have known a photographer standing under his own light, and most hideously distorted by that circumstance alone—without the additional help of his instrument—to argue with us, the wretched sitter, that we were none the worse for his light!

It is difficult to speak strongly enough about this question of shadows and their value. Queen Elizabeth, in her ignorance, thought shadows unbecoming to the glory of her majesty, and wished to be painted without any at all: and, doubtless, there are people who now-a-days think shade a smudgy dirty thing, the less of which comes upon their countenances the better. But light cannot be thrown out in its full brilliancy, nor forms shown in their variety, without its aid. Why, one of the main differences between a fine day and a dull one lies in the shadows which proclaim the first, and are wanting in the other. On a wet, dull day, as you stand in the grey sickly light, you may look all round about in vain for your shadow; it is not to be found. A cheerless, monotonous glare is over all things. The sun comes out, and the first thing it does is to cast your shadow dark and clear and sharp upon the ground—your shadow and that of the trees, the buildings, and all things else that come within reach of its rays. How different everything looks then; how solid, how bright, how finished! Those shadows are larger in the early morning and again as the day declines, and it is one reason of our admiration of those two seasons that then the rising or sinking sun catches but one side of every object, and leaves so large a portion of the scene lost in a mysterious and softened shade.

## INVENTORS AND THE INTERNATIONAL EXHIBITION.

Provision has just been made for the protection of inventors exhibiting at the International Exhibition by the passing of an Act for the Protection of Inventions and Designs exhibited at the International Exhibiton of Industry and Art for the year One thousand eight hundred and sixty-two. 29th April, 1862.

Whereas it is expedient that such Protection as is hereinafter mentioned should be afforded to Persons desirous of exhibiting new Inventions or new Designs at the International Exhibition of Industry and Art to be held in the present Year, under the Direction of "The Commissioners for the Exhibition of 1862:" Be it enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same as follows:—

1. This Act may be cited for all Purposes as "The Protection of Invention and Designs Amendment Act, 1862."

*Protection of New Inventions.*

2. The Exhibition of any new Invention at the said International Exhibition shall not, nor shall the Publication, during the Period of the holding of such Exhibition, of any Description of such Invention, nor shall the User of such Invention, under the Direction of the said Commissioners, prejudice the Right of any Person to register provisionally such Invention, or invalidate any Letters Patent that may be granted for such Invention.

*Protection of Designs.*

3. The Exhibition at the International Exhibition of any new Design capable of being registered provisionally under the Designs Act, 1850, or of any Article to which such Design is applied, shall not, nor shall the Publication during the Period of the holding of such Exhibition of any Description of such Design, prejudice the Right of any Person to register provisionally or otherwise such Design, or invalidate any Provisional or other Registration that may be granted for such Design.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting of the South London Photographic Society was held in the City of London College, on the evening of Thursday, May 8th. Mr. Sebastian Davis in the chair.

The minute-book not having arrived in time, the routine proceedings were delayed until the close of the meeting.

Mr. Howard, as Treasurer, and Mr. Wall, as Secretary, intimated their wish to retire from those duties at the Annual Meeting to be held next month.

Mr. Wharton Simpson hoped this intimation was not to be regarded as a formal tender of the resignation of these gentlemen, the loss of whose services would be deeply felt by the Society. He trusted they would reconsider the question, and suggested that as Mr. Wall's increasing professional duties left him very little time for the discharge of the secretaryship, an assistant should be appointed to share the labour.

After some remarks from the Chairman, and conversation on business matters,

The Chairman called upon Mr. Blanchard for his paper on "The Influence of Bromides in Collodion."

Mr. Valentine Blanchard said that he was compelled to come before the meeting with an apology. He had prepared no paper. But he thought that when he told them that in going into the subject of bromides, he had found in the course of his experiments, that in order to treat of the subject fully it would require more time than he could then give it, that some of the experiments demanded a more complete investigation before he could give a positive opinion upon them, and he was especially anxious to arrive at definite conclusions on some points recently raised by Mr. Sutton in the *Photographic*

*Notes* they would hold him as legitimately excused. They would allow him now, he hoped to exhibit the results he had brought with him, and make some comments thereon, for the subject would necessarily produce an animated discussion, and he would then, with their permission, take up the subject after the recess, when he hoped to bring before them a more complete paper than he could possibly have done had he written one for the present meeting. There had always been a great deal of conflicting evidence as to the increased sensibility imparted to collodion by the introduction of bromides, and many men, standing high in the profession, had recorded their opinion that there was nothing gained by their introduction. One thing was, however, certain, that bromides had produced such a uniformity of action in collodion, that, even if they were to admit that, under the most favourable circumstances, a simply iodized collodion could be made to give results as rapid as one containing a bromide, still all must admit that their introduction had tended in no small degree to improve the productions of photography, for, whereas, an iodized collodion giving good results a few days after iodizing, would, at the end of a few weeks, be comparatively useless for rapid purposes, the introduction of a bromide would render it as useful at the end of as many months. He would now pass round the results of his experiments as far as he had gone, and he thought the value of bromides would be found very evident.

His *first experiment* was with two samples of collodion on one plate. Both were prepared about six months ago. One half of a plate was coated with collodion iodized with iodides of cadmium and ammonium, 3½ grains to the ounce. The other half with iodide of ammonium 4½ grains, bromide of cadmium 1 grain. It would be seen that the bromo-iodized half was clean and full of detail, whilst the simply iodized half was dirty and under-exposed. This experiment was made in a bath quite new, and nearly neutral, giving, with the collodion he usually employed, instantaneous results. There was no colour to indicate the liberation of free iodine in the simply iodized sample.

*Experiment* II.—One half of a plate was coated with a collodion bromo-iodized as follows:—Iodides of cadmium and ammonium 4½ grains, bromide of cadmium 2 grains. The other half with collodion iodized with iodide of potassium 3½ grains newly iodized. The bromo-iodized half was perfectly clear and brilliant, whilst on the iodized half there was the ghost of an image covered by fog. The experiment did not quite satisfy him, for the iodized collodion was altogether only 24 hours old, and, therefore, could not be in its best condition.

In *Experiment* III, he took the same iodized collodion as in the last for one half of the plate, and introduced 1¼ grains of bromide of cadmium into a portion of the same collodion for the other half of the plate. This was sensitized in an old bath. Both halves indicated under-exposure, but the bromo-iodized half was much the best.

*Experiment* IV was a repetition of the last, but instead of using the instantaneous shutter employed for all the other, experiments he gave about 2 seconds. The bromo-iodized half was quite clear with the exposure about right, whilst the iodized half was partly fogged, but indicated under-exposure.

*Experiment* V was with iodide of ammonium 2½ grains, bromide of cadmium, 5 grains, for one half of the plate: bromide of cadmium, 5 grains, for the other half. It would be seen that where bromide was employed alone, there was but a faint picture, and that the introduction of 2½ grains of iodide had wonderfully improved the results.

It appeared, however, that where the bromide was present in large quantities, a corresponding amount of iodide was necessary for the best results, for it seemed that the excess of bromide had a tendency to rob the iodide of a portion of its creaminess. The point he wished to determine in his experiments was, how much bromide to use with the greatest advantage; he hoped to have more to say on this point when he resumed the subject after the recess. All the preceding results were produced by iron development; iron, 30 grains, with a very small quantity of acetic acid, not more than 10 minims to the ounce.

His next experiment was made with collodion iodized with iodide of potassium, 3½ grains, for one half of the plate; iodide of potassium, 3½ grains; bromide of cadmium, 1¼ grains, for the other half; but developed with pyrogallic acid, 2 grains; acetic acid 10 minims, to 1 ounce of water. The bromo-iodized half gave a thin picture with plenty of half tone, whilst the iodized half had a complete reduction of silver all over of ruby red colour, which would indicate an alkaline condition of bath or over-exposure. Unfortunately, he had not this result with him, for on washing it after fixing, the whole film washed off. He was unprepared for this, for in all the other results with iron development he had taken no care whatever in the washing. It appeared, however, that the pyro exercised some influence upon the film, which made it unable to bear rough treatment. He thanked them for their patient attention to his imperfect remarks, and he hoped to go more completely into the question next season.

Mr. Harmer remarked that he had often observed a much greater tendency in the film to leave the glass when developed with pyro, than when developed with iron, and especially that it would not bear treatment with bi-chloride of mercury after development with pyro.

Mr. Wall had met with similar experience.

The Chairman said the use of bromides was a subject which had long engaged his attention, and some time before it had received much consideration from the photographic world he had come to some definite conclusions on the subject. It was necessary to preserve the different aspects of the subject quite distinct, and consider each part of it under its own most favourable conditions. In speaking then of the respective advantages of simply iodized, or of bromo-iodized collodion, it was necessary to have reference to the developer; and the question which arose was whether simply iodized collodion with pyrogallic acid development, or bromo-iodized collodion with iron development presented the greatest advantages. He thought experiment generally, and his own experience certainly, was in favour of the latter. Another point which had not, he thought, received sufficient attention, was the different effects produced by different bromides. His own conviction was, that a bromide with an alkaline base was much more efficient than the bromide of cadmium; a small proportion of the bromide of potassium, for instance, much more readily reduced over-intensity, and gave softness and half tone than a larger proportion of bromide of cadmium. The character of the pyroxyline was another important element in the consideration. Where a bromide was used he preferred a pyroxyline which tended to give an intense image when the collodion was simply iodized; the addition then of a small portion of bromide gave the maximum of advantages, in rapidity, cleanness, and delicacy, and in reducing the density which would be present when an iodide alone was used. The bromide of cadmium he had not found so efficient in this respect, and larger quantity was necessary. Another element to be considered was the character of the lens to be employed. The use of a lens of long focus reduced the intensity of the light, and had a tendency in like ratio to reduce the intensity of the resulting picture; whilst if a compound lens of short focus were used, the image was very brilliant and intense. It was clear that some modification in the collodion was necessary in these two cases, and the collodion which gave a sufficiently dense picture with a lens of long focus, would probably give a picture too intense with a lens of short focus, and this over-intensity might be reduced by the addition of a bromide. It must not be forgotten, however, that some samples of pyroxyline were of a character unsuited to the use of bromides, and that in such cases the best results were obtained by their omission. He mentioned these points to remind members that the question was one which required considering in all its aspects. The use of a bromide, for instance, was not always an advantage if pyrogallic acid development were used. When they came to iron development, however, the advantages of a bromide were beyond a question, both in sensitiveness and cleanness. The point at issue, however, seemed to be whether greater sensitiveness was obtained with a simply iodized collodion and pyrogallic acid development, or with a bromo-iodized collodion and iron development. He had no doubt himself that with a bromo-iodized collodion and iron development, more sensibility could be obtained than with the most rapid simple iodide and pyro. Still there were interesting points to settle, and as he understood Mr. Blanchard, he was not satisfied that as yet he had given the iodides alone a fair test.

Mr. Blanchard: precisely.

The Chairman, continued, the iodized collodion which gave fog was probably too newly iodized. It should have been iodized at least 24 hours to secure its best conditions.

Mr. Blanchard said his newest sample had been iodized that length of time; but he thought probably a longer time might be better.

The Chairman said that each should be tried under its own best conditions of bath as well as developer.

Mr. Wharton Simpson said he understood that the bath Mr. Blanchard had used in the majority of the experiments was one in the most sensitive working condition, such as he would use in his practical, instantaneous operations, and such, therefore, as should give fair play to any collodion. Mr. Blanchard had referred to some recent experiments made by Mr. Sutton, which it might be interesting to state. Most of the members knew that Mr. Sutton was an authority on the manufacture of collodion, and photographic matters generally, worthy of much respect, although in the matter of bromides, he held some views which his (Mr. Simpson's) experience did not confirm. Mr. Sutton had recently detailed a series of experiments for testing the value of bromides, in which, however, they were used alone, and not in conjunction with an iodide. He stated, that a plate coated with collodion containing five grains of bromide when immersed in the bath, and withdrawn in the usual time, presented a thin blue film, and that it required some hours' immersion before it became creamy, and hence he argued, that when a large quantity of a bromide was used in conjunction with an iodide, and the plate only left the usual time, a large portion of the bromide remained unconverted into bromide of silver. If this were so, it was unquestionably an important consideration. His (Mr. Simpson's) experience did not entirely confirm this. A bromized plate left the usual time —say two or three minutes—in the bath, certainly gave a thin blue film, but on leaving it double that time it was much more dense, and he had no reason to believe from its appearance that the whole of the bromide was not converted into bromide of silver. Still, that the change was slower seemed evident, and the subject was worthy of further attention. Mr. Sutton's convictions were very strong in the matter, he even regarded bromides as retarders—useful to hang on to the wheels of the iodide as a drag, when it was running too fast. The whole of Mr. Blanchard's experiments tended to prove an opposite conclusion. He (Mr. Simpson) had tried similar experiments scores, he might say hundreds of times, and always with similar results. The use of a bromide alone, unquestionably, gave slower results than the use of an iodide, but the combination of the two he had always found most rapid, most clean, and most satisfactory. Mr Blanchard had referred to the universal reduction, in one experiment, with iodide alone, as possibly indicating a very high and almost unmanageable state of sensitiveness. If it were so, some trace of an image would have been found, however buried in fog; it only appeared to indicate over-readiness to reduction or decomposition, under the influence of a developer, and would probably have been found the same without the action of light at all. He might mention, in conclusion, as interesting, that Mr. England, whose instantaneous pictures everyone was familiar with, had recently told him, that after many months of the most careful experiment, he had come to the conclusion that bromo-iodized collodion, with iron development, was three times as sensitive as simply iodized collodion with pyrogallic acid development.

Mr. Wall suggested that the universal use of bromides by the best photographers, was a strong argument in their favour.

Mr. Harmer and Mr. Lane had both noticed the fact that a bromo-iodized collodion required a somewhat longer immersion in the silver bath, and that if it did not receive that, it looked creamier after coming from the camera, than when taken from the bath, showing that the reaction had been going forward with the free silver on the plate.

The Chairman thought the fact mentioned by Mr. Sutton as to the slower reaction between a bromide and the silver bath, worthy of further attention, as any unconverted bromide in the film would probably act as retarder, and referred to a practice which once obtained, of pouring a solution of a bromide over the plate, to prevent the further action of light.

After some further conversation on the subject,

Mr. Fry, in answer to the Chairman, said he had not a shadow of a doubt as to a bromo-iodized collodion being the best possible for rapid results, giving the highest possible degree of sensitiveness, and the maximum of delicacy and cleanness. He could scarcely understand how the matter could be brought into discussion, the thing seemed so palpable. He regarded bromo-iodized collodion, as one of the photographer's greatest boons. Whereas, at one time, a certain sample must be kept for landscape, another for portraits, another for copying, another for dry plates; he now found that one good bromo-iodized collodion was, with slight modification in the treatment, available for all purposes. It seemed to combine all the advantages which had before belonged to several.

After some further remarks, the thanks of the meeting were given to Mr. Blanchard, who was requested to continue his experiments.

The Chairman showed a dry plate, prepared with albumen and glucose, developed with pyrogallic acid, without any acetic acid, and a single drop of silver solution. The result was a good negative, with a much shorter exposure than usual.

Mr. Simpson showed an experimental negative taken with honey and tannin, in seven seconds, lens six inches focus, and half-inch stop.

The presentation print, Robinson's exquisite vignetted landscape, "Early Spring," was delivered to members.

After some further routine proceedings, and the election of Messrs. Brookes, Clifton, and Cornish, as members of the society, the proceedings terminated.

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### Amateur Photographic Association.

A meeting of the Committee of the Amateur Photographic Association was held on Monday, the 28th April, at 26, Haymarket, Mr. G. Shadbolt, in the chair. The minutes of the last meeting having been read and confirmed, the Secretary laid before the meeting the printed catalogue of the Association pictures, with which the committee expressed their decided approval. A question having been raised by the Secretary relative to the price which should be charged to members and subscribers for the prize pictures (now the property of the publishers), it was decided, with their consent, that each member and subscriber should be entitled to select one copy of each of the prize pictures at the same rate as the other Association prints, but that for any further copies it should be left to the publishers to regulate the prices to be charged.

The subject of a Photographic Art Union, in connection with the Association, was again discussed and adjourned.

The Secretary, having pointed out to the meeting the unavoidable delay which had occurred in obtaining the first year's negatives, and consequently in the award of the prizes, the preparation of the catalogue, and the distribution of the prints, it was decided that the Association year shall henceforth commence the 1st of June, instead of the 1st of May, and that subscriptions for the ensuing year will, therefore, not be due until the 1st of June next. It was also decided in reference to the selection of prints by members and subscribers, that they may select them from any of the Association negatives, which the publishers may have in hand, irrespective of the year in which they may have been received; and further, that upon payment of the subscription, members and subscribers may at once select their two or one guinea's worth of prints, as the case may be.

The proceedings of the meeting then terminated.

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## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris*, *14th May*, 1862.

Positive printing with nitrate of uranium has still its advocates. M. Hermann Krône states that the best and quickest papers, which give the most brilliant results under good negatives, are those which are first well impregnated with the solution of nitrate of uranium (1 part nitrate to 7 parts of water), quickly dried, and then again floated for a minute only on the same nitrate solution. Paper thus prepared retains its good qualities a very long time, if kept in a dry dark place. After the lapse of a year, they lose in great part their sensitiveness; they then yield proofs of less vigour with a yellow ground, which in a diffused light becomes of a brownish red in the course of a few days. These proofs cannot be fixed by the usual washings, like those taken upon paper recently prepared. In order to obtain the most vigorous and beautiful proofs, we prolong the exposure in the sun, under a negative, and develop with a solution of nitrate of silver, of the strength of half per cent., slightly acidulated with nitric acid, and alcoholized with ten per cent. Wash the proofs in distilled water, and tone in a bath of chloride of platinum, one per thousandth of water; the proof to remain in this bath only a few seconds, and as soon as it becomes darkened and of sufficient vigour, it must be immediately removed and washed in abundance of water. By this method, the greater portion of the picture is retained on the surface of the paper. The vigour of the proof may be augmented by drying it very rapidly, and varnishing it with wax.

On the preparation of positive paper, M. Davanne makes the following remarks:—

"Among those who prepare albumenized paper, some are accustomed to add acetic acid to the albumen, or soluble acetates, or perhaps in certain fermentations of albumen, acetic acid is spontaneously evolved; in any case the presence of acetic acid in the paper must have a prejudicial influence from giving rise in the silver bath to the formation of needle-like crystals of acetate of silver, which remain either on the surface of the proofs, or on the surface of the negatives, and thus cause the loss of one or both.

"This result has frequently occurred to me under circumstances which I think it will be useful to describe in order to guard photographers from similar annoyance. For several days I made use of a paper charged with a soluble acetate; the acetate of silver formed remained either on the paper or dissolved in the bath, when the latter becoming weak, it was filtered into a dish, and before sensitizing any paper on it, it was sufficiently strengthened by a concentrated solution. Some sheets of paper were sensitized on this bath in the feeble light of the laboratory, and all the negatives and the positives taken from them during the day were covered with fine, needle-like crystals, which became blackened in the light, and would have caused me to lose all my negatives if I had not prevented it by quickly washing them. Analysis showed that I had to deal with acetate of silver; the acetic compounds could be derived only from the preparation of the paper. But the question arose, how could they be formed so suddenly in such abundance, while the temperature had not varied perceptibly, when the bath gave none the day previous, and only on the next day when I had added to the bath a fresh quantity of solution? The reason is, simply that, contrary to what happens with most of the other salts of silver, the solubility of acetate of silver is much less when the nitrate of silver is more concentrated, and that at the moment when in a positive bath almost saturated with acetate of silver, but not yet crystallized, a concentrated solution of nitrate is added, there is an immediate general formation of acetate crystals, which are afterwards deposited upon the proofs. By observing this fact we find a ready means of remedying this accident:—We must, when we desire to restore the bath to its original strength and volume, first add the necessary quantity of dry nitrate of silver. After it is dissolved in the bath, it is left in the cold night air; next day we begin by filtering the bath, to separate the crystals which have formed, and not till then the necessary quantity of water. In this manner we first make a very concentrated bath, which allows of the greater portion of the acetate of silver to be deposited, and when it is subsequently diluted there is nothing to fear from crystallization.

With regard to the keeping of sensitized positive paper, M. Krône remarks:—Our practical experiments on this subject fully prove that sensitized papers are not perfectly preserved in boxes by drying alone, but that it is indispensably necessary to continually maintain a small quantity of gaseous chlorine, which converts the molecules of silver recently reduced into chloride of silver. This is why we have never been able to preserve our strongly albumenized paper when sensitized in boxes with chloride of calcium only, while in boxes supplied with chloride of lime we have obtained very satisfactory results. A mixture of these two substances—

| | |
|---|---|
| Chloride of calcium ... ... ... | 3 parts |
| Chloride of lime ... ... ... | 1 part |

will enable us to preserve both sensitized paper and unfixed positives during a much longer time than is usually required, for, of these two substances, the latter constantly exhales chlorine gas; the first keeps it constantly dry. It must not be omitted to state that too much gaseous chlorine deprives the paper of all its sizing, and also diminishes the sensitiveness of the chloride of silver, that is, brings it to the state of pure chloride of silver, without excess of nitrate. The paper thus preserved tones much more readily, and assumes much richer hues in the chloride of gold. The traces of nitric acid, which are disengaged during the preservation of the paper, seem to us, without any remarkable inconvenience to the paper, provided these are well washed before toning, for the proofs preserved in this manner remained pure and white, without the slightest yellow tint. We cannot say the same for those preserved with chloride of lime alone; for these proofs always assume, after a time, a yellow line in the white portions, especially when the chloride of lime has, in consequence of long service, become moist or aqueous.

The more the paper is impregnated with salted albumen, or the more the albumen holding salt converted, by sensitizing into chloride of silver, the more difficult the preservation of the paper becomes, and the more chloride of lime must be added to the calcium in the boxes: the thinner and more superficial the albumen is, the whiter the paper remains, even without artificial preservation, when merely kept in a press. A paper, with the albumen coagulated before sensitizing, always keeps better than one not coagulated; for the albumen, like all organic substances, decomposes the salts of silver into metallic silver more slowly when the albumen is coagulated than when it is in a soluble state.

## HOT DEVELOPMENT FOR DRY PLATES.

Dear Sir,—The present rage for hot developement is calculated to do more harm than good to the novice in photography.

I have for some time past used heat in developing collodio-albumen plates, but only when the exposure has been short, and the plates newly prepared.

Extreme care must be employed in the manipulation, otherwise, foggy pictures will unquestionably be the result. My plan is to apply first a *plain* strong pyro solution, and if the image does not soon appear, to flood the plate with hot water, and go on again with the pyro, until *all* the details are well out, when citric acid and silver must be added to the developer, and the hot water discontinued.

The mistake often made, is a too liberal use of the hot element, irrespective of the exposure, and the continuance of it, after the silver has been added to the developing solution.

I enclose a stereograph from a negative taken last Monday at six o clock in the evening. There was a good light, and my intention was to give about 3 minutes exposure, but in order to illustrate my method to a friend, I exposed only 45 seconds, and produced a fair negative. Now, if I had continued the exposure to 3 minutes as originally intended, and proceeded to employ hot water in the development, I should have ruined my negative at once.

When the exposure has been *moderate* (say about two-thirds the time a dry plate usually requires), then mix the pyro with *warm* water, and proceed very cautiously to work.

Hot water is very excellent to fall back upon in case the picture develops tardily, but great discretion must be used in its employment

Perhaps these hints may be useful to some of your readers.—I am, yours very truly, John H. Underwood.

*Beech Cottage, Sale Green, Cheshire, May 13th*, 1862.

[The stereograph enclosed is a very fine one, and evidently from a good negative. The tone of the print is very charming. We should be glad to know something of the paper, printing and toning employed. Ed]

## Talk in the Studio.

PHOTOGRAPHY IN THE EXHIBITION.—We observe with pleasure that, notwithstanding the inferior position accorded to photography by Her Majesty's Commissioners, the "leading journal" regards it as worthy of repeated and prominent notice in its criticisms on the contents. Of the British department it recently remarks:—"We mentioned yesterday, with the praise they deserved, the very fine collection of French photographs in the south gallery, though we now learn that some of the very best in this display are by English artists resident in France. Some remarkably good ones are sent by Mr. Maxwell Lyte, an amateur, whose pictures may be at once known by the words, 'Lux fecit'—a true photographer's pun on his name and art. Mr. Bingham, too, one of the best of the Paris professionals, sends some fine specimens, which go far to keep up the general excellence of the French show. There is a special class devoted to English photography in the building, which contains some of the finest specimens of the photographic art ever brought together. There was no class devoted to photography in 1851, and there was near being no exhibition of the art on this occasion, in consequence of the most unfavourable place assigned to it. As it is, the London Photographic Society have refused to exhibit, and, but for the efforts made by the most eminent photographers, the art, as regards England, would have been unrepresented altogether. The photographic collection is placed along with the class devoted to educational appliances, in a large room in the upper floor of the tower, between the English and foreign picture galleries—about the most inaccessible and unfavourable spot to which it could be banished, but to which we feel now justified in calling the attention of visitors, as containing a collection which will repay a long visit. Here are collected the finest portraits of Williams, Claudet, Watkins, and Mayall, Caldezi's copies of miniatures and cartoons, the exquisite views of Bedford, Fenton, Cundall, Downes, and White, and the fancy pieces of Robinson. Frith also sends specimens of three great views in the East, which were taken for Negretti and Zambra. Some of the best exhibitors in this class are to be found among the amateurs, of whom there are many, such as Colonel Sir Henry James, the Earl of Caithness, Lady Jocelyn, Colonel Verschoyle, Colonel Stuart Wortley, Sir A. Macdonald, &c. The educational appliances in this department of the Exhibition likewise deserve an attentive visit." The error made as to the Photographic Society having refused to exhibit, will be understood by photographers as a misconception as to the nature of the steps taken some months ago."

THE PHOTOGRAPHIC CONTRACT AT THE EXHIBITION.—We intimated a conviction a few weeks ago, that the impossible conditions attached to the photographic tender, for the privilege of photographing in the Exhibition Building, had a definite purpose, and was part of a little scheme of jobbery. An advertisement which appears in the official catalogue, affords a striking illustration of this idea. A certain firm who have *not* obtained the contract, had made such arrangements and received such assurances, it would appear, that the contract was already regarded as secured. Accordingly, in the advertisement in question, the firm to whom we allude, announces the publication of a series of views of the interior and contents, taken by Mr. Francis Bedford! Rumour tells other curious tales on this subject, which we forbear, however, to chronicle. We may mention one incident we have heard related, however, which throws some light on the source of the scurvy treatment photography, generally, has received in this international undertaking. A few days ago Mr. England was engaged in photographing a piece of machinery in the annexo, and had placed an attendant in such a position, as to show relative size, &c., when one of the commissioners passing, immediately denounced this as a breach of contract, styling the operation as taking "shilling portraits," and obtaining a sight of Mr. England's pass or warrant unhesitatingly appropriated and put it in his pocket! A telegraphic message brought Mr. Nottage, who took prompt measures to have the pass restored, and his staff put on a proper position, safe from further indignities. Without mentioning this commissioner's name, we may state that it was the same gentleman, who, some time ago in certain evidence before the House of Commons, denounced "photographic professors" as "pests!" We then said photographers were obliged by his good opinion. They may now guess how much more they have to thank him for.

## To Correspondents.

B. B. L.—It is impossible to give a simple and decided answer to your question, as to which is the best method of intensifying There are several methods, all good, and each best under certain circumstances. The most skilful operators are masters of all, and apply each to the purpose for which it is best suited. Experience alone is a certain guide in this respect. The most commonly used and most generally useful is effected by the application of pyrogallic acid and silver after washing away the iron developer, and before fixing. When a slight amount only of additional intensity is required to give decision to a picture full of detail, the same process may be applied after fixing. Dr. Diamond obtains a good effect by leaving a thin negative for a few hours in a bath of old hypo, until the image is sulphuretted. One of the best methods we know of obtaining intensity and retaining delicacy, is that effected by means of bichloride of mercury and iodide of potassium; but requires careful management. When once mastered, it is a very efficient method. Avoid overloading the negative with intensity, or you will certainly bury detail. It is better as a general rule to varnish negatives.

M. A. not having sent us his address, leaves us only this method of thanking him, and acknowledging the receipt of a very fine salmon, which arrived just after going to press last week. On submitting it to the usual processes of qualitative analysis, such as cooking and eating, it proved pre-eminently satisfactory.

S. S.—Your question is a somewhat indefinite one. "Will one of ———'s No. 1 B lenses work more rapidly than other lenses, if both are stopped down to equal apertures?" "Other lenses" constitute an exceedingly indefinite standard of comparison. We presume you probably mean other lenses of the same focal length. This will depend entirely on the construction and diameter of the lenses. In regard to the lens of which you speak, it will work more rapidly and perfectly with the same aperture than common lenses of the same focus.

J. H. S.—It is probable that thin blue glazed calico will answer your purpose better than the stout calico you describe. But we fear the defect of limited size, and too little glass is a radical one, and can only be palliated, not cured. If you can move the house, the best remedy would be found in so placing it that the sitter should face the north; you would then be free from the troubles of direct sunlight, and of imperfect illumination, when that direct light is shut off.

J. A. SLATER.—When we state a process as described by another person, we are not responsible for any want of clearness or detail in the statements. We have pleasure in giving any information or assistance, but our correspondent must work out the matter for himself. 2. In dissolving gum, time is required, a few hours at least; if you boil and burn it, as you describe, you alter its character. 3. In the process referred to, use throughout a saturated solution of borax, which will be at the rate of about one ounce in a pint of water. Borax is soluble in 20 parts of cold water. 4. When a small quantity of spirits of wine is recommended to be added to a solution, we should judge it to mean about half a drachm to the ounce. Such phrases are used when the operation has been done by guess, precise proportions being unimportant.

J. H. JONES.—Bury's Rolling Presses are the best and cheapest of which we have any practical knowledge. We use one of their large ones and find it extremely efficient and satisfactory. For prices, see advertisement. We shall be glad to hear from you.

W.—We are glad you have found the method described practically useful, and are obliged by your good opinion. We have no intention of noticing such matters as those to which you refer. They are too small for attention, and our space is demanded for more important matter. We don't care to deal in counter-imputations, however easy to establish. It is unnecessary to disprove what nobody regards or believes. You will see the propriety, therefore, of not inserting your letter.

NEGATIVE.—The proportions of pyroxyline altogether depend upon its quality; hence you will see the propriety of saying in the formula to which you refer, "soluble cotton, *quant. suff.*" We have in hand at present samples of cotton, one of which gives a thin film with eight grains to the ounce of solvents, and another which gives a thicker film with three grains to the ounce. Both yield good collodion, but we prefer the former for its physical qualities; it is much finer, and a more manageable film. 2. Negatives for enlargement should be produced with a collodion of the former quality, as a collodion made with cotton like the latter shows a great deal of structure, which when magnified is very injurious. As a general rule, equal proportions of ether and alcohol will be found most useful.

PHOTOS.—We prefer albumenized prints to be prepared for colouring in oil by means of gelatine or isinglass. We cannot give you the exact proportions, as we have always mixed it by rule of thumb. We should say as much isinglass as will lay on a penny in a couple of ounces of water, dissolve by heat, and then add a little spirits of wine. It is better to use it too thin than too thick, for in the latter case it will crack off; but if it be too thin, a second or third coat will make the print all right. A little practice will enable you to hit the happy medium between having the paper in the condition to absorb the medium, and having the paper so thick that it will crack off. Bear in mind that oil colours dry very slowly, especially in damp cold weather: the pictures should be kept, if possible, in a room at a temperature of about 60° whilst painting. A little of some "drier," sugar of lead, for instance, may be added to colours which dry slowly, but this must be done sparingly. Try the mode of sizing we have indicated, and let us know how you get on. 2. We should think that enlarging on to iodized paper with a good north light, by means of the lens you mention, and a moderate sized stop, would require an exposure of at least half an hour, probably more. A bromide in the salting preparation would give increased sensitiveness. 3. We should prefer the production of an enlarged negative on glass and then printing from that, as described in our ALMANAC for this year, and also by Mr. Heath at a recent meeting of the Photographic Society.

C. M. SMARTT.—We are glad to find that you have been successful in preparing a non-actinic transparent silk. From the print enclosed, it appears to be entirely satisfactory. We shall be glad to call the attention of our readers to it when we see a sample.

W. H. WARNER.—We are glad to hear that you are working the enlarging process so successfully, and are kept so fully employed. The other matters shall receive attention. We shall have pleasure in receiving the paper.

Several letters and articles in print, and answers to correspondents, are compelled to stand over until our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 194.—May 23, 1862.

## SOUTH LONDON PHOTOGRAPHIC EXHIBITION.

From a recent inspection of the pictures now in course of hanging at the Crystal Palace, contributed to the Exhibition of the South London Photographic Society, we have every reason to believe that the display will be eminently satisfactory. Many excellent photographers, whose works we have always examined with interest at other exhibitions, and who are entirely unrepresented at the International Exhibition, have some very superior pictures here. Amongst these we may mention the name of Mr. Annan, of Glasgow, whose fine large, and artistic landscapes, with natural skies, both by the wet and dry processes, will command universal admiration. Mr. Earl, also, contributes a series of the largest landscapes we have seen on one sheet of paper, which are very excellent. Messrs. Jackson Brothers, of Jumbo, near Manchester, contribute a series of artistic gems, in the shape of landscapes with figures. Without entering in detail here, however, we may simply repeat that we find, with pleasure, that this exhibition has afforded opportunity for the display of many very excellent photographs, both in landscape and portraiture, which in the South Kensington Gallery have found no place.

As regards position and publicity, the advantages of the South London exhibitors are out of all proportion superior to those in the garret of the International Building. At the Crystal Palace, the pictures are in an accessible gallery in the most attractive part of the building, within sight and tempting reach of all the hundreds of thousands of visitors who will be present during the summer. The gallery is well ventilated and comfortable, an awning having been erected in this part to shut out the heat of the sun's vertical rays. The screens are conveniently arranged and neatly decorated, the main colour being maroon flatting, bordered with black and Etruscan yellow. The ample space placed at the disposal of the society permits them to restrict the position of all pictures to within a foot or two of the eye line, so that nothing will need to be "skyed," nor will the visitor break his back by stooping to examine meritorious pictures. The whole of the very large collection of photographs contributed, will, we understand, be hung so that none shall be at a height greater than six or seven feet, or lower than within two feet or eighteen inches of the ground, whilst an effect of the utmost value to individual pictures, as well as to the *ensemble*, will be gained by leaving a space of two or three inches between all the frames. Some attempt at classification will also be made. Portraiture will occupy one department, landscapes another, and reproductions a third; and these, again, will be divided into sections, consisting of different processes. If the contemplated arrangement can be well carried out in this respect, there can be no doubt of the great value it will possess.

A difficulty will be found here, we fear, arising out of the tardy arrival of some of the promised contributions, the space for which cannot possibly be calculated in their absence. The work of hanging is, however, now going rapidly forward, and contributions arriving late must, we apprehend, be placed as best they may, without strict regard to arrangement.

It was originally contemplated, we believe, to open in the middle of May, but owing to the causes to which we have referred this was found impracticable. It is now definitely determined, we understand, to invite members, exhibitors, &c., to the private view on Saturday, the 31st, when we anticipate the pleasure of examining a very highly satisfactory exposition of photographs.

## THE EFFECT OF BROMIDES IN COLLODION.

Mr. Sutton resumes his remarks on this subject in the last number of the *Notes*, and in order to do justice alike to the subject and readers, by placing his statement of the matter fully before them, we make some further extracts. It will be seen that he admits that bromides are useful in counteracting the effect of impure chemicals; but enforces his conviction that no advantage is gained by their use when pure chemicals are employed. In this case, even, we conceive, photographers will continue to avail themselves of their aid, as it is with the commercial standard of purity photographers have to deal. Our own experiments, from which we derive our conviction of the value of bromides, have been conducted with the purest chemicals we could obtain, and with a nitrate bath, &c., in the best possible condition. Nevertheless, we have often stated that it is possible to obtain conditions in which a simply iodized collodion and pyrogallic acid development will produce results as good and rapid as bromo-iodized collodion and iron development; but that these conditions are difficult to secure, and impossible to maintain. Mr. Sutton says:—

"The effects of bromide are widely different, according as the chemicals used are pure or impure.

"With pure collodion and nitrate of silver, which are working well with the pyrogallic developer, and giving rich creamy negatives, with red intensity and blooming surface, the addition of bromide to the collodion renders the process *slower*, and after a time, affects the nitrate bath so that it will not again give the same kind of negative as before, but a thin grey negative, difficult to intensify. It is, however, difficult to work out-of-doors in a very strong light with simply iodized collodion, on account of its tendency to give red solarization in the over-exposed parts, and under these circumstances, the addition of a bromide to the collodion reduces the redness and brings the process more under control. There is, however, another and a better remedy for solarization, which consists in soaking the pyroxyline for half-an-hour in water containing carbonate of soda, so as to neutralize all the acidity which pyroxyline invariably shows, and which no amount of mere washing will entirely remove. Red solarization appears due, in great measure, to the acid contained in the pyroxyline, and it is most marked with cadmium collodion, which contains no base capable of liberating the iodine and neutralizing the acid. Negatives taken with cadmium collodion are generally the reddest, and the most given to solarization. The most rapid known wet process, which is at present practicable, is that in which pure chemicals are used, and no bromide; and in this process it matters not greatly whether the developer be iron or pyrogallic acid, for in neither case does the negative require intensifying with silver, and in both cases the time of exposure is about the same.

"With collodion simply iodized, the details in the shadows may be brought out with so much vigour and intensity as to destroy the effect of shadow altogether, but with a bromide in the collodion it is more difficult to give intensity to the details of objects in shadow, and therefore it may happen, in such cases, that a more truthful representation of objects in strong contrasts of light and shade can be produced.

"Such are the effects of bromide in collodion when pure chemicals are used, and it is then only useful when the light is too strong, and the contrasts too violent for the iodide alone. But these statements do not agree with the general experience of photographers, because pure chemicals are not commonly used by them.

"With common chemicals—that is to say, with collodion made with methylated ether, and nitrate of silver which has not been recrystallized and is acid to litmus paper—the effects of a bromide are different from what has been described before.

In this case, with iodide alone, the negative is thin and poor, and devoid of detail, requiring an enormous exposure, and difficult to intensify, so that things do not work well at all; but when a bromide is added, a thin picture can be got with a fair exposure, with a good deal of detail, which can be intensified into a printing negative by treatment with pyro and silver, after the details have been first brought out with the iron developer.

"We now see why the common opinion has gained ground that bromide is an accelerator in the collodion process. It is so when the chemicals are bad, but not so when the chemicals are pure.

"When the chemicals are bad they contain an acid or highly oxydized principle which interferes with obtaining a dense negative in the ordinary way; and we have now to endeavour to explain how the addition of bromide to the collodion counteracts that effect.

"In the preceding article on this subject it was stated that the film of bromide of silver is very slowly formed in the nitrate bath, requiring sometimes as much as a couple of hours to convert the whole of the bromide of cadmium into bromide of silver. But the film of iodide of silver is fully formed after the plate has been immersed a few minutes in the bath. If, then, a plate is removed from the bath after it has only remained in it a few minutes, some undecomposed bromide of cadmium will remain in the film, and this will no doubt render it less sensitive. But we are now speaking of a pure neutral nitrate bath. Suppose the bath or the film to contain traces of a strong acid, such as nitric or oxalic, it is then easy to see that this will attack the cadmium, and liberate the bromine, allowing it at once and promptly to combine with the silver and form bromide of silver in the film. The proof of this is, that if you add nitric acid to a solution of bromide of cadmium, you at once liberate bromine and form nitrate of cadmium in the solution. It appears, therefore, that a strong acid in the film (produced by free iodine or oxalic acid in the collodion, or nitric acid in the bath), assists the rapid formation of the bromide of silver, and thus renders the bromo-iodized collodion more sensitive."

Some very interesting remarks on the value of bromides in the dry processes follow, from which it will be seen that Mr. Sutton's views on this subject have undergone considerable modification:—

"We have next to determine, by careful experiment, the effects of bromide in the dry processes, and here some remarkable results are obtained, so remarkable that we must defer for a time the completion of this article, until we are able to speak more confidently on the subject. Those only who have experimented much in photographic processes can form an idea of the difficulty of arriving at a constant result and safe conclusion, and of the time these experiments take, and the multiplicity of little accidents which throw you out, however well arranged your system may be, and however carefully you may perform the manipulations. It appears, however, to be nearly certain that bromide *is* an accelerator in some of the dry processes, giving, with a wonderfully short exposure, details to which the preservative seems to impart greater power of acquiring density. When a bromo-iodized collodion film is exposed in its wet state it is not highly sensitive, probably, as we have shown, from its containing free unconverted bromide of cadmium; but when this film has been washed nearly free from that bromide and also from the free nitrate, and then allowed to get dry, the small quantity of free nitrate which remains entangled with the pyroxyline and preservative, becomes concentrated by parting with its water, and the dry film then acquires exquisite sensitiveness. In order, however, to produce this state of things, certain proportions must be observed among the various substances used, and when these are properly determined, a highly sensitive dry plate may be produced —as sensitive, in fact, as the best wet collodion, or possibly even more so."

To this we may add that in all the most rapid dry processes of which we have any knowledge, a collodion containing a large proportion of bromide is used. Mr. England, who contemplates competing for the Marseilles prize for an instantaneous dry process, uses four parts of bromide to three of iodide. From a conversation we had with Dr. Hill Norris, we glean that a bromo-iodized collodion was used in his rapid dry plates; and in our own experiments dry plates with bromo-iodized collodion have been at least two or three times as sensitive as those with iodide only.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Trays and Dishes.

Trays and dishes may be separated into two classes, according to the use for which they are required. 1st. Those which are intended for developing paper or glass negatives. 2nd. Those which are intended for washing, sensitizing, or any other purposes.

Trays intended to be used for developing pictures with any reducing agent and nitrate of silver, must be made in glass or porcelain; because the vitreous surface of these materials affords a greater facility of ensuring that absolute cleanliness which is indispensable in this operation. The most minute particle of organic matter, or metallic deposit, adhering to the bottom of the tray, will, under the action of the developing agent, and in the presence of free nitrate of silver, prove the cause of a reduction of metallic silver upon the surface of the dish, which will speedily spread itself, first in isolated patches, and gradually over all that portion of the dish which is covered with the solution. This action is of course produced at the the expense of the picture which is at the moment being developed in the dish, and upon which alone the reduction of silver should take place; but in addition to this loss, the picture is more frequently than not spoiled by contamination with the irregular deposit, and by detached particles of this latter floating in the liquid and settling upon the face of the picture.

To the beginner these remarks may appear to be hypercritical, as it will seem to him an easy matter to wash a dish of any material perfectly clean. He must remember, however, that not only ordinary and apparent cleanliness is necessary, but that a vessel in which a reducing agent and free nitrate of silver are to sojourn together must be absolutely and chemically clean. The following experiment, will go far to convince him of the truth of this. Clean a porcelain tray thoroughly with whiting and cyanide of potassium, and having washed and dried it, develop in it a collodion plate of any kind—say a collodio-albumen with gallic acid. If the proper quantity of free silver only be added, it will be found that the liquid will remain to the end of the operation quite clear and nearly white, and the dish will remain perfectly clean. When the picture is finished encourage a deposit of silver upon the dish by placing it with the refuse developing liquid still in it in the day light.

The bottom of the tray will soon be blackened. When it is in this state pour off the liquid, and let the deposit dry on the dish, still under the influence of light, for a few days. Then wash the dish with a piece of rag and water *only*, until it appears perfectly clean, and after wiping it, proceed to develop in it another plate similar to the first, with a like solution. It will be found, in all probability, that the developing liquid will soon become turbid, and that the bottom of the tray will be covered in patches with reduced silver, which will gradually spread over its surface to the detriment of the picture. These effects are produced by some *chemical* impurities which the simple washing was unable to remove, and that the eye could not detect.

A glass or porcelain tray can always be rendered chemically clean by rubbing them with whiting, or some such substance, and cyanide of potassium. But the porous granulated surface of such materials as gutta-percha, india-rubber, ebonite, &c., renders it impossible to apply mechanical friction to every part of their surfaces, and unfits them consequently for the purposes of development.

For sensitizing positive paper, for washing, dipping, or

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* Continued from page 232.

any such uses, trays made of other materials, such as gutta-percha, ebonite, or wood well coated with rosin cement can be employed.

Many of the remarks made concerning the various kinds of baths will also apply respecting trays of the same material. Thus the glass trays are the least well made of all so far as workmanship goes, and from the amount of material used owing to their enormous thickness they are extremely expensive. Some glass trays, however, are much better made than others, having tolerably flat bottoms, parallel sides, and being provided with a lip; but the greater number are clumsy, inconvenient, and ill-made utensils, by no means up to the mark, or as good as we have a right to expect for the price charged.

Porcelain dishes are generally well made and suited to the work for which they are intended. They are constructed with a lip, and can be had of every size and shape.

The same remarks apply equally to trays of gutta-percha, which, when made of the pure gum may be safely used for all purposes except developing. They are mostly very well made. These trays are especially useful for washing plates in, for those processes in which such an operation is necessary: as the soft nature of gutta-percha permits the operator to shake about the plate roughly, which is the most efficient way to wash it, without danger of injuring it. It is indispensible to procure these trays as well as all other apparatus constructed of gutta-percha from a house where it is known that only articles manufactured of the pure gum are supplied, otherwise disappointment will inevitably ensue. Utensils made of adulterated specimens of gutta-percha not only act in an injurious manner upon the various chemicals that the photographer is in the habit of using, but they will stand little wear and tear, and in a short time crack to pieces, proving the false economy of buying cheap trumpery. These observations are necessary, as there is a great deal of rubbish in the market. There are several respectable firms who are known to manufacture all articles for the use of photographers out of perfectly pure gutta-percha, and the purchaser will do well to supply himself from such a shop, even if the prices be a trifle dearer: though it is worthy of remark that the most worthless adulteration of gutta-percha is generally charged for at the same rate as the pure article.

Ebonite trays have been lately introduced. Ebonite does not appear to possess any advantages over gutta-percha for photographic dishes; and it is nearly three times as costly, its use, therefore, is not likely to become very general. The articles of this material are generally very well made.

Trays for sensitizing positive paper, and washing, can be made of wood, as described for baths. They must be securely fastened with screws, and properly coated with rosin cement. With perfect efficiency they combine the advantage of extreme cheapness, and the photographer can make them himself. These dishes are probably the most convenient kind to employ for washing paper prints after fixing, as they can be made large at little expense, and are not liable to fracture.

(*To be continued.*)

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

In giving an account of the principal chemical compounds which are of interest to photographers, we have been obliged to follow a certain order, which, whilst it has been very convenient in grouping together bodies of like action, and presenting similar substances to our readers in juxtaposition, has rendered it necessary for us to separate other compounds from those with which they have many points in common. We have conveniently classified the chemicals with which it was our task to deal according to the acids which they contained, and under these headings—hydro chloric acid, nitric acid, sulphuric, &c., have given their most important saline compounds. We have necessarily been obliged to exclude much valuable matter referring to the equally important group of bases, and it is our intention now to glance at the chemistry of these bodies, so far as they are likely to be of interest to our readers, and have not been before referred to.

We have already noticed several salts of *potash* under the headings of the respective acids, we will now speak of the few remaining compounds of that base which are of photographic interest.

Hydrate of potash, or caustic potash, as it is more frequently called, is the oxide of the metal potassium in combination with water: it is the type of the *alkali* class of bodies, being a highly caustic and energetic body, uniting with great violence to acids forming very stable salts. It is prepared commercially from the carbonate by mixing slaked lime with its hot solution. Carbonate of lime is formed, and the solution, which must be allowed to become clear by standing, is decanted off and rapily concentrated by boiling down in silver vessels. If the liquid be filtered it is liable to be contaminated with organic matter, as the strong caustic alkali has a powerful solvent action upon organic bodies. Filtering also gives the solution of caustic potash an opportunity of absorbing carbonic acid, which it does very greedily, from the air. Caustic potash is liable to contain many impurities. The following is a list of the principal ones, with their means of detection:—*Carbonate of lime*, this is owing to the liquid not having been clear when decanted from the precipitated carbonate of lime. *Oxide of iron* may also be present from the evaporation being conducted in an iron instead of a silver dish. Both the carbonate of lime and the oxide of iron, together with other insoluble substances accidentally present, remain behind when the potash is dissolved in water. When the evaporation is conducted in the air, *peroxide of potassium* is formed in small quantity towards the end of the operation. It is owing to the presence of this substance that the hydrate of potash gives off oxygen gas when dissolved in water. The ordinary caustic potash in sticks, which is used in surgery as a caustic, and which is prepared by evaporation in iron vessels, evolves a considerable quantity of oxygen upon solution. Graham and Davy state that the amount of oxygen evolved appears to be in direct ratio with the oxide of iron left behind when the potash is dissolved in water. According to Watts this connection between the oxide of iron and evolved potash suggests the supposition that ferrate of potash is formed. If the solution of carbonate of potash has not had sufficient lime added to it for the purpose of rendering it caustic, or if the mixture has not been sufficiently boiled, *carbonate of potash* will remain in the solution; this may be detected by adding an acid in excess to the diluted solution; an effervescence will show the presence of carbonic acid. It may be removed by cautious addition of lime-water, and subsequent filtration and decantation. *Sulphate of potash* is also a very frequent contamination, owing to the presence of this impurity in the crude pearl-ash which is generally used for converting into caustic; it may be detected by supersaturating with hydrochloric acid and then adding chloride of barium; a white insoluble precipitate proves the presence of sulphuric acid. *Chloride of potassium* may likewise be present; it is readily detected by adding nitric acid in excess and then nitrate of silver; the well-known white precipitate of chloride of silver is produced if the slightest trace of chlorine be present in the solution. *Nitrate of potash* is an impurity which is sometimes present; it may be detected by testing the solution for nitric acid according to the plan given in a previous number under the head of nitrates. Besides the above-mentioned impurities certain metallic oxides may be present. *Alumina*, which is a very common as well as a very annoying impurity in caustic potash, may be detected by adding an excess of hydrochloric acid, and then an excess of ammonia, and boiling, a translucent white precipitate shows the presence of alumina. Other metallic oxides may be detected by supersaturating with acetic acid, and then precipitating them with ammonia and sulphide of ammonium, a white, brown, or black precipitate shows the presence of a metallic impurity. For photographic purposes caustic potash is generally required pure, and when used for the preparation of oxide of silver, by precipitating nitrate of silver with it, the presence of many of the above impurities would be very injurious, as the oxide of silver is usually wanted absolutely pure for neutralizing minute traces of nitric acid, or other delicate reactions. We will, therefore, give a process by which impure caustic potash may be purified, and also another by which a perfectly pure article may be prepared *ab initio*, in case the photographer has no crude caustic potash to purify.

The caustic solution, after evaporation to a syrupy consistency, is mixed with about one-third of its volume of alcohol, and well shaken together in a close vessel, it is then left to settle. Three strata are formed, the bottom one consisting of a precipitate which may contain lime, oxide of iron, and sulphate of potash; over this is an aqueous solution of chloride of potassium, carbonate of potash, and sulphate of potash, together with a portion of caustic alkali; on this floats the upper stratum, consisting of an alcoholic solution of caustic potash. This is to be poured off, and the spirit separated by distillation or evaporation in a silver vessel, until the hydrate begins to sublime. A resinous matter will be formed by the decomposition of the alcohol; this will be found swimming on the surface, it must be removed, and the hydrate of potash poured out on plates. The only impurities which this alcoholic potash is likely to contain are chloride of potassium, together with traces of carbonate and acetate of potash.

The next method of preparation to which we alluded is more expensive, but yields a very pure substance. Sulphate of potash, which is readily obtained in a state of perfect purity, is powdered finely, and then boiled in a strong solution of caustic baryta, until a small portion of the liquid filtered off from the precipitate gives a turbidity upon supersaturation with hydrochloric acid, and addition of chloride of barium. This proves that the sulphate of potash is present in excess. This is now decomposed by careful addition of baryta water in slight excess, and the decanted solution is evaporated, the small excess of baryta being precipitated during evaporation by the carbonic acid in the air.

Solid caustic potash must be preserved in very well stoppered glass bottles. Both in the case of the solid and solution of potash it is advisable that the stopper of the bottle should be rubbed over with solid paraffin, in order to prevent the adhesion of the stopper to the bottle, which almost always takes place after a certain time when this precaution is not taken. It should also be preserved in hard German glass bottles, in preference to the lead glass in general use in England, as the latter communicates silica, lead, and other impurities to the potash.

The solid hydrate is white, hard, brittle, and very deliquescent. Below redness it melts to a clear oily liquid. It requires but half its weight of cold water to dissolve it, the solution being attended with considerable rise of temperature. In more dilute solution it forms the liquor potassæ of the druggists. In this state it is a clear, colourless, inodorous solution, possessing intense alkaline properties, shown by the perfect manner in which it neutralises the most powerful acids; the strong blue colour which it communicates to reddened litmus paper, the brown colour which it imparts to turmeric paper; the decomposing power which it exerts on most, if not all metallic salts, withdrawing their acid and setting free their oxide; and finally by the strong power which it possesses of disorganizing the skin, communicating to the fingers, for instance, a greasy feeling, owing to its having dissolved the epidermis, and converted it into a kind of soap.

## CELESTIAL PHOTOGRAPHY.

Mr. Warren De la Rue has presented to the *Académie des Sciences*, a collection of astronomical photographs and engravings, upon which M. Faye reports that he has carefully examined them, and will endeavour to make their importance in a scientific point of view, fully appreciated. He says—The total eclipse of the year 1860, is too familiar to you to render it necessary for me to detail the great enterprises it occasioned. On the other side of the channel, Mr. De la Rue was charged with the photographic department, and here we have the results of this portion of the English expedition into Spain, placed before our eyes. The original proofs have been enlarged by well known methods, in order that the details of the mysterious phenomena may be better appreciated. Among these photographs, some faithfully represent the first impressions with all their defects, occasioned by accidental jarring: others have been retouched to remove these defects of which the origin is known: all are deserving of the lively interest you have shown in them. It is in fact a real triumph of modern science to be able in this manner to transmit to the remotest posterity, the brilliant but transient phenomena of a total eclipse. It would be useless to repeat in this place the results that may be derived from these remarkable designs for the solution of the problem which astronomers have pursued since the eclipse of 1842: the *Académie* has received ample details upon this subject, from Padre Secchi, who, in the south of Spain, has also succeeded in obtaining photographs of this same eclipse. I shall limit myself to remarking that the fact of the impression of the protuberances does not prove that these appearances are real objects floating in the supposed atmosphere of the sun. Simple flashes of light would show just as well upon the plates, on the sole condition of having the same intensity. To speak decidedly on this particular, we should find a much more significant argument in the correspondence established by Padre Secchi between the proofs obtained by Mr. De la Rue and his own, obtained at intervals of a few minutes at stations separated by the entire width of the Spanish territory.

Whatever it may be, the success of my honourable colleague of the Royal Astronomical Society of London, is a great step in a new and fertile field of observation. It will be desirable that the *Académie*, in thanking Mr. De la Rue for his present, should enquire of him the details of the method he has pursued, and particularly respecting the improvements which his recent experience in Spain may have suggested to him for future operations.

But while rendering full justice to these beautiful works, it must not be supposed that we remain strangers, or are indifferent to the progress which is based upon a French discovery. I will remind you, therefore, that in the year 1858, there were presented to the *Académie* at its sitting on Monday the 15th of March, some beautiful large proofs of the principal phases of this phenomenon, proofs which were susceptible of exact measurements and obtained direct without the intermediate operation of enlarging.* Upon the first glance at these proofs we may distinguish the smallest spots, and even the very curious and complicated undulations of the marginal faculæ; and on this same occasion you were reminded how useful to science it would be to collect, on the same scale, day by day, and with the same fidelity, a continuous history of the solar disc.

Let us for a moment suppose the *Académie* to be in possession of such designs, continued perseveringly for many years; what problems connected with the consitution of the sun should we not be permitted to solve? Who at the present time can tell, by an attentive but excessively special study of the spots in the sun, that the appearance of these spots is a periodical phenomenon. It is even suspected that the appearance of these spots is connected with the variations of terrestial magnetism. In taking the remarks of one of our members on the motions peculiar to these spots as a starting point, a learned German has, by the aid of long-continued observations determined the direction and velocity of the currents of the photosphere.

* It must not be forgotten that Mr. De la Rue's photographs relate to the phenomena of *totality*, and that the photographic impression of this phase presents much greater difficulties than that of a partial eclipse.

Again, the continuous study of the solar disc presents to us one of the best means of verifying the hypothesis of a group of asteroids in the region of Mercury, which that enigmatical planet which M. Lescarbault's observations led us for a time to hope would soon be in our possession. Now the proper means of attacking the questions I now raise, and all those reserved for the future, is photography. With photography we do not incur the risk of losing our time in the pursuit of a false idea, for we register all the pheuomena at once, those which interest the science of the present day, and those which the scieuce of the future may hereafter claim for observation. Well executed photographs taken on a large scale, and susceptible of exact measurement, are complete and uuimpeachable witnesses, which may be as profitably consulted a century hence as now. We cannot, therefore, receive with too much favour the recent progress accomplished by Mr. De la Rue in this direction, in which he has for some time past acquired a pre-eminent and indisputable authority; but, at the same time, that this direction be not neglected by us, we must not cease to point it out to persons occupied with photography scientifically, and to show ourselves disposed to welcome the results of their efforts.

I now pass to designs of another kind, which Mr. De la Rue has also presented to us. These designs are based upon minute micrometric measure, executed with the aid of a Newtonian telescope of 13 inches aperture. We first remark several representations of the great comets of 1858 and 1861. These cometary desigus are very beautiful. Yet we find the contours too marked, too hard, the details too forcible. I fear that these defects will prevent astronomers from consulting them, if not with benefit, at least with entire confidence. In spite of their merit and perfect execution by the engraver, these plates please me less than those of the comet of Donati by Mr. Bond, and those of Padre Secchi of the last great comet.

We have next the designs of the plauets Mars, Jupiter, and Saturn. Those of Mars are admirable. I judge of them by memory, for it is a long time since I observed this planet; but I had the good fortune to study it at the Paris Observatory with M. Lerebour's great lens, at a time when this lens had undergone no alteration, and no design has ever recalled my impressions of that period iu so striking a manner as these of Mr. De la Rue.

But what removes these designs from the category of ordinary representations of the celestial bodies, and which will especially excite the attention of the *Académie* is the putting in practice of an idea at the same time original and profound.

The distance of these planets is such, that their images always appear, even in the largest telescopes like flat figures, without relief, as on maps. It would be physically impossible to apply the method of the stereoscope in such cases; for no two places on the surface of the earth would be sufficiently distant to give the necessary visual angle. Mr. De la Rue has wished, nevertheless, to make the planets be seen stereoscopically, and he has succeeded. Instead of varying the point of sight, which is impossible, he has varied the moment of observation by some hours, or by some years, according to circumstances. Two images of Mars, obtained at an interval of two hours, correspond for this planet, to an angular rotation of thirty degrees. It is as if the artist had turned so much around the planet to procure a pair of images of it. Placed in the stereoscope, these beautiful engravings must produce a grand effect. With Saturn, of which all the superficial changes assume a figure of revolution about the axis of rotation, the same method leads to no result; but two images of Saturn, taken at an interval of three years and a half, give, in respect to the ring of that planet, the same stereoscopic effect, aud exhibit the motion of translation around the sun. I venture to beg of the *Académie* to have constructed a stereoscope of suitable dimensions, so that we may all enjoy the pleasure of this singular planetary relief, which so naturally represents an unnatural effect, but one not beyond our comprehension. Already a learned Russian has taken advantage of analogous images of the moon, to study certain very delicate points in the confirmation of our satellite.

In conclusion, the photographic proofs and eugraviugs of Mr. Warren De la Rue possess great scientific value; they merit our approbation.

I have the honour to propose to the *Académie* that it communicates our testimony of their value and importance to the learned secretary of the Royal Astronomical Society of London.

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## ON THE EXPENDITURE OF SILVER USED IN PHOTOGRAPHIC OPERATIONS, AND ON THE SAVING THAT MAY BE EFFECTED.

BY WILLIAM TUDOR MABLEY.*

In the early days of photography but little was thought of the expenditure of salts of silver: we were only too happy if we gained satisfactory results, irrespective of expense. As the art advauced, it was observed that but a very small portion of the silver employed entered into the composition of the picture; and those who practised it largely began to turn their attention to the saving of that which had been allowed to flow away from the sink.

At present professional photographers, for the most part, economise their expenditure of silver solutions, but the great bulk of those who practise the art as amateurs do to this day throw away a considerable quautity, which may be easily saved: there are, indeed, some amoug professional photographers who still do so.

The purpose of my observations this evening will be to show what quantity of nitrate of silver is taken up by floating paper for printiug purposes, how much of that quantity may be recovered, and what savings may be effected from other sources of waste.

It has been asserted that only five per cent. of the silver employed in sensitizing paper goes to form the picture. This may be; but what I propose now to do, is to state the amount that can, in ordinary manipulation, be recovered with very little trouble, and without any great aptitude for chemical operations. It must be understood, therefore, that larger quantities than those I shall mention may be obtained if the processes be followed out with chemical accuracy. I may state that the results I shall bring before you are reliable, they having been arrived at by workiug with considerable quantities, and having been verified by repetitions.

To carry out the first point, viz., the expenditure of silver —I floated fifteen whole sheets of paper; and this I did the one after the other, so as to avoid any error which would arise from allowing the solution to remain any length of time in the dish, or from the pouring of it backward and forward. These fifteeu sheets were floated upon a bath of nitrate of silver, containing fifty-six ounces, at seventy grains to the ounce. Immediately this was done, the solution was again measured, aud was found to have lost seven and a-half ounces; but, at the same time, it had decreased in strength down to sixty-two grains to the ounce. The original bath, therefore, contained 3920 grains of nitrate of silver, and the bath, after the floating of the paper, 3007 graius—showing a diminution of 913 grains, and an appropriation by each sheet of sixty grains, or one drachm, which, with nitrate of silver at four shillings the ounce, is just sixpence in money value. It must, however, be remarked that the result will somewhat vary accordingly as the paper has more or less albumen, more or less chloride, or is thick or thin. The paper that I used was of an average quality of albumenized paper, and the result may fairly be taken as an example.

I now proceed to state how much of this may be recovered. The first thing is to save the drippings. The most conveuieut method of doing this, to my miud, is to suspend

* Read at a meeting of the Manchester Photographic Society, April 2nd, 1862, and reported in the Society's organ.

the paper from a cord, which is placed in an inclined direction over a board, or anything that will carry a cup to receive the drippings; the remaining moisture may be drawn off by a piece of bibulous paper. In this manner I saved from fifteen sheets of paper one and a-half ounce of solution, containing eighty grains of nitrate of silver.

The next point is the recovery from the washing of the prints before toning. This operation of freeing the prints from nitrate of silver is not so easily accomplished as might be expected. It adheres to the paper very strongly, and the bulk of it can only be removed by at least three changes of water. The prints should soak in the first water for fifteen minutes, and be afterwards moved about: the operation is greatly expedited if hot water be at hand. Prints washed in this manner gave for the fifteen sheets of paper a solution which yielded 350 grains of chloride of silver.

I now come to the hyposulphite fixing bath, which is thrown away more frequently than the water used for washing prints. This, for the fifteen sheets of paper upon which landscapes had been printed, yielded 180 grains of metallic silver. The methods adopted for precipitating silver from the washings and fixing baths are to be found in all books on photography. I may, however, mention that it will be found desirable to keep two stock jars—one for the washings, and one for the fixing baths. From the former of these chloride of silver may be precipitated by the addition of common salt; but such a proceeding cannot be adopted in the latter, as chloride of silver is soluble in hyposulphite of soda. Another course must, therefore, be adopted, and the most simple is to add sulphide of potassium, and thus precipitate the silver as a sulphuret.

My reason for recommending the use of two jars is, that when chloride of silver can be precipitated, it is of a known value; the sulphuret, however, arising from the use of sulphide of potassium is a variable compound, and the quantity of silver it contains can only be ascertained by trial. Sulphide of potassium has, however, a very disagreeable odour, and the operation should, therefore, be conducted out of doors. There are other methods which do not involve this inconvenience, and for which I refer to Hardwich's *Photographic Chemistry*, &c.; but the plan I have mentioned is the most simple, as the precipitation may be done in the old way, and may be continuous.

If an excess of chloride in the one case, and sulphide in the other, be kept in the jars, the operation goes on, and it is easily ascertained whether they be exhausted, by removing a small portion of the clear liquid, and testing it with a fresh solution of chloride or sulphide. As the latter substance, however, is sometimes slow to act in the case of weak solutions, a small quantity of sulphuretted hydrogen gas may be used; but a better method is one which I have adopted at the suggestion of Mr. Caro, an ingenious chemist in the establishment of Messrs. Roberts and Dale. It is simply this:—Take a test tube, and partly fill it with some of the clear solution; in this place a small quantity of caustic soda, so as to make the solution caustic, drop in a fragment of grape sugar, and heat the whole over a spirit lamp or gas-burner: if there be a trace of silver present, it is immediately precipitated in the metallic state.* This method is indeed the best that can be adopted for dealing with the bulk of the solution, if the trouble of heating it be not regarded.

So far the savings treated of have reference to the printing process; but there are other sources of loss to the photographer. For instance, it is a common practice to wash out vessels which have contained nitrate of silver at the sink. I find that a dish for floating a whole sheet of paper, and which is 24 inches by 20, retains upon its surface a quantity of solution, at sixty grains to the ounce, which after close draining yields 25 grains of chloride of silver; and when we consider how often this operation of washing dishes, measures, bottles, and other utensils takes place, it will be seen that a great loss is sustained.

* Mr. Mabley illustrated this experiment.

Again: it is a very common practice to throw away filter papers. I find that such a piece as this, and which is eight inches in diameter, retains 15 grains of nitrate of silver, the solution used being 60 grains to the ounce.

In preparing dry plates, which have to be washed after leaving the silver bath, there is much to be saved. In washing a series which gave a combined area on one side of 480 inches, and which were sensitized in a 30-grain bath, the washings afforded 35 grains of chloride of silver.

There is also a continual waste by spilling solutions, and these may be recovered simply by keeping blotting-paper at hand to absorb the fluid.

In developing collodio-albumen plates, a large quantity of silver is often required to get up the intensity, and a very small quantity of this goes to the picture; as it is renewed when it becomes dirty a great sacrifice is made. This refuse may be added to the stock jar containing the hypo baths.

## PHOTOGRAPHY IN THE TROPICS.

BY WM. FITZGIBBON.*

For some months past I have been promising myself to write you, but the multiplicity of my engagements, and my business occupations, added to no small share of laziness, have prevented me; at last, however, I have made an effort, and I give you its result.

First, I enclose you a few stereoscopic views, and shall occasionally send others, provided you like them. By the first friend I find going home I shall forward some negatives for your Photographic Society; of course I do not know whether you are forming a collection of views from different parts of the world, but if not, I would suggest it; and I am pretty sure if other brethren of the photographic art feel as I do, they will not refuse a little labour to add their mite to the collection.

I have read so much about processes, toning and fixing, &c., by this method and by that, during the last five years, that I have become thoroughly bewildered; you will probably laugh when I tell you that I have scarcely ever seen a toning or fixing process published that I have not tried; some would work, others failed, as to the results stated, in my hands, and others were worthless; as I never made but a few ounces of each, the loss could not be great, and everything was worth a trial. Instead of throwing them away, I put them all together in a glass jar, holding about three gallons, and to these I added occasionally an old hypo bath. Imagine to yourself what a toning and fixing bath it is, a mixture of nearly everything used by anyone; and, as to proportions, well, the less said about that the better. A few weeks ago it came into my head to *try the mess*, and the stereoscopic views numbers one, two, and three are the result. The albumen paper I prepared myself, fifteen grains of chloride of ammonia to the ounce of albumen, floated for three minutes, the albumen four days old before using, and Saxe paper: silver bath, eighty grains to the ounce, and one drop saturated solution of citric acid to three ounces; floated for five minutes. This I have worked for the last twelve months, and always with excellent results. I overprint a little, and instead of washing in water I wash in a solution of chloride of sodium, two ounces, to eighty ounces of water; in this the print changes rapidly, first bronzing, and finally to a dirty red or brick colour; I now wash in several waters until the saline taste is removed, and then pass to the mixture above, and leave it until I get the tone I like, say from twenty to forty minutes, afterwards work as usual. Now, whether these prints will fade or not is a question; so far I have been very fortunate, and it rarely happens that any of my proofs fade. I may here remark that some two years and a-half ago, I toned some albumen prints as follows, and out of over one hundred not one has faded, and I work it now in preference to any other, except

* From the *American Journal of Photography*.

the mixture. Nos. 4, 5, and 6 are done so, and are two years old.

On taking from the printing-frame, wash in chloride of sodium, as above, then in water, and tone in—

| | |
|---|---|
| Chloride of gold ... ... ... | 8 grains |
| Distilled water ... ... ... | 16 ounces |

Shake well, and add—

| | |
|---|---|
| Acetate of soda ... ... ... | 1 drachm. |

This quantity will tone the proportion of thirty-two prints whole-size.

After washing thoroughly, fix in hypo bath, one ounce to five ounce of water. All my work is done in yellow light, and an abundance of it. In the toning bath the proof needs close watching for the first few proofs, afterwards it works slower.

I believe that the principal cause of fading (of course there are several others, such as bad paper, bad toning, and bad fixing, and want of proper care in handling the proofs), is our bad system of washing. The plan of hanging a print up to dry I have never approved of, because I do not believe that any amount of soaking or washing will remove all the effect of the toning and fixing ingredients from the paper; they must be forced out. In a number of your Journal of 1860 you allude to a good plan, that of passing the proofs through a patent clothes-wriuger: I have tried it, but the pressure is not enough, as I understand it. I therefore set to work and got a machine that answers a double purpose, and I firmly believe will be found of great utility, not only in removing the water from the proofs, but afterwards in mounting them on pasteboard, and for which a lithographic press is recommended.

I enclose you a sketch (made for me by Mr. Thompson, an American chemist residing here, and who estimates the expense of getting them up, in New York, at from sixteen to twenty-five dollars) and description, to which I refer you; I have now a bungling wooden one, but wish for a proper one, if it can be made at about the price above stated. Please give me your opinion about its utility.

I have lately noticed that an effort is being made to introduce some new articles into collodion, with a view of obtaining sufficient intensity without resorting to redeveloping agents. With this object before me I now send you a sample of cotton known here as "Ixcaco," which, I think, would be worth the while of making gun-cotton of it, and testing it. The colour is very suitable, and I have an impression it may help. My own experience is, that any collodion of a deep yellowish colour will produce negative pictures of greater intensity than a clear one, provided the colour is not caused by the liberation of iodine from the sensitizing agents used. The cotton in question will produce the effect. It will require picking out and cleaning, as I send it in its rough state. Try it, and if it suits let me know, and I will send you a quantity; I cannot get the right quality of acids here for a fair test, so that some trials I made were failures, the cotton not dissolving.

A root grows here, and is known as *camotillo*, that produces the effect of turmeric, described in the Xantho-Collodion; I have tried it with good success; but what I have found answer equally well is the following developer :—

| | |
|---|---|
| Protosulphate of iron ... ... | 2 ounces |
| Distilled water ... ... ... | 20 „ |
| Acetic acid ... ... ... | 2 „ |
| Sulphuric acid ... ... ... | ½ drachm |
| Refined loaf sugar ... ... | 10 grains |
| Alcohol ... ... ... ... | 1½ ounces. |

I have obtained negatives with this developer as intense as needs be, though not at all times, for instance, when the exposure has not been right, For positives I use a modification of the developer: half the quantity of acetic acid, and substitute nitric for sulphuric; the result is a clear, bold white and black picture, with well-defined half-tones, and but very slightly metallic. My object in adding the sugar to the developer is, that I find it has a tendency to rot the collodion when added to it; this effect is not observable when used in the developer, yet a like intensity is produced. These facts I learned as far back as 1854, when experimenting with different articles as developers.

You will probably recollect sending me, some time since, a few articles, among which was some iodide of cadmium: on its reaching me, one ounce of it, from some cause or other, was nearly black. I made no use of it, until a few days ago, on running short of the article, I opened the bottle, and found it in a black wet mass. I sensitized a few ounces of collodion with it, and unfortunately threw the balance away; I say unfortunately, because, on trying a picture, on the collodion, settling very bright purple and green colours appeared (and for which I am unable to account), which still retain all their original brightness; they are not well seen without slightly turning the picture on one side. The editor of one of our newspapers was with me at the time, and has since published a uotice of it. I tried a second, and a third, in fact several, and in every instance obtained the same result: in some instances the collodion peeled off on drying, in others it did uot. One of these pictures I shall send you for examination, probably you can explain the cause, ou seeing it; it has evidently been caused by some peculiar state of the iodide of cadmium used, as nothing of the kind has been produced by the other bottles of iodide.

I trust that you will not find my letter a bore, if you do, throw it away; if not, make such use of it as you think it may deserve. I shall write again, in all probability, about June, or July, as by that time I trust I shall be enabled to give you the results of some experiments in which I am now engaged.

I regret to say that, owing to a large number of operators traversing the country, the photographic business is pretty well ruined, as to a fair price or an amount of work. This city, which will hardly support one establishment, has four; and apart from this there are some three of four young men who have learned the business (with a vengeance!), and are now working hard to break it up entirely.

At the present time I am preparing to take advantage of the dry weather for a trip up towards the Mexican frontier, to add to my collection of views and Indiau costumes.

A good, simple, dry process would be of great service to me, but as yet I have met with none that gives me the desired results, without being too complicated to work with in a country like this, where an artist has a thousand difficulties to encounter, that are not dreamed of by our friends at home.

*Guatemala, March 6th*, 1862.

## THE NITRATE OF URANIUM BATH.

THIS toning bath is the best, but like all alkaline baths requires great care in the manipulation. It will produce those tones of black and white, so desirable in the *cartes de visite*.

Float the albumen paper in a solution of 90 grains of silver to each ounce of water, having previously added a few drops of strong aqua-ammonia, to neutralize the acid in the nitrate of silver. Let it settle a few minutes, and filter. Prepare three solutions as follows:—

| | |
|---|---|
| No. I.—Chloride of gold ... ... | 15 grains |
| Or, one bottle of the ordinary chloride of gold. | |
| Water ... ... ... | 2 ounces. |

Neutralize with bicarbonate of soda.

| | |
|---|---|
| No. 2.—Acetate of soda ... ... | 100 grains |
| Water ... ... | I quart, or 32 ounces. |

| | |
|---|---|
| No. 3.—Nitrate of uranium... ... | 15 grains |
| Water ... ... ... | 2 ounces. |

Bicarbonate of soda sufficient to neutralize the acid, which may be known by test paper.

Mix Nos. 1 and 2 by pouring the gold into the soda. Then add the nitrate of uranium, and filter. This will tone nearly 200 prints, when a new bath can be prepared, to which this old one may be added, and the tone in most cases improved; but should there be any mealiness, lay aside the whole bath, and prepare a new one, reserving it for future use, and it may be added gradually to the new baths. Always wash the prints well, as in other alkaline baths, and immerse in the above the usual time. On removal from the toning bath, wash carefully, and fix in a solution of hyposulphite.

The foregoing method of toning is now adopted in the most extensive establishments in New York. On trial, it will prove the most practicable, and there is not so much waste of chemicals.

The use of aqua-ammonia in all the silver solutions for the albumen paper, is recommended.

Difficulties will occur in the use of all baths, and slight variations in the proportions of the chemicals of each of the toning baths, as laid down in this book, may be adopted.

Great attention should be paid to the quality of the paper, and to the negatives, which must possess all the requisites for a good print. Wash carefully through all the various stages, until the final mounting of the picture.—*American Journal of Photography.*

## VARNISHING PHOTOGRAPHS.

The practice of varnishing photographs has always, in our own opinion, issued in spoiling them. As, however, it meets the taste of some photographers, and is much practised on the Continent for large developed prints, we subjoin a couple of letters on the subject from American journals. The first is signed J. Longwell, and is as follows:—

"Take a clean glass the size of the picture, warm it sufficiently to melt bees' wax, which is to be rubbed over one side. With a piece of Canton flannel rub the superfluous bees' wax off, leaving only a thin even film on the glass. It should present no uneven ridges or markings caused by rubbing; they would show afterwards in the picture. Set the plate aside.

"*Enamelling Solution.*

| | | |
|---|---|---|
| Patent gelatine | ... | $1\frac{1}{2}$ ounces |
| Alcohol | ... | $2\frac{1}{2}$ " |
| Water | ... | $7\frac{1}{2}$ " |

"Put altogether in a bottle, and melt in a water bath. When dissolved, filter into a flat dish. A moderate heat should be kept under the dish, so that the solution may be kept fluid, and not allowed to cool. Float the picture for three minutes, picture side down, carefully expelling all air bubbles, the same as albumenizing paper. Raise it up, and let it drip a moment. Have on hand a pail of clean water. Hold the picture by the upper edge in the right hand, and take the glass previously waxed in the left hand. Let them both descend (a few inches apart) perpendicularly into the pail of water, which should be deep enough to cover them. Bring the upper edge of the picture even with the upper edge of the waxed side of the glass. Hold the two firmly together, and gradually raise them out of the water. The picture now adheres very nicely to the glass. Should there be any air bubbles, they must be worked out. The glass can now be laid flat, a piece of blotting paper laid over the picture, a glass on top of that, and a moderate weight on top of all for a few hours. Then place the picture and glass where they will thoroughly dry, when the picture will come off with a beautiful enamelled surface."

The next letter is from Mr. Sinclair, as follows:—

"Many good operators oppose the use of any varnish, or sizing of any kind, after the photograph is mounted, and tell us that it destroys the artistic effect: that an engraving is always injured by varnishing; that photographs should resemble engravings as much as possible, and therefore should not be varnished, and much more to the same effect. It is not my intention to dispute these statements, notwithstanding my non-concurrence in them, but merely to state my opinion and the reasons I have for it.

"Those who follow photography as an amusement are at perfect liberty to varnish their pictures or leave them plain, and nobody has any right to find fault, but with those who follow it as a business the case is very different, nine out of ten of our customers want their pictures varnished; 'They look so much better;' under these circumstances we have the strongest reason in Dollardom in behalf of our practice; but I hold that a properly varnished photograph is more lasting than one not so protected. I have some photographs that have been exposed to the fumes of coal-gas until the unvarnished cardboard upon which they are mounted has become quite yellow, yet the photograph is unharmed, while others left plain are considerably faded, and this I think conclusive evidence that varnishing is not only no injury, but a positive benefit to the photograph; and as I have no patent process to sell, I think it will do no harm to let your readers know what I use, and perhaps save me the trouble of sending it to some of them as I have had frequent applications for my process.

"I take fine picked gum arabic and make a solution about as thick as collodion, and spread one coat over the photograph with a clean brush and set it aside to dry: when dry I take the 'Artist's Picture Varnish' (to be had of all colormen and dealers in artist's materials), and having diluted it with twice its bulk of spirits of turpentine, I give the pictute a thin coat, which finishes the operation.

"If the gum is too thick it will crack, and the picture will be spoiled; if too thin, the varnish will strike through, and produce transparent spots, but if the gum and varnish are of the proper consistency and neatly laid on, the surface will be almost as fine as heavy albumenized paper."

## RAPID DRY PROCESSES.

The great problem of an instantaneous dry process is not yet completely solved. Dr. Henry Draper's process is only a step in that direction, although it has been demonstrated to be a genuine discovery of real and great utility, yet leaves much still to be desired and to be accomplished.

The dry plates wanted are such as can be used in the ordinary work of the practical photographer—portraiture. When such plates are found, Humidus' occupation will be gone, he will needs go drown himself. Who would dabble about a silver bath in a dark room at the top of a house reeking with fumes of drugs and heat, when he could buy his plates all prepared at a cheaper rate, or if he could prepare them himself in the cool of the evening or morning, or prepare a store for the whole summer in the bracing winter atmosphere?

Depend upon it, photographers, the time is coming when you will abandon your silver bath and collodion, and when you will have no more risk of staining your carpets and patrons with silver solutious than the Emperor of China. Here is work for the experimenters; let them bend themselves to it, for it must be done. We sincerely believe that the next great sensation which shall send a thrill through the photographic world is a *genuine* instantaneous dry process.

While the ink on the above is still wet, the *Photographic Notes*, of April 15th, reaches us, and we find that Mr. Sutton therein tells his readers that he has "succeeded in preparing rapid dry plates as sensitive as the best wet collodion; that these plates yield excellent printing negatives," &c., and we begin to think the great time has surely come. But further on he tells us that the principle on which these plates "consists in using a suitable iodized collodion, in washing the excited film thoroughly from the silver bath, in order to prevent stains, and in restoring the sensitiveness by means of fresh silver added to a suitable preservative, which never becomes absolutely dry and hard." So we have our doubts; a film containing free nitrate cannot be kept for ever; a preservative which requires a certain amount of moisture in it will not yield steady results. Yet many thanks to Mr. Sutton; he is a worker, and his zeal is in the right direction.—*American Journal of Photography.*

## PHOTOGRAPHING FROM BALLOONS IN MILITARY RECONNOISANCES.

Last summer, when Professor Lowe first commenced his ascensions in his balloon, for the purpose of observing the positions of the enemy, the Photographical Society of this city made a communication to the War Department, through their president, Professor Draper, pointing out the great advantage that might be derived from taking photographs of the enemy's camps from the balloon, and offering their services to aid in carrying the suggestion into effect. The *American Journal of Photography* suggested that the photographs thus taken might be examined under the microscope, and thus the most minute details might be studied at leisure.

Secretary Cameron, in the multiplicity of his public and private affairs, never found time to reply to the communication, and the matter was dropped.

We see that Professor Lowe has just commenced his ascensions, and we suggest to General M'Clellan, or any other officer who may chance to see these remarks, the propriety of calling upon the Photographical Society for the services which they offered last year. Professor Draper, the president, is a man of European reputation. Professor Joy is vice-president. Many of the leading members are men of position in the world of science, and the high character of the society is sufficient warrant that its suggestions are worthy of consideration. Let our military art accept the wonderful aid tendered to it by the most subtle department of science.—*Scientific American.*

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris*, 21*st May*, 1862.

The prize of 2,000 francs, offered by the Duc de Luynes, for a perfect carbon-printing process, has been awarded by our Photographic Society to M. Poitevin. The committee were anxious also to mark their sense of the great improvement effected, both in the mode of operating and in the resulting proofs, by M. Fargier, and suggested that a medal of the value of 600 francs should be given to this gentleman. Upon putting this proposition to the members of the society, it was so far modified as to be awarded in money, instead of a medal; the sum to be taken from the funds of the Photographic Society.

M. Ad. Martin recommends that the free sulphuric acid of the iron developing solution be completely removed, because the presence of this acid favours the deposit of large crystals of silver, which increase in size in proportion to the quantity of acid present. He proposes the following formula for a developing solution:—

| | |
|---|---|
| Water ... ... ... ... | 500 parts |
| Sulphate of iron ... ... ... | 100 „ |

After filtering, add 25 parts of a very limpid solution of acetate of lead, of the strength of 10 per cent.; the object of this is, by forming an insoluble sulphate of lead by double decomposition, to replace the free sulphuric acid and a portion of the sulphate of iron by acetic acid and acetate of protoxide of iron.

We then filter the liquid again, and add 25 parts of acetic acid, and 450 parts of water, with 5 parts of acetic ether (which, by retarding the coming of the image a little, avoids stains), and 5 parts of alcoholised nitrous ether. Negatives developed with this solution possess vigorous black tones, similar to those obtained by pyrogallic acid, and very different from the usual gray tones given by sulphate of iron employed in the ordinary way.

M. Davanne, referring to a process for obtaining very superior tones in proofs upon albumenized paper, recently published in *Humphrey's Journal*, remarks, that this preparation, which evidently has an alkaline reaction, owes it to the well-known property possessed by nitrate of ammonia of dissolving a large proportion of oxide of silver. This may, possibly, be an excellent photographic preparation, but it is a mixture of nitrate of silver, and of nitrate of ammonia holding oxide of silver in solution; hence the name of *ammonio nitrate* bestowed upon it can only give a false notion of its composition. It may be useful to remark, that the solution of oxide of silver in pure ammonia forms, not a mixture like the preceding, but rather a definite compound, very detonating, and extremely dangerous to handle when dry.

Most of the salts of silver, which are either insoluble, or only slightly soluble in water, are more or less soluble in nitrate of silver; thus the chloride, and iodide of silver, dissolve in much larger quantities when the solution of nitrate of silver is more concentrated. Acetate of silver, however, forms an exception, and is, on the contrary, less soluble in proportion to the greater strength of the nitrate of silver; this peculiarity of acetate of silver is sometimes the cause of failures in photography, which it becomes easy to avoid, when the fact is known.

It sometimes happens that the preparations of albumen, and also of collodion, contain small quantities of soluble acetates, introduced accidently, or purposely; when these preparations are immersed in the silver bath a little acetate of silver is formed, which remains in solution, and as the bath becomes weaker by use the solubility of the acetate of silver increases in proportion, and makes no deposit; but if we strengthen the bath, the conditions of solubility become altered, and a crystallization of acetate of silver, in the form of fine, needle-like crystals, takes place, either upon the collodion plates or upon the positive proofs. When we know a bath to be in these conditions, we must add an excess of nitrate of silver, leave the solution in a cool place for a night to filter, then add the proportion of distilled water necessary to restore the too concentrated bath to its normal strength.

M. Robinet has communicated some interesting remarks upon the spontaneous purification of natural waters by freezing. The fact that water loses all its calcareous salts when converted into ice, is, since the beautiful researches of M. Dufour, of Lausanne, no longer a matter of surprise. The experiments were conducted by the hydrotimetrical process, which consists in adding to the water to be assayed sufficient of the test liquor to cause the soap lather to appear. The first experiments were made upon water from the lake in the *Bois du Bologne*: before congelation it marked 29° of the hydrotimeter, after congelation and melting it marked 0°. M. Robinet has frequently seen the hydrotimetric degree of water descend, after congelation, from 30° to 0°; from 29° to 2°, from 19° to 3·5°, from 29° to 2°, from 33° to 4°, from 11° to 1°, from 18° to 1°, &c., &c.

M. Van Walderen remarks upon the dry collodion process, that all the methods practised give results more or less satisfactory, with an exposure varying from 25 to 50 seconds, but he thinks that the question of *rapid dry collodion* is still unsolved. He adopted the Rev. J. Lawson Sisson's process, and obtained by it negatives in much less time than by any other process he had previously employed. He considered that this extra sensitiveness was due to the alkaline state of the borate of silver employed, and in order to satisfy himself on this point he dissolved 0·1 grain of caustic soda in 100 grains of water, and covered with it some plates which had been sensitized in the ordinary silver bath, and well washed. These plates, several days after this operation, and consequently quite dry, were found to be at least as sensitive as those prepared by Mr. Sisson's process, for stereoscopic views were obtained upon them in three seconds, while with the most sensitive collodions previously employed, they required at least 30 seconds exposure with the same objective. With the same collodion in a humid state the result was scarcely less prompt.

Mr. Sisson, by his discovery, undoubtedly made a great step towards obtaining an instantaneous dry collodion, but I think that his process might be rendered much simpler, either by covering the sensitized and well washed plates with a solution of dextrine in water, simply saturated with borax, or rather with a very weak aqueous solution of caustic soda. It is very probable that some other alkaline salts will give as good or even better results. I have tried phosphate of soda, but the results it gave were less satisfactory with respect to rapidity, than with soda or borax, for it required no less than 4 or 5 seconds exposure to obtain a good negative. There is an advantage in using borax which deserves mention, this salt, but slightly soluble in water, admits of its saturated solution being employed without the fear of seeing the film blacken immediately under the developer, an accident that frequently occurs when we employ a too concentrated alkaline solution. Other alkaline salts will therefore require to be carefully weighed.

The science of all sciences, Anthropology, the "science of man," is one of those which receives most valuable aid from the art of photography. Our photographic society has recently received a series of proofs, taken by M. Gavet, a missionary, representing various types of the natives of Nova Zembla, taken under the most difficult circumstances The artist remarks that photography, by its marvellous results, has, in the hands of the missionaries, become one of the most powerful agents in converting the untutored natives to Christianity. M. Hammerschmitz, of Cairo, has also made a similar contribution of a number of proofs, representing various Egyptian types of the human family.

A method of photographic engraving, invented by M. Fontaine, of Marseilles, is thus described:—"Having a photographic negative of the object which it is desired to engrave upon copper, I expose it in a pressure frame to the light in contact with a plate of that metal, covered with a solution composed of pure gelatine, bichromate of potassa, and fish glue. After exposure to the light, I immerse the plate in a dish containing lukewarm water, the bichromate of the soluble portion of the gelatined plate being dissolved, I obtain the design from the negative *en creux* (intaglio); then I pour upon it some pyrogallic acid to harden the gelatine and fix it, so that the minute details should not disappear upon its drying. When dried, I pour upon the plate a solution of pure gutta-percha in sulphide of carbon, and afterwards I take a piece of gutta-percha of the same size as the plate, and warm it on one side. I then put it in contact with the side of the plate, which I had covered with the solution of gutta-percha, and put in a press. Next removing the whole from the press, I remove the gutta-percha from the gelatined plate, which is perfectly united with the purified gutta-percha, and I have then obtained in relief in great purity the design of the negative which I desire to engrave. After black-leading it, I place it in an electrotype bath, and thus obtain an engraved plate."

M. Mathieu Plessy communicates the following, upon the use of a bath of acetate of soda for washing positive proofs, by immersing them, upon removal from the pressure frame, in a solution of that salt, of the strength of two per cent., for ten minutes. The proofs tone much better, more quickly, and of very superior vigour and intensity. In this particular, M. Plessy's experience exhibits a remarkable coincidence with that of Mr. Fry in England.

M. Aimé Girard, upon presenting to our photographic society some stereoscopic proofs, obtained from negatives taken by Mr. Warren de la Rue, remarked, "We know that the planets, in consequence of their remoteness from the earth, appear like plane surfaces, even in the most powerful instruments. Mr. De la Rue conceived the ingenious idea of producing proofs of those stars in relief, by placing different views of them in the stereoscope. But as it would be impossible to find on the surface of the earth stations sufficiently wide apart, he obtained the desired result by executing two views of the same star taken at different times, when its aspect had become sufficiently modified. Such views, when placed in the stereoscope, furnish an image of the star in relief.

In connection with the important question of dry collodion plates, M. Aimé Girard remarks that it would be well for photographers to direct their attention to the qualities primarily attributed to the Taupenot process by its inventor, who had, in fact, presented his method as capable of furnishing instantaneous pictures. M. Girard exhibited to the photographic society an album, the proofs in which had been obtained, if not absolutely instantaneous, at least with remarkable rapidity. Beside, the Taupenot process seems very apt to furnish good results, in consequence of the almost indefinite resistance it offers to the developing solutions. M. Ferrier added that he had tried the Taupenot process, but had hitherto found it too slow in his hands, as it always required at least an exposure of a second under the most favourable conditions; but he had every reason to hope that with more experience, it would eventually accomplish all that could be desired in an instantaneous dry process.

## THE NITRATE OF MORPHINE DRY PROCESS.

Sir,—I am surprised that we see nothing in the pages of the News, to indicate that this very important process has been deemed even worthy of a trial by any of your readers. Had Mr. Bartholomew's experiments been published, even by an anonymous writer, and had his communication betrayed any evidence of his ignorance of chemical changes, one would have thought that, at all events, some of your many readers, even if for the purpose only of placing others on their guard, in common fairness to your correspondent, have done him the justice to test his good faith, and would have given others the benefit of their report. But when you prefaced the insertion of your correspondent's letters with a notice of the valuable hints which his former experiments in photography had suggested in the pages of your journal, the silence, on which I beg to remark, seems the more unaccountable. The reason, perhaps, is not hard to divine. The introduction of organic matter into the nitrate bath is one of those things which photographers are most anxious to eschew. It seems, with reckless hand, to assail one of the very axioms of our art—to soil with known impurity that which we have been taught to keep with such scrupulous care intact from all contamination. Theory, and that not hastily formed; practice, too, long acquired, seem with united voice to say, "Beware of such nostrums!" and "don't run the risk of spoiling your bath;" "place this process in the category of crude notions which ought to have no quarter with any photographer who knows what he is about." Prejudice would be, perhaps, too harsh a name to affix to such conclusions; and yet, if they form a hindrance to that investigation, which may tend to give us a deeper insight into those mysterious molecular changes, which are brought into play in the production of a picture, I know not whether this twin-sister of ignorance has not had something to do with such contempt prior to examination. Now, in the absence of any other communication on the subject by abler hands than mine, I venture to hope that the following account of some very interesting, and, I may add (eventually), successful experiments, which I have recently undertaken, may prove not unwelcome, nor unprofitable, to some of your readers, who may, perchance, employ photography in the pursuit of *knowledge*, as well as of pleasure or profit:—

1. I added about 3 grains of muriate of morphine (pre-

viously dissolved in a little distilled water) to about 40 ounces of an old 40-grain negative bath. This, of course, led to the precipitation of chloride of silver, produced by the combination of the silver with the muriatic acid united with the morphine, which, in its turn, joined affinity with the morphine. The bath now consisted of nitric acid, in combination with silver and morphine, and, *so far as any organic substance can approach to stability in such a union*, we may, I think, assume that we have it here. I use the term, "*approach to stability*" advisedly, because it is absurd to expect that, under such circumstances, the bath is not exposed to the taint of change and decomposition, at least, to a certain extent. Whether this contamination is fatal to success, and accompanied with the ruin of the bath, or whether it is unworthy of notice, compared with the advantages it now offers, remains to be seen.

2. The bath thus prepared is passed through a filter to free it from the chloride deposit. In this condition it is highly sensitive, and if made of fused nitrate, it is, without the addition of acid, very liable to produce foggy pictures. The question is, what kind of acid should it be treated with to remedy this tendency? The condition of the bath in the course of a week or ten days points to *nitric* acid as the curative agent required. For, if the dipper be examined, it will be found covered with an exceedingly thin deposit of silver, the formation of which the nitric acid will have a tendency to prevent, just in proportion to its excess.

3. I added a weak solution of this acid in distilled water, until blue test paper showed a very decided and immediate change of colour. In this state the bath is still capable of imparting a high degree of sensibility to the collodion film, which is retained after unlimited washing and drying.

4. The exposure need be little more than half of that required in the Fothergill process.

5. I develop with the usual 1-grain pyro developer, first moistening the plate with distilled water.

6. The result is the same with different kinds of collodion, but films which are tough and contractile, are apt to leave the plate after fixing. A previous coating of thin albumenous solution would be advisable. I have had some correspondence with Mr. Bartholomew on the subject, and found him very communicative and obliging, and my own experiments lead me to the conclusion that the report of his discovery, published in your pages a month or two ago, is thoroughly reliable, and the discovery itself is *in the highest degree important*.

All that the bath requires is occasionally filtering, and replenishing with fresh nitrate; it would, undoubtedly, be better to make it in the first instance of *unfused* nitrate.—I remain, dear sir, faithfully yours, William Law.

*Marston Rectory, Rugby, May 16th*, 1862.

## Photographic Notes and Queries.

### Failure in the Dry Processes.

Sir,—I have been trying to realise the great advantages which must result from the method of preparing dry plates, as proposed by Mr. Bartholomew, strictly according to his directions, so far as I know, but so entirely without success, that I cannot help thinking there must be some fallacy I am unable to discover in my mode of operation. I will, therefore, with your leave, detail my method of proceeding as briefly as possible, and beg your advice and aid in detecting my error.

1. I carefully cleansed, coated, and sensitised the plates. Collodion, Perry's, of Sheffield, bromo-iodized, and works well by the wet method; bath 40 grains to the ounce, neutral, which also works well.

2. Immediately on removal from the bath I washed the plates in three waters, by placing each plate in three successive dishes of boiled rain-water, and causing the water to flow over it by a rocking, undulating motion for several minutes.

3. On finishing this operation, I coated them with a solution of gelatine, in the proportion of 1 drachm to 10 ounces of water rain-water—boiled and filtered—the gelatine was dissolved in this water by raising it to the boiling point in a clean, new pipkin.

4. This done, I left the plates to dry spontaneously, and when quite dry, I left them for a minute or so in a solution of the best sub-carbonate of soda of commerce, and dried them spontaneously by leaning them against the wall of the room, the prepared side outwards. All the operations took place in the dark room.

After exposure, I developed with iron (20 grains to the oz.) and acetic acid. Not a trace of a picture appeared. I afterwards exposed one of the plates to sunlight for about two minutes, and applied developer, with scarcely the smallest darkening of the film. Again I prepared a plate in the same way, by using in all the operations rain-water boiled and filtered. I proceeded as far as the gelatine, coated as before, and then applied the alkaline solution only on half the plate; neither side was at all affected by the exposure of 5 to 10 seconds.

Finally, I exposed a plate after washing only, with precisely the same result—a perfectly white and unsullied film.

I should tell you that the rain-water is not such as answers perfectly well for solutions. I tested it with nitrate silver without producing any evidence of impurity.

I am particularly desirous of mastering this process, and shall be much obliged by any assistance you can give me.—Yours obediently, Quæsitor.

*May 4th*, 1862.

[Our correspondent describes every step in his operations as having been apparently conducted with legitimate care, and at the first glance it would appear impossible that failure should have occurred. On a more second examination of the operations we think the source of failure becomes clear: our correspondent developed with a solution of iron and acetic acid, but without any nitrate of silver. In such case, he would not be likely to obtain an image with even much longer exposure. With pyrogallic acid, without acetic acid, an image may be obtained in a dry plate if it contain any salt of silver capable of reduction; but in his operations, as described, a few drops of silver should be added to the developer.—Ed.]

### Keeping Fothergill Plates after Exposure.

Dear Sir,—Your correspondent, "G. S. Penny," on page 226, if he wishes a dry-plate process that will keep after exposure should work the Fothergill, as plates prepared that way will keep any reasonable time between exposure and development. I have developed Fothergill plates on the thirtieth day after exposure; this I did last October; they were only kept in tin-plate boxes, of course, light-tight, no extra precautions; two I kept for that same time in the mahogany dark slide, only to try, and they all developed as quickly, and as cleanly and free from fog as if they had been exposed and developed the same day. I am, sir, yours truly,

*London, May 18th*, 1862. W. L.

### Bromo-Iodized Collodion.

Dear Sir,—I find in last week's News, an enquiry whether my collodion contains any bromide, as a similar question has been asked on two or three occasions previously, I would state for the information of your readers that it is a bromo-iodized collodion. These remarks apply to my dry process collodion. My new wet process collodion, as will be seen on reference to your advertizing columns, is sent out cadmium iodized, cadmium bromo-iodized, and extra bromo-iodized, according to the purposes for which it is required. The bromo-iodized being for general use.—Yours, &c., Alfred Keene.

*Leamington, May* 14th, 1862.

Photographic Literature.—M. Disderi, the celebrated French photographer, has just issued an illustrated volume, entitled "The Art of Photography," with an introduction by Lafon de Camarsac. We notice, also, that Major Russell's excellent little work on the tannin process has been translated into French by M. Aimé Gerard.

## Talk in the Studio.

AMMONIA NITRATE FOR ALBUMENIZED PAPER.—Mr. G. R. P. Frazer, of New Glasgow, Nova Scotia, sends us the following formula for ammonia-nitrate of silver, to be used with albumenized paper. Some fine-toned prints are enclosed as illustrations of the operation of the process:—Dissolve an ounce of pure nitrate of silver in eight ounces of water, pour off one-third of the solution into another bottle, and add aqua ammonia until the precipitate first caused is redissolved. Then add to this the remaining two-thirds, and add to the whole one drop of nitric acid to each ounce of solution. The paper should not be floated on this solution for more than a quarter of a minute. The tones are rich and brilliant, and the process considered by those who use it a decided improvement on the usual method.

THE JURORS IN THE PHOTOGRAPHIC DEPARTMENT OF THE EXHIBITION.—We learn from the *Photographic Journal* that Dr. Tyndal is acting as deputy chairman, and Dr. Diamond as secretary or reporter to the jury in the photographic department. The jury have been requested to take under their adjudication all photographic apparatus, and chemicals designed for photographic use, whether in their own or other classes. The jurors are proceeding actively in their labours, and are summoning, where it is deemed necessary, exhibitors to explain the details and claims of their contributions. The awards are to be made before the 15th of June. The following selections from the "Instructions to Jurors," explain the arrangements in regard to medals:—*Medals to be awarded without reference to Nationality:* The medals will be awarded for excellence only, without reference to countries, the Exhibition, so far as regards the juries, being considered as a whole, and not as consisting of a mere juxtaposition of separate displays by different nations. *Number of Medals:* The number of medals required by each class cannot be determined with precision before the examination of the objects. Guided by the experience of former exhibitions, Her Majesty's Commissioners have authorized the special commissioner to place a definite number of medals at the disposal of each jury, but have reserved the right of the council of chairmen to increase this number, if individual juries give reasons which are considered satisfactory by the council. *All Medals of one kind:* There are no gradations of medals, all being the same. The medals are to be awarded for merit, without any distinction of degree, and without reference to competition between producers. It is not the best manufacturer, in any particular branch of industry, who should alone be rewarded by a medal, but all producers who shall show by their exhibits, that their products are excellent in their kind. No exhibitor, however, can receive more than one medal from one jury. *General Instructions for the giving of Medals:* The council of chairmen do not deem it advisable to issue formal and positive instructions as to the conditions under which medals should be awarded, but think it expedient to offer the following suggestions to the juries, trusting in their ability to make rules for their separate guidance. The jury for Class XIII., Philosophical Instruments, will reward novelty of inventions, or novelty in the whole or part of the instruments exhibited, ingenuity of construction, new application of old principles, application of new priciples, improvements in beauty of form, increased durability, extended applications, excellence and precision in workmanship, economy of production. The jury for Class XIV., Photography and Photographic Apparatus, will reward the instruments of photography on the same considerations as are attached to the class of philosophical instruments. In regard to photographic impressions, they will reward novelties in the mode of production, durability, excellence in the results obtained, and artistic merit. With reference to photographic materials, novelty or new applications, increased sensitiveness, or powers of retention, and facilities of operating should be favourably considered.

## To Correspondents.

J. JEFFERSON.—So far as we know the authorities of the South Kensington Museum still publish their photographs. Their catalogue can be obtained at the Museum at the cost of a few pence.

J. R. P. FRAZER.—We are obliged by your letter and enclosures. As regards an instantaneous collodion, we cannot advise you to do better than follow the formula of Mr. England, given in our pages.

W. W. B.—It is somewhat difficult to speak of the character of a lens from the specimens of its work sent; as whether the lens be a good or a bad one, better results might have been obtained with it. The negative is as you state considerably under-exposed, and the model is not well lighted. The image is not perfectly sharp or well defined at any part. The lens may be a good one, and from the maker you name most probably is so, but it has a curved field, which accounts for the middle of a standing figure being out of focus when the head and feet are in. If a lens cover imperfectly, the falling off will of course show at the edges, but as regards curvature of field, it entirely depends upon the focussing as to where the defect is most apparent. If you focus for the edges the centre will be out. Probably this may be an excellent lens for some purposes, but scarcely well suited for card portraits with standing figures. A smaller aperture will reduce the evil.

A. B.—Prints may be placed in the acetate of soda bath previous to toning, direct from the printing frame.

CANTUAR.—We have never tried the addition of bromide to the collodion you name. It is possible that for some purposes, and with iron development, it might improve it. It is not certain that it does not already contain some. The best mode of adding bromide would be to make a solution of bromide of ammonia in alcohol, say 8 grains to the ounce, and then add half a drachm of the solution to an ounce of collodion, which would be at the rate of half a grain of bromide to the ounce of collodion. 2. The varnish in which you attempted to dissolve wax and failed, was probably a spirit varnish. Wax is very sparingly soluble in alcohol. You should use a benzine varnish, commonly sold as a "crystal varnish." Wax is freely soluble in benzine or in essential oils. Spirit varnish without wax, applied cold, so as to chill, may sometimes be used instead of ground glass with transparencies. A thin solution of starch may also be used. Leaving the unaltered iodide of silver would not answer well, as it would be too opaque, and would probably eventually darken somewhat.

M. A. O.—We have not answered your letter until we had opportunity of making some enquiry. From what we learn, the prints which were decided to be ineligible for exchange were not the same as those of which we spoke favourably. You will readily perceive that the referees can have no motive in the decisions at which they arrive, but a wish to do justice to all, and to elevate the art as much as possible; and you must remember that in order to make their unremunerated labours tolerable, or even possible, the rules arrange that their decisions shall be final, and not subject to question. We would recommend you, when one lot of prints is rejected, to resolve to improve and send some better next time. We feel assured that the referees, whether we are present at their deliberations or not, will gladly give a favorable consideration to all contributions, and that to a lady they would rather err on the side of lenient judgment than otherwise.

TROUBLESOME.—The alkaline gold toning bath with acetate of soda is largely and successfully used. It is well, if the chloride of gold contain free acid, to add just sufficient carbonate of soda to neutralize it. 2. Filter out the cyanide of silver precipitated in the silver bath, to which the cyanide was added by mistake. If there be any quantity, add more silver to the bath to restore its strength. The bath will not be injured if the cyanide were pure, except so far as its strength is reduced by the loss of silver. 3. We have not found acetic acid cause pinholes in the negative. 4. You have probably given your tannin plates too little exposure. You say that with honey and tannin you got a picture, but it required five minutes' exposure. It entirely depends on the state of the light, and the focus and aperture of your lens, whether that was a long or short exposure. It might be a very short one.

R. C. H.—Your lens would probably answer very well for enlarging. The size of the stop to be used will somewhat depend on the amount of definition given, the state of the light, &c. Probably about ⅜ths of an inch aperture would be found to answer. 2. It is desirable in enlarging to reverse the position of the lens. We are glad your glass house proves satisfactory.

J. G. B., Huddersfield.—All the accounts we bear confirm the conviction that honey is a decided advantage in the tannin process. We have not used gelatine with plates so prepared; but we see no reason to believe that a two-grain solution would retard at all. Probably with honey you will not need the gelatine coating. The experiments we described were with collodion made by ourselves; but we apprehend that any good bromo-iodized sample would answer. In cases where you wish to follow some formula, without the trouble of making collodion, you will find it a convenient plan to buy a good plain collodion, and then add such iodides and bromides as may be necessary. This is a better plan, and involves less trouble, than purchasing pyroxyline. The negative from which the enclosed print was taken appears to be very good; but three quarters of an hour is a frightfully long exposure for an open-air picture.

J. W. R.—We cannot tell in what point you have failed, but the process as described in the work to which you refer is successfully practised by manufacturers in gelatinizing the covers of fancy boxes, &c. Remember that it is necessary that the glass should be prepared with ox gall, or a trace of oil or grease, so that the gelatine shall not adhere firmly. A little practice, carefully observing all the instructions, will probably issue in success.

J. G. L.—The "black stuff" enclosed, which had been scraped out of the corners of ebonite dishes, appears to be simply some kind of india-rubber varnish. You will rarely find articles of this kind sent out by manufacturers chemically clean; photographers should always take the precaution to thoroughly cleanse new vessels. 2. The formula for a bromo-iodizing solution would depend somewhat on the character of the pyroxyline, and the purpose for which the collodion is to be used. You can add a little more bromide, using either the bromide of cadmium or of ammonium, to a bromo-iodized collodion, if it tends to over-intensity or hardness; or you may procure plain collodion, and iodize it yourself with iodide of sodium, 4 grains, and bromide of cadmium, from half a grain to a grain and a half, according to the quality of the pyroxyline and use of the collodion. Or, with iodide of ammonium or potassium, 2 grains; iodide of cadmium, 2 grains; and bromide of cadmium in the same proportion as above. 3. We think you will find the tannin and honey preferable to the tannin alone.

R. ALBURY.—We are obliged by your letter. We will make use of some of its suggestions shortly.

B.—The exposure necessary for the interior of a church will vary very much with circumstances, such as the number, size, and aspect of the windows, and whether they are of plain or coloured glass, &c. Your own judgment and experience must guide you. The interiors of St. Etienne, in Paris, by Mr. England, received exposures of five or six minutes. Use a bromo-iodized collodion and iron development.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 195.—May 30, 1862.

## COPYRIGHT IN PHOTOGRAPHS.

On another page we give at some length the discussion which arose at the second reading in the House of Lords, of the "Copyright (Works of Art) Bill," in which protection from piracy is provided for photographs. We do so in order to impress on those concerned the fact that the Bill and their recognition in it, is by no means safe yet. We know there are, at the present moment, many photographers who are reserving, at temporary inconvenience and loss, with hopes of permanent gain, works ready for publication, until the Bill shall pass into law. It is important, therefore, that any influence which can be brought to bear shall not be neglected or relaxed.

We do not intend here to discuss the principle or the wording of the Bill; we believe both are capable of some amendment. But we accept the fact, with thankfulness, that a method is provided by which an artist or photographer may secure his property in the results of his own skill and labour, and that on the sale of such works means are provided for vesting the copyright in either vendor or vendee, as may be arranged and agreed.

We are concerned, however, to see the steady persistence with which apparently feasible, but really foolish and ignorant objections, are brought against the right of photography to be included in the protection of the intended Act. Earl Stanhope, whilst defending the Bill generally, and showing the groundlessness of the forebodings and vaticinations of objectors, stops short when he approaches photography. In defending the object of the Bill he cannot be gainsaid. "If," he observes, "it were once admitted that a man should profit by the fruits of his own genius, no person could fairly say that, having given a copyright to another, Parliament should refuse it to the artist. There was no difference in theory between a poem and a picture, and the producers of both had an equal right to protection." Why, in the name of common sense, the insertion of the word "photographic" before the words "artist" and "picture" in the above sentence, should alter the whole case, we cannot conceive. But he suddenly qualifies his arguments, and admits he feels some difficulty on one part of the Bill. "For example, he could not see how the principle of copyright could be carried out in the case of photographs. One person might make a copy of a photograph of the Coliseum, originally produced by another; but who could say that the copy was not an original photograph? How could any one assert that the person who published it did not go to the Coliseum, take his stand upon the same spot of ground as the other photographer, and commence his operations at the same hour? So, too, with respect to photographic portraits of living persons. He should be glad if some noble and learned lord could show how the proposed law was to be enforced in the case of photographs."

If the noble earl had understood anything of his subject, had known anything of photography or photographs, he would not have needed to ask how it was possible to distinguish between the works of different photographers. He would have understood that in photography it was as possible for the artist to stamp his individuality upon his productions, and be distinguished by his "manner," as in painting. If he will walk with us, or any one familiar with photography and photographers, through any public exhibition of photographs, we will undertake, unhesitatingly, to point him out at once, without reference to catalogue, the works of Bedford, Heath, Mudd, Wilson, or any other artist of standing, in landscape; or of Williams, Claudet, Mayall, and others, in portraiture. But another argument might have suggested itself to the noble earl. If photographs were so lacking in individuality as he seems to conceive; if photographs of the same place and person were necessarily as much "alike as two peas," a large element in the photographer's desire for protection would be removed. If all photographs were alike, the value of property in any of them would be at least much diminished. But one part of the injury done to photographs by piracy derives its force solely from this individuality. The pirated copies possess the style and manner of the artist who is plundered, but the work is bad, flat, mealy, and fading. Thus the original artist is not only robbed, but his works are travestied, and his reputation damaged.

Again, in the case of portraiture, there could rarely be any difficulty in enforcing the law or proving its infringement, because it would be very easy to prove, in the majority of instances, that the original of any pirated portrait never sat to the pirate for the picture in question, and that he could only have obtained a negative by reproducing it from an original print. The piracy would in such case be placed beyond a doubt.

But we can put a stronger case than this, in reference to many subjects, and one in which the wroug is still more patent. We have not, moreover, to suppose a case; there is one before us actually in point. The London Stereoscopic Company have just paid a heavy sum to Her Majesty's Commissioners for the right of photographing inside the Exhibition Building. Fifteen hundred guineas have been paid down, and an engagement entered into for the prospective payment, under certain conditions, of sums which may amount to twice the amount already expended. The Company have undertaken these heavy payments for the *sole* right of photographing in the building, and doubtless with the view to reaping the sole profit of such undertaking; and, if we are not mistaken, they are at present delaying the publication of the pictures until the passiug of this Bill shall give them protection. Without such protection the moment they publish their views, the sole right to obtain which has cost them some thousands of pounds, they are at the mercy of all who are sufficiently unscrupulous to profit by pirating the property of others. Now in such a case there could not be the shadow of a doubt as to the piracy; there could not be the slightest difficulty in proving it; for no other photographer could by any possibility get a negative of the building except by piracy, or other dishonest means.

That cases may be supposed in which some difficulty to prove piracy might exist may be granted. The Earl has supposed one case: two photographers may take negatives of the same subject, from exactly the same spot, with exactly similar lenses, on the same sized plates, and under like conditions of light and atmosphere. All this is possible, although not very likely. But even then it would be very easy to prove all this, and we venture to assert that it is next to impossible for two different photographers to produce two negatives, under whatever conditions, so exactly similar, that an expert could not readily distinguish whether one was a reproduction, or both were original negatives. Moreover, these things, which are easy for any photographer to produce, afford no temptation to piracy. If a photographer can easily get an original, he will not pirate for the mere pleasure of selling piracies. It is only where certain difficulties exist, where an amount of capital in skill or money, not possessed by the pirate, require to be expended in obtaining an original, that copying is resorted to. In portraiture the likeness of a distinguished person only accessible through the agency of position, ability, or influence, all of which constitute capital. In landscape, architecture, &c., places and scenes only accessible by privilege, or the expenditure of money. In subject pictures, where the genius in conceiving, and skill in working out, good ideas, not possessed by the incompetent. It is in regard to these, and such other things costing effort, skill, and money, and in which the property in an original is easily proved, that piracies are most usually practised, and not upon common-place subjects easily obtainable by all, and originality in which is not easy to dispute, nor worth the denial, that cases of piracy causing difficulty in enforcing the act would arise.

But the truth is, these and other frivolous objections raised, originate with those who have a material interest in the continuance of photographic piracy. These gentlemen have been more active we fear in opposing the protection of the Bill, than photographers generally have been in seeking for it. The Solicitor General informed the Lord Chief Baron, President of the Photographic Society, that he had received various communications purporting to come from photographers, stating that photographers did not wish for such protection! We have good reason to believe that Mr. Harvey Lewis, who opposed the protection of photographs when the Bill was in the Commons, was, as we then suggested, "coached" on the subject; but we did not then suppose that it was, as we have since been informed, by those interested in the maintenance of piracy. We have heard something of the arguments used against the Bill. It will cause endless litigation, it is stated. That can only happen if the pirates resolve on continuing their work; litigation can only arise out of infringement of the law; and in such case, all laws for the protection of society might be said to cause litigation. It will be a great hardship, it is urged, upon the multitude of small shopkeepers of various kinds. who now sell pirated reproductions of album portraits, &c., who knowing nothing about the art or the difference between reproductions and originals, will become quite innocently amenable to the law and its penalties. To this we may reply in the first place, that however ignorant some of these dealers may be of photography, they are not so entirely ignorant of the difference between copies and originals as might be supposed. They generally know how it effects the price. We have repeatedly lately inquired in such establishments, the prices of photographs, and asked why such a one was so much more than another. We have promptly received the answer, "This is from life, and that is a copy from another picture." If, however, this were not the case it in no wise affects the justice of the case. It is the duty of all persons engaging in any especial trade, to acquaint themselves with the laws which affect it. Moreover it would rarely occur we apprehend that the mere vendor transgressing the law in ignorance, would be called upon for penalties without warning, or except in the case of persistent delinquency. The law will not, unfortunately, be retrospective, and these dealers can continue the sale of the mass of rubbish which now disgraces the art, until the public taste is sufficiently educated to reject such things.

A variety of equally frivolous and more irrelevant arguments against the inclusion of photography in this Bill have been brought before us, and, we fear, before members of the legislature. It is quite possible that, even at this stage, unless every effort be made, that photographers will find themselves unrecognized by law, and without any protection against piracy.

## CARD PORTRAITS.

WE are in the habit of receiving from time to time, amongst other specimens of photography, various examples of card portraiture. As this class of portraiture is of very great interest to photographers at the present time, and involves some especial conditions, whenever we meet with unusual excellence, we endeavour to ascertain the precise formula used. We have noticed from time to time the artistic qualities of the late Mr. Lacy's, and Mr. H. P. Robinson's—a recent group by the latter gentleman, consisting of two lovely girls standing in front of a rustic arbour is the finest card picture we have seen, and was recently pronounced by a friend, one of the first landscape painters in water colours of the day, to whom we had shown a copy, to be the best photograph he had ever seen. We have noticed the portraits of Mr. Hawke as especially excelling in delicacy, roundness, and vigour. We have recently received some specimens from Mr. McNab, of Glasgow, which, besides many excellences of arrangement, accessory, &c., are unquestionable the most brilliant and vigorous, without being hard or wanting in delicacy, we have yet seen. The negatives from which they are produced are evidently of the very best class: sufficiently dense in the highest lights to preserve intact the purity of the white paper; but these high lights are most sparingly used, consisting of little more than mere points; there are no patches of white without drawing or detail. From these minute high lights, descending by the most delicate gradations of half-tone to the deepest shadows, in which, although still cautiously used, we have points of black, evidently bare glass in the negative. On an examination of such pictures, we see how sparingly either pure black or white may be used in obtaining brilliancy. It is in the infinite gradation and variety of tones, and not in crude harshly-contrasted masses of black and white, that this quality consists. It is necessary, however, in order to secure the widest scale of tones, to begin with the lowest. A brilliant negative must be clean and free from fog, commencing from bare glass. Mr. McNab's pictures eminently illustrate this; and as regards brilliancy and gradation of tone, they are perfect. Some very quiet inobtrusive scenic backgrounds are introduced with good effect. The definition towards the edges is not in all cases quite satisfactory, probably from the use of a lens of short focus, but the principal parts are very sharp and well defined.

Mr. McNab supplies us with a few particulars of his working, but, as will be seen, it is the old story; there is no secret to tell, merely careful application of well-known principles. It will be seen that he does not swear by any formula or process, but uses his judgment as to the method which will best suit the circumstances. He says:—

"It affords me the greatest pleasure to comply with your request in furnishing the formulæ (if such they may be called) in use by me. In the first place, the collodion is mostly of my own making, after Hardwich's formulæ: paper or cotton is prepared with weak acids at a high temperature to ensure intensity in the collodion; but sometimes I find it of advantage to mix it with that of other makers. The silver bath is prepared in the usual way, from recrystallized nitrate of silver, 35 grains to the ounce of water. If on using it for the first time, it shows a tendency to fog, it is slightly acidified with nitric acid. I develop with iron, 15 grains to the ounce of water when the light is good; but in cold weather, and weak indifferent light, it is increased to 20 grains. I sometimes find it of advantage to use the following:—

| | |
|---|---|
| Iron ... ... ... ... | 4 drachms |
| Acetate of soda ... ... ... | 1 ,, |
| Water ... ... ... ... | 17 ounces |
| Pyroligneous acid ... ... | 2 ,, |
| Alcohol ... ... ... ... | 1 ,, |

"The plates are developed and well washed, and put aside in a rack to dry, until we find it convenient to clean them. When they are dry, a line of varnish is put round the edges to prevent the film from being removed in the following operations of cleaning and intensifying. I find this saves much valuable time in the busy part of the day, while engaged in taking sittings. The plates are wetted again, previous to clearing them with cyanide of potassium.

"Discrimination and caution have now to be exercised in the selection of the treatment suitable for the various conditions of the deposit formed in the first development.

"Sometimes when the light has been good, the negatives are nearly dense enough, and but slight intensifying is required. In this case, pyrogallic acid, $1\frac{1}{2}$ grains to the ounce of water, and one or two drops of silver from a 30-grain solution is floated over the plate, until it has attained the required density. When the negatives, as first produced, are feeble, with slight deposit of silver, they are treated to a weak solution of iodine, which is floated upon the plates for a short time; they are afterwards copiously washed previous to applying the pyro and silver. At other times I find it better to intensify by pouring on a saturated solution of bichloride of mercury until the film is of a grey colour, after which it is washed, and a solution of iodide of potassium, of 1 grain to the ounce of water, is applied until a greenish yellow tint is produced, in which state I consider it best for printing. If carried too far, hardness is the result; if stopped somewhat soon, any amount of softness can be obtained. The length of exposure, and density of the negatives determines the course to be adopted.

"In printing I prefer *Rive* paper for soft negatives, and *Saxe* paper for hard ones. The sensitizing bath contains 90 grains of silver to the ounce; the paper is floated upon it from three to five minutes, according to temperature. I tone with Maxwell Lyte's formula."

We may remark, in conclusion, that Mr. McNab does not tone his portraits beyond a warm purple brown, which tint in our estimation gives the utmost effect of brilliancy and transparency obtainable in photography.

## THE WEATHER DURING THE COMING SUMMER.

A correspondent forwarded to us, some little time ago, a copy of a provincial paper, the *Kent Pioneer*, containing a series of observations, from which were deduced the conviction that the weather during the coming summer will be fine and dry. As photographers are pre-eminently interested in the question, we make a condensation of the remarks, for the benefit of our readers, who may take them *quantum valeat.*

The conclusions arrived at are based upon certain observations by the late Dr. Kirwan, who says:

"1. When there has been no *particular* storm about the time of the Spring Equinox (March 21), if a storm arise from the east on or before that day; or if a storm from any point of the compass arise nearly a week after the Equinox, then, in either of these cases, the following summer is generally dry, four times in five.

"2. But if a storm arise from the S.W., or W.S.W., on, or just before that Equinox, then the following summer is generally wet, five times in six."

The writer of the remarks to which we refer, has found the truth of those observations strikingly verified, and especially instances the last two years, of which he takes a retrospect, showing the conformity of the results with Dr. Kirwan's theory. Applying the same observations to the present year, he predicts a dry summer, and observes:

"Having just shown, as we trust to the satisfaction of our readers, that these observations of Dr. Kirwan are not undeserving of notice, we propose to apply them in our anticipations for the ensuing summer. In the first place, there was no particular storm, such as a hurricane, nor even a brisk gale, about the 21st of this month. But for nearly a week previous the wind was in, and near to, the N.E. On the 20th a great quantity of rain fell, the wind still in the N.E., and on the 21st we had a snow storm from that direction. None of the phenomena indicating wet have occurred; but on the contrary, those only that promise a dry summer. The weather itself during the past fortnight would by no means lead one to speculate from that, on the likelihood of a dry summer; but from observations of twenty years, we have no hesitation in saying that our belief is that the summer of 1862 will most probably be a dry one."

Photographers generally will be heartily glad if these predictions be verified.

# The International Exhibition.

## THE BRITISH PHOTOGRAPHIC GALLERY.

The photographic visitor to the International Exhibition, will, doubtless, be tempted, as we have been, to flit from one part of the building to another, examining, now the fine pictures of Notman, of Canada, then of Angerer, in Vienna, next, those of Ghemar, of Brussels, next those of Albert, of Munich, then, perhaps, those of Hansen, of Copenhagen, or Wothly of Aachen; and next, perhaps, those of Disderi, or Warnod, or Alophe, or Lyte, or Bingham in the French Department. He will, from time to time, visit these and others because they are new to him, and because they are well worth seeing, and above all—no light matter in a building of such extent and such attractions—they are easy of access. Until within the last few days, the British Department has not been in a state approaching completion or permitting criticism. Now, however, it is a little more in order; the awnings are erected, and some ventilation established; the covers are removed from apparatus—we wish we could say as much for the coating of dust on the pictures—and the place is presumed to be nearly complete, it may be more profitable to our readers if we endeavour to go through the contributions in something like consecutive order.

Before proceeding further, however, we must say a word or two more on the shortcomings of the place; not for the purpose of grumbling—we are tired of that—but in the way of warning some of the contributors of a danger which it may be they have not contemplated. Some of the contributors of apparatus have already found to their cost the trying alternations of temperature in the room. French polish has been cracked; collodion bottles have exploded; dark tents and boxes of pine have warped and twisted in all ways; cameras have been stuck together in their sliding bodies by the size with which the lamp-black was mixed to black the inside, melting; and a variety of similar evils have, we may say, been already discovered. Contributors of pictures, however, especially those living at a distance, may not anticipate, nor by personal inspection be able to ascertain, that their pictures are hung against damp walls. In the picture galleries this has already been found to act disastrously on some of the paintings; and steps are being taken, by lining the backs with American cloth, to put a stop to the evil. But no such care need be anticipated in regard to photographs. Already we are startled by the yellow cheesy effect of some specimens, which but a little time ago were pure and white. In water-coloured specimens the effect is still more disastrous. Many beautiful prints, carefully tinted in water colours, represent fair faces as covered with leprous and livid blotches, the effect of some of the pigments changing under the combined action of damp and gases exhaled from the materials of the newly made walls. We hope those contributors who have opportunity will, for their own sakes, look to this so far as may be possible. We may suggest that, in addition to other precautions, or where no other can be taken, a piece of cork, placed at the back corner of each frame, is known by experts in the management of pictures to afford a good protection against damp walls, by preventing immediate contact, and by being a non-conductor.

We have also one word to say about the hanging. Much fault has, we know, been found with this and the general arrangement. It is objected, indeed, that no arrangement of any kind seems to have been made, and that the various contributions of the same contributors are hung about the room at random. To this we may reply that it is an easy matter to find fault with what has been done; but it would not have been found so easy to have done differently. We can speak from personal observation of the industry and effort of the gentlemen to whom the thankless task of superintending this duty was committed. Two of the gentlemen forming the Committee, and the superintendent were, we know, constant in their attendance and indefatigable in their labours. The third gentleman of the Committee, whose name, we presume, was added to supply the inevitable aristocratic element, without which such affairs are supposed to be incomplete, is, we believe, guiltless of praise or blame iu this matter, except so far as either may be due for non-attendance. But in regard to the hauging, we repeat, we do not see how it was possible to do much better. The task was worse than making bricks without straw. Beset on every side with applications, the Committee granted allotments for every inch of space on the walls, and then failed to satisfy all applicants. The mass of contributions sent in were to hang somewhere, not one-fourth of them could be hung on the line, or in reasonably accessible positions. As for keeping the contributions of each photographer together, that would simply have been making the matter worse. A. for instauce, sends in half-a-dozen or a dozen frames, and because one of them is of sufficient excellence to occupy a central position on the best wall or screen, the remaining eleven indifferent frames are to be hung in the same place to the exclusion of the good frames belonging to B, C, D, and E, respectively. Where space permits nothing is more desirable than careful arrangement and classification, as adding to the convenience and satisfaction of visitors as well as photographers; but where mauy pictures have to be hung in limited space, the only attempt at justice can consist in giving, as far as possible, the best positions to the most worthy pictures, and where many contributions are sent by one person, iu aiming that at least some portion of such contributious shall, if worthy, be hung well, even if the remainder be skyed or cornered. But whatever attempt at selection might thus be made, one consideration was imperative: the pictures must be hung in such arrangement as they would best fit, and thus economise space. The result is, there is no denying it, very ugly; very bewildering; but the Committee deserve something better than unreasoning blame for their unrequited labours, aud we feel it only due to them to say, that, however unsatisfactory may be some parts, or the whole, of the Department, it arises from causes for which they are in no respect responsible.

A distinct catalogue, and a distinct system of numbering in accordance with this catalogue, has now been adopted. In some instances the process by which the pictures have been produced is appeuded, but not in all; nor are we furnished in every instance with the name of the subject. With such facilities, however, as we can command we shall proceed in our next to give some consecutive account of the contributions, which the length to which our preliminary remarks have exteuded, preclude us froni commencing this week.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Plate Boxes.

Before considering whether the boxes sold for stowing photographic plates, are made in the best form that could be devised, it is necessary to examine the several uses to which they are intended to be applied, and to study the differeut requirements of each of them.

Plate boxes are used for stowing clean plates ready for immediate use; for preserving sensitized dry plates, or in some cases partially prepared plates which have to undergo another process before being ready for the camera; and for packing away negatives. I think it will appear that the plate boxes offered to us by manufacturers, are not entirely suited to any of these purposes, though at the same time I believe it may be shown that there is no difficulty in designing one, to fulfil the necessary conditions.

It is not usual or prudent to pack away plates cleaned and ready to use for any considerable time before they are required, as it is rare that the polished surface of the glass will retain for long that absolute dryness and cleanliness, which are in such a high degree necessary to ensure the most perfect results. Still, it is frequently a conveuience, especially to the amateur, to prepare beforehand to this extent all the glasses that are likely to be needed for the day's work, in which case, a plate box is the most handy receptacle. But it is necessary that no part of the surface of the glass should come in contact with anything, as, however harmless the touch may appear to be, it *may* have the effect of producing a stain upon the negative; and the direct contact with wood, especially those woods which have much essential oil in their composition, should be avoided. It is well known that if a piece of perfectly clean filtering paper (a cleaner thing than which it is difficult to imagine), be placed for some time between two polished glasses larger than itself, an impression of it can be seen upon each of them by breathing upon them, and this impression would probably be visible in negatives taken upon those glasses.

Now the grooves in the present plate boxes are merely rough cuts, as the tool left them, with parallel sides, and the surfaces of the glasses placed in them not only can touch the wooden divisions but *must* of necessity remaiu in direct contact with them so long as the plate continues in the box. It is true that, as the contact is only with the extreme edges of the surface of the glasses, probably little harm would result from this if the plate box were kept specially for this purpose; but if it have served previously for stowing negatives or uncleaned plates, foreign matter may have got deposited in the grooves, and the glasses will be stained. The simple remedy for this is to make the sides of the grooves V shaped, instead of parallel, when it will be impossible for any portion of the surface of the plate to come in contact with them.

For the permanent stowing away of negatives the plate-box is both cumbersome and costly if their number be at all considerable. Professional photographers in this country, mostly have cupboards with grooved shelves, suitable to each size of plate they employ. The number of the negative is scratched upon the plate itself with a diamond, and is writteu again upon a strip of paper laid along the edge of the shelf: so that reference to any particular negative is easy, and at the end of the day, after being used, it is returned to its proper groove.

A simple way for amateurs, who have not generally so many negatives to pack away to which daily access is necessary, is, when they are properly varnished and numbered, to place a piece of paper betweeu each couple laid face to face, and tie them up in parcels of say ten apiece: every parcel being labelled with the numbers of the negatives it contains, and an index made descriptive of the subject of the several numbers. In this way reference to any particular negative is easy, and the method is neither expensive or cumbersome.

Negatives that have not yet been varnished; that are in daily use, or that are not iutended to be permanently kept, must be temporarily stowed in plate boxes. For the reasons given above, the present plate boxes are not well suited to this end, as the rough and parallel sides of the grooves inevitably scratch the edges. This is frequently of little importance but sometimes it damages an essential part of the picture, and as the simple expedient of making the sides of the grooves V shaped (fig. 25), is all that is required to avoid the evil, it is to be regretted that mauufacturers continue to neglect this trifliug alteration.

Fig. 25.

Boxes for the above purposes may be of the present form with the exception named, and of the cheapest material, white wood being as effective as the most expensive.

* Continued from page 243.

The only intention in their use, is to preserve the plates from mechanical injury, and from dust.

Boxes intended to hold sensitized dry plates, have other conditions to fulfil, and it will be found a wise economy to provide separate boxes, devoted specially to this particular use, rather than to employ one kind indifferently for every purpose. They need not necessarily be expensive, but they cannot be made so low in price as the simpler class for negatives.

One of the chief causes of spontaneous decomposition in a sensitized dry collodion plate, is damp; indeed I am very inclined to believe it is the only one, and I think it not improbable that a prepared plate kept in a *perfectly* dry condition, would retain its sensitiveness indefinitely. The intrusion of air, which always contains a certain amount of moisture, should therefore be scrupulously guarded against. The joints and lid must be air-tight, and the pores of the wood—if that substance be employed in its construction—must be filled up. The grooves must be so formed, that no part of the surface of the glass can touch their sides, and they must be made of some material not liable to be scratched or chipped by the sharp and hard edges of the glasses as they slide in them, because the fine particles thus separated, adhere to the plates, and cause spots in the negatives. Metal boxes with metal grooves are open to this objection, as tiny spangles of metal are ground off by the hard glass, which cause a real amount of mischief. A coating of gutta-percha or india-rubber varnish, or a solution of any neutral and not brittle gum, lessens this objection to metal grooves, but the coating must be very thick to make their use perfectly safe, and I think it will generally be found advisable to employ at once some softer substance on which the friction of the glass edges has no effect.*

The fastening should be attached to the box, and not be a loose piece which can be mislaid: probably the best kind of fastening is a spring snap as with that the mere shutting down of the lid fastens it also.

As the grooves of the boxes must be made sufficiently large for the plates to slip freely into them, they do not offer a suitable means of packing the prepared glasses for travelling, as they would run great risk of being broken with a very little jolting; and if cotton wool, paper, or any other kind of padding be placed with them to keep them firm, they may get covered with dust. The dry plate box should only be used at home, and even then not to stow the sensitive plates away for any considerable time, but only to deposit such as are intended to be used within a limited period. Therefore the element of bulk need not be considered in their design.

There is no way, I think, of packing sensitive plates, whether for travelling, or keeping at home during a long period, so good as that adopted by Dr. Hill Norris for his gelatine plates, which are sent in this manner to all parts of the world, without being injured or loosing their sensitiveness. It is extremely inexpensive, compact, and entirely efficient, and for the reasons given above, to be preferred to any kind of plate box. Two strips of stout paper, about 6 inches wide are well dried and doubled up four times, making each a four fold strip about $1\frac{1}{2}$ inches wide. These are folded backwards and forwards as many times as the package is to contain plates: from eight to ten will be found a convenient number.

In the paper grooves thus formed the plates are laid one over another, one of the paper strips being of course placed at each end. When all the grooves are full, the back of a plate being outside top and bottom, they are tied round firmly with string and enveloped in paper, making a compact parcel. This is wrapped up in a piece of thin sheet gutta-percha, or mackintosh of suitable size, also securely tied round, and the whole is buried in bran contained in a common deal box, $\frac{1}{2}$ an inch larger each way than the packet. Plates so packed are securely guarded against light, atmospheric moisture, and rough usage. They will travel safely without further

Fig. 26.

protection, or can be put in a portmanteau, or bag. At home, they can lie in a drawer or on a shelf, and in all cases can be easily got at when wanted.

The following description of a box for sensitive plates, will not be found open to any of the objections I have stated; I think it will be found generally efficient, and at the same time not expensive. Wood should be selected as the material in preference to metal, as this latter when made of moderate thickness is too flexible to be of any serviceable protection to its contents in case of a fall or blow. But, for the double purpose of excluding air, and of preventing any escape of volatile essences the wood may contain, which might produce an injurious effect upon the prepared plates, it is necessary that the pores of the wood be effectually closed. This is achieved by soaking the various pieces, after they have been properly shaped, for a few minutes in melted beeswax. The ordinary white wood generally used for plate boxes is well suited, as its soft structure readily absorbs the wax. When each piece has been thus treated, and the superfluous wax well wiped off from the surfaces, the box is to be put together with a waterproof glue and screws The lid is fastened on with strong hinges in the usual way, and closed with a spring snap. Upon the edges of both the box and the lid, are fastened bands of vulcanized india-rubber, previously boiled in potash to extract all the free sulphur, which, when the lid is closed, press firmly on each other, like the human lips, and form a perfectly air-tight joint all round. The grooves for the glasses are of the section shown in fig. 25, stamped out of stout sheet gutta-percha, and fastened into the box with a waterproof glue or other cement. The gutta-percha extends to the bottom of the box, but the grooves finish about $\frac{1}{4}$ of an inch from the bottom, so that the plates may be kept from contact with the wood.

It will be seen that such a box may be kept in any climate or atmosphere, or even under water, without the sensitive plates contained in it being in any way injuriously affected.

(*To be continued.*)

* Since writing the above I have seen a very excellent plate box, intended specially for stowing sensitive plates, manufactured by a well-known photographer, in which gutta-percha, grooves, nearly similar to those described, are used. These plate boxes are very well suited for the use for which they are made, and can be obtained of all sizes at a reasonable price.

## Scientific Gossip.

Fusion of Two Hundredweight of Platinum—Nitrate of Silver—Rock Salt and Aniline Purple in the Exhibition—Examination of Glass in the Spectroscope.

At the time that M. St. Clair Deville's experiments were known to very few in Paris even, and totally unknown in England, we published the first descriptions of his wonderful results which appeared in this country. Great was the astonishment and incredulity with which the account was received. It is true that platinum had often been melted by the oxyhydrogen blowpipe in small masses, and scientific men were not unprepared to hear that lumps of some ounces in weight had been reduced by this means to a liquid form; but when we inform them that 20, 30, and even 40 lbs. of it had been liquified at one operation, the figures were thought by many to have been a misprint. A few months, however, showed that we were perfectly correct in our statements, and long after philosophers were thrown into a state of scientific amazement by the full publication of Deville's wonderful metallurgical processes. Athough devised by a French *savant*, the process has, we believe, met with the most extended application in England. Messrs. Johnson and Matthey, the well-known metallurgists of Hatton Garden, having immediately seen the importance of the process, and made arrangements with the inventor for employing it in in their works. The crowning feat of all has just now been performed. In the presence of the inventor, aud a goodly collection of English and Foreign *savans*, this firm accomplished an operation hitherto unparalleled in the science of metallurgy. In their lime crucibles and furnaces, and by the calorific action of ignited jets of mixed oxygen and hydrogen, they reduced to a perfect fluid state, and then run into a mould, a mass of platinum of the astounding weight of 2 cwts.

This magnificent ingot, of the value of £3,840, is now one of the most striking ornaments in the Metallurgical Department of the Internatioual Exhibition. In order to show the extreme fluidity of the melted metal, the lump is purposely left in the state in which it came from the roughly constructed mould; the metal has ruu into every minute crevice, between the blocks of which it was built, and illustrates in a striking manner the great adaptability of this metal for castings. The still more highly refractory metal, iridium, has also succumbed to the enormous temperature at their disposal, and is present in the same case, in the form of a perfectly fused lump, weighing 27¾ ounces. The manufactured metals exhibited by this firm are also of the highest interest; they show an enormous platinum boiler, capable of rectifying three tons of oil of vitriol of full strength in twenty-four hours. This is worth £465. Coming to articles of more special interest to the photographer, we find some beautiful specimens of gold, both in the metallic form, and also in the form of neutral chloride of gold, prepared especially for photographic purposes. There is likewise upwards of £80 worth of silver in different forms, viz., a lump of chemically pure silver, weighing 41 ounces, a bar of the same metal, melted by the combined gases, weighing 377 ounces; nitrate of silver commercial, and fused into sticks; and finally some beautiful specimens of fused and recrystallized, nitrate of silver, prepared especially for photographic purposes, and hermetically sealed in glass tubes for exportation.

Passing on to the Chemical Department of the Exhibition, after braving the difficulties of the subterranean passage, and with difficulty, and after much enquiry, finding our way through the ponderous iron forgings and mineral products into the Eastern Annexe, as it has become the fashion to designate this remarkably ugly and ricketty shed, we find ourselves amongst a collection of scientific products the inspection of which amply repays us for the difficulties and dangers encountered in our voyage of discovery. One of the first objects which meets the eye is the pillar of rock salt supported upon large square blocks of the same material. This is shown in the same state in which it was dug from the mine, and is of some photographic interest, inasmuch, as it illustrates, in a striking manner, a fact which we have taken several opportunities of impressing upon our readers. Pure chloride of sodium does not, as our readers well know, absorb moisture from the atmosphere, but the presence of small quantities of certain mineral impurities communicates to it deliquescent properties. The mass of salt in question affords a fine illustration of this fact. Close examination shows it to be always covered with a film of water collected here and there into drops, whilst the floor upon which it rests is soaking wet with brine for some distance round it. It is growing small by degrees and beautifully less, and before many weeks are over the boards in that department will only require sprinkling with nitrate of silver solution to render them in a high state of photographic sensitiveness. The Stereoscopic Company, who will require positives printed by the acre, would do well to avail themselves of this interesting phenomenon. The natural tendency of this salt to absorb from the atmosphere is not diminished by the leakages in the roof. It is a great pity that this beautiful specimen of the product of our English mines is not better protected, it far more deserves a glass case than many substances prettier, perhaps, to look at, but of considerably less commercial importance. From mineral salt to mineral coal is an easy transition, and the latter naturally leads us to the magnificent products derived from its destructive distillation. The best known of these, coal-gas, we shall not mention, but the splendid array of coal-tar colouring matters, is too important to be passed by. One of the first things that strikes the eye upon entering the department is the gorgeous display of Messrs. Perkin aud Sou, as the originators of a branch of industry entirely new since 1851. These gentlemen certainly deserve prominent notice. They here show us a collection illustrating their manufacture of mauve or aniline purple from the rough coal-tar to the pure dye; a lump of the latter, upwards of a cubic foot in bulk, the product of 2,000 tons of coal, occupying one corner of the case, whilst the centre is filled up with dyed specimens of all kinds in skeins aud fabrics with the various mordants used in fixing the colour. The completeness of the collection will give it an interest to all intelligent visitors beyond the beauty of the display, and will make them readily appreciate the happy intelligence which succeeded in extracting "a thing of beauty" from the vilest refuse, aud the skill which has adapted it to the most agreeable forms of decoration.

Two specimens of yellow glass have been sent us by a correspondent for examination in the spectroscope; they are, both to the naked eye and in the instrument, of the same quality—a rather light orange yellow. A spectrum examination shows that they are but ill-adapted for photographic purposes, as they allow considerable quantities of green and blue rays to pass through. Placing one over the other effects some improvement, but even then some chemically acting rays filter through. When perfectly good glass is easily obtained for illuminating purposes, we do not counsel the employment of an inferior variety.

## SENSITIVE DRY PROCESSES.

BY H. COOPER, JUN.

During the last four months, I have been making experiments to ascertain which is the simplest, most sensitive, and surest of the dry processes. The processes I took to experiment upon were the tannin, Mr. England's modification of ditto, the morphine, alkaline gelatine, alkaline resin, plain washed collodion, and morphine resin. The collodion was a mixture of Ponting's, and one iodized with iodide of potassium and cadmium, and bromide of cadmium. The bath, 35 grains of nitrate of silver, and $\frac{1}{10}$ of a minim of acetic acid to the oz. I prepared six plates by each of the above methods; I will give a short epitome of my method of preparing them, so that a more definite conclusion may be drawn between the conflicting merits of each:—

1. *The Tannin.*—Coated and sensitized a perfectly clean plate, washed thoroughly, and coated with solution of tannin 15 grains to the oz. I ran a brush-full of varnish, prepared as follows, round all the plates to prevent slipping of the film:—The varnish: 1 drachm of shellac and 1 drachm of fused gum benzoine to enough alcohol to form a solution about double as thick as Sœhnée varnish. The advantage of this solution is, that it adheres firmly to the glass, but can be easily removed by alcohol, to which a little nitric acid has been added.

2. *Mr. England's Modification of the Tannin.*—Proceeded as before, but coated with—

| | |
|---|---|
| Tannin ... ... ... ... | 15 grains |
| Pure honey ... ... ... | 16 ,, |

to the oz. of water.

3. *The Morphine.*—Took a good working negative bath strongly acid, and added ¼ grain of nitrate of morphine, previously dissolved in a little distilled water, and filtered out the black deposit. Coated and sensitized the plates; thoroughly washed and dried.

4. *Alkaline Gelatine.*—Coated and sensitized a plate in the ordinary bath, washed and coated with a warm solution of gelatine, 15 grains to the oz. I forgot to say, that before coating with gelatine I added 5 grains of carbonate of soda to the salt bath used for soaking the plates in.

5. *Alkaline Resin.*—Added 1 grain of gum guaiucum to each oz. of collodion, coated and sensitized the plates in the ordinary bath, washed, soaked in the alkaline and salt bath used for the last plates, for five minutes washed, and dried.

6. *Plain Washed Collodion.*—Simply washed a sensitive plate in an unlimited quantity of water, and dried.

7. *Morphine and Resin.*—Sensitized a plate coated with the collodion containing the gum guaiucum, in the morphized bath. Being determined to give them a fair trial, I kept them all for three weeks. Then I took, as my standard of sensitiveness, Ponting's collodion, and a nearly neutral bath, with which I have taken negatives in ½ of a second. Exposed each kind on same day, on same subject, &c. The results were as follows:—The tannin developed with pyrogallic acid, after being wetted with cold water, required *twenty* times as long as the wet plate. One wetted with water at 160° required twice as long as the wet plate; but the film required *great* care to prevent its slipping. I lost the first plate I tried by this method, by *dipping* in the fixing bath (hypo); for on washing it very carefully, to my great astonishment, the film which had appeared perfectly firm, slipped off, so that I saw the picture slowly float down the sink.

2. Mr. England's modification required, with cold water, twice as long as the wet, and with water at 120°, half as long again; so that it will be seen that the hot water did not exert the same accelerating effect as in the tannin prepared by Major Russell's method.

3. *The Morphine* I found to be about equal in sensitiveness to Mr. England's tannin, but yielding a much softer negative, and being, also, more free from stains, &c.; so that, on the whole, I prefer the morphine, for which every photographer ought to thank Mr. Bartholomew.

4. On proceeding with my experiments on the alkaline gelatine, I was much disappointed in this process, as I had hoped, at first, great things from it. With cold water it required three times the exposure of the standard wet plate; with hot it took about the same time as the wet, but the picture was covered with a fog, which could not be rubbed off. Some might fancy that this fog was produced by over exposure, but to test it I exposed a plate for a much less time, when only the high lights appeared, but the same annoying fog appeared in full vigour. Great care is also necessary in the preparation of the plates, to prevent a net-work formation covering the bottom of the negative. It is produced if the soda be mixed with the gelatine, or if the soda be not thoroughly removed by washing, if applied before or after the gelatine.

5. The alkaline resin I found to be less sensitive than the preceding, but easier to work.

6. With the plain washed collodion I have had some very curious results. Some two months ago, I prepared a batch of plates by this process. After spoiling a good many, I succeeded in the following way:—Expose for same time as wet collodion, soak for two minutes in distilled water, then just *dip* in the bath, wipe the back, and develop with—

| | |
|---|---|
| Sulphate of iron ... ... ... | 15 grains |
| Sulphate of copper ... ... | 10 ,, |
| Acetate of soda ... ... ... | 1 [illegible] |
| Citric acid ... ... ... | 1 ,, |
| Acetic acid ... ... ... | 15 minims |
| Water ... ... ... ... | 1 ounce |



The negatives developed in this manner were very fine, all that could be wished, soft and brilliant.

On exposing and developing one of the six prepared with the others for these experiments I was astonished to find not even the trace of an image after prolonged development. In the last week's NEWS a correspondent writes to say that he has met with something very similar; but it appears he used no silver in developing, which would easily account for it; but mine was dipped in the bath. I then exposed one for five minutes with no better result. Thinking that something might be wrong with the developer I exposed one and developed it in a totally different way with fresh chemicals, as also the remaining three plates, each in a different way, but the film remained perfectly white and clear, no kind of stain of any kind, or any trace of an image appearing. I have not had time since to prepare any fresh plates, but I soon hope to do so, when perhaps I may find some solution of this strange behaviour of the film.

7. *The Morphine Resin* I found to be very clean, bearing a good deal of rough usage, and being nearly as sensitive as the plain washed *morphine.*

Having heard a good deal of Dr. Norris's plates being developed satisfactorily with hot water after a very short exposure, I procured some of those plates, and the results were quite sufficient to justify the praise which they have received. I am afraid that this paper has exceeded the ordinary limits, but those who have had to write on subjects in which every detail is important, know how difficult it is to express oneself clearly, and so that no one may be misled, in a short space. Pleading this as my excuse, I will only ask those who have time to make carefully some such experiments as I have endeavoured to explain, so that we may soon reach the "consummation devoutly to be wished," an instantaneous dry process.

## COPYRIGHT (WORKS OF ART) BILL.

House of Lords, Thursday, May 22nd.

EARL GRANVILLE, in moving the second reading of this Bill, observed, that under the present state of the law, artists and engravers were entirely without protection for works of art. The purchaser of such works was also liable to have them pirated, and inferior works of art might be passed off as the productions of masters. Besides, some change was required in our law, in order to enable us to avail ourselves of the provisions of international treaties, with reference to this subject. Under this Bill the artist was to have the copyright of a picture or other work or art during life; but, as between the artist and purchaser, it was necessary that there should be a written agreement. After that agreement was made it was to be registered in the same manner as a literary work. There was a provision to the effect, that copyright should not in the slightest degree interfere with the reproduction of any scene or object. Protection was only given to the work of art as it stood. He would not on that occasion go into the details of the Bill, which were matters of procedure. He should be glad, in committee, to receive suggestions from any noble lord; but, as it was desirable to confer with others on the subject, he hoped notice would be given of them before going into committee.

Lord OVERSTONE had great doubts as to the propriety of their lordships reading this Bill a seconding time. It was an artists' Bill, for protecting the interests of artists, and without any reference to the interests of the general purchasers of pictures, the interests of purchasers of pictures by commission, and the interests of the public at large. It was always understood that the fundamental principle of patent rights was, that there should be some invention, something new, creative, on the part of the individual seeking their protection. In consideration of granting that exclusive protection, it was also understood that at the end of a certain period there should be an effectual dedication of the invention to the public interest. Neither of these objects was provided for by this Bill. His main objection to the Bill was, that it did not discriminate as to the character, position, and interests, as well as the reasonable rights, of the various parties concerned. If a person ordered a portrait to be painted of himself or of any member of his family, or if he commissioned an artist to produce a picture upon a given subject, surely common sense required that the copyright, if there was to be a copyright, should at once be vested in him rather than in the artist. Such was the law in France, such was the law that reason and justice would dictate, but such was not the law that this Bill contemplated. Again, the Bill provided that copyright might be reserved at the time the picture was produced, but the registration of it was not necessary for a twelvemonth. The consequence would be, that there would exist a patent right unknown to the public for the whole period of one year. It was obvious that, if a copyright was to be granted, the registration of it should accompany, if not precede, the first production of the work, otherwise copies made and sold in good faith would be liable at any moment to be seized and suppressed. Even the language of some of the clauses was calculated to give rise to a great deal of doubt, and he believed that much litigation would result from the passing of the Bill, particularly that portion of it which related to the fraudulent imitation of works. The Bill, if pressed forward, would require very careful consideration, and he thought it should be withdrawn and a different measure introduced in another session.

Earl Stanhope did not think the noble lord had stated any valid objection against the principle of the Bill. The noble lord had spoken as if the Bill were retrospective in its character. No doubt that idea was in the minds of several persons when the Bill was before the other House, and he knew that some great publishing houses were afraid that their property in illustrated works would be destroyed; but if their lordships would look at the Bill, they would see, especially from the commencement of the first clause, that it was entirely prospective. Moreover, though the Bill were to be passed to-morrow, it would still be in the power of a purchaser to make a bargain with the artist whom he employed that the copyright should be vested in him. When, many years ago, he had charge of the Literary Copyright Bill in the House of Commons, he was opposed by some persons who anticipated all kinds of disastrous consequences from the passing of the measure. Those anticipations had been entirely belied by the result, and the same would be the case in the present instance. If it were once admitted that a man should profit by the fruits of his own genius, no person could fairly say that, having given a copyright to another, Parliament should refuse it to the artist. There was no difference in theory between a poem and a picture, and the producers of both had an equal right to protection. He admitted, however, that there were one or two points in the Bill on which he felt some difficulty. For example, he could not see how the principle of copyright could be carried out in the case of photographs. One person might make a copy of a photograph of the Coliseum, originally produced by another; but who could say that the copy was not an original photograph? How could any one assert that the person who published it did not go to the Coliseum, take his stand upon the same spot of ground as the other photographer, and commence his operations at the same hour? So, too, with respect to photographic portraits of living persons. He should be glad if some noble and learned lord could show how the proposed law was to be enforced in the case of photographs.

Lord Taunton entertained great doubts as to whether the true interest of art or artists would be promoted by the operation of the Bill. A good picture should, he thought, be its own protection against the art of the copyist; and he, for one, had no sympathy with the man who purchased a picture and laid it up in his gallery for the purpose of boasting that he possessed something which nobody else could procure. The Bill, moreover was, he was afraid, calculated to give rise to litigation, and on these grounds he was not disposed to look upon it with favour. It might benefit the dealer in pictures, but he did not believe it would operate for the advantage of the artist or the public at large.

The Lord Chancellor was surprised to find that while a man was allowed a property in that which was, in the ordinary way, the work of his hands, it should be gravely contended that in those productions which were the creations of the mind no such right should be admitted. For his own part, he was entirely of the opinion which was expressed by the great Lord Mansfield, to the effect, that in all works of the mind and of genius the common law of this country ought to be held as giving an absolute property. After great exertion, the imperfect state of the law, so far as literature was concerned, was amended to meet the requirements of the case, but the fine arts were still left without an adequate protection—the painter, in point of fact, without any at all. As an illustration of the justice of that view, he might mention a case in which a celebrated artist sold a picture for a considerable sum, of which some time after, a copy was produced, with the name of the artist attached to it. The person by whom it was so attached was indicted for fraud and forgery, but it was held he was not amenable to the law. A state of things such as that, surely stood in need of alteration nor was it due merely to our country, but to foreign nations, that some step should be taken in the matter. As far as the artist was concerned, there was no possible ground why he should not receive the same protection as the poet and historian. The purchaser of a work of art would also obtain benefit from the passing of the Bill, as the measure would tend to prevent inferior repetitions of works of art from being improperly hawked about. In these respects the Bill proceeded not only on the principle of justice, but of great expediency; and, as regarded the public, its operation would be most advantageous, because in proportion as protection was given to works of genius, and the remuneration of the artist thereby enhanced, would productions of beauty and talent be increased in the country. Some observations had been made in reference to the provision which related to alterations made in a work of art; but that provision had been introduced in consequence of it being known that many pictures, in respect to which alterations had been made, were sold again as the works of the original painters. As an illustration of this, he might mention that in a picture painted by Mr. Charles Landseer there were introduced the figures of two dogs, which received some touches from his brother, Sir E. Landseer. The picture got into the hands of a dealer, who cut out the figures of the dogs, and sold them as the work of Sir E. Landseer, and having repaired the hole in the original picture, and got it painted over by some inferior artist, he then sold it as the work of Mr. Charles Landseer. These were some of the frauds committed on artists, and, without being actuated by petty feelings, they might naturally manifest some sensitiveness on the score of their reputation at being so treated. A point had been raised respecting the difficulty of proving in some cases that photographs were copied, but he thought it possible that the copy of a photograph might be sufficiently detected, as it would be hardly possible for two persons to produce representations of the same object under exactly the same conditions of light, position, and other circumstances. He did not deny that there were many provisions in the Bill which would require careful consideration in committee; but the great principle of the measure, which recognized property in works of art, and the adoption of which had been too long delayed, was in accordance with a natural feeling of justice.

The Bill was then read a second time.

Friday was appointed for the consideration of this Bill in committee. It was announced, however, that it would be postponed till the Tuesday following.

Lord Overstone trusted that the postponement of the Bill might be taken as an indication that the Government was alive to the full force of the objections which had recently been urged against it. It was not his intention to propose any amendments in committee; but, nevertheless, he might throw out one or two suggestions for the consideration of the Government. In the first place, he thought it was reasonable and proper that the words, "new and original," should be introduced before the word "picture," in the first clause. Secondly, he thought that if Parliament were prepared to grant a copyright, it ought at once and absolutely, without any necessity for negotiation and arrangement between the parties, to vest that right in the employer, and not in the artist. Such was the law in France, and in the discussion upon the Bill the other night the Lord Chancellor rested his argument upon the expediency and necessity of making our law correspond with that of our neighbours on the Continent. His third suggestion had reference to the question of registration. Not a single word had yet been said in explanation of that extraordinary clause in the Bill which provided that copyright was to be obtained without the necessity of registration, except after the lapse of a twelvemonth. An arrangement more inexpedient, more impolitic, and more inconsistent with justice, could not well have been devised. He trusted the objections which had been raised against the Bill would lead his noble friend, the President of the Council, more carefully to consider its provisions, and introduce into it those modifications of which it stood in need.

Lord Taunton observed, that under the operation of the Bill, as it stood, an artist in Australia who happened to make a copy of a work sent out to the colony might do so without knowing that the work had been registered in this country, and might, in consequence, unwittingly be subjected to all the inconvenience which the penal operation of the Bill would entail.

Lord Chelmsford suggested that the further consideration of the Bill should be postponed to Friday.

The suggestion was adopted.

## Proceedings of Societies.

### North London Photographic Association.

The last meeting of this association, before the summer recess, was held in Myddelton Hall, Islington, on the evening of Wednesday, May 21st, Mr. G. Shadbolt in the chair.

The minutes having been read and confirmed, the following gentlemen were elected members of the association:—Messrs. J. Turner, Wm. Cornish, and J. Sinclair.

Mr. Hill presented two fine photographs from metagelatine negatives to the Society's portfolio.

Mr. G. Dawson, Lecturer on Photography, at King's College, then read a paper on the practical working with the panoramic lens, in the course of which he exhibited the apparatus, and gave practical illustrations of some of the manipulations, and also exhibited a series of prints he had taken to show the class of subjects to which the lens was peculiarly adapted, and those which should be avoided.

Mr. Dawson, having coated a curved glass to illustrate the best mode of manipulation, a conversation on the subject followed, as to the influence on the collodion film of supporting the plate on the tips of warm fingers, some gentlemen suggesting, that the use of india-rubber finger stalls would be an advantage from their non-conducting quality. Mr. Dawson responded with an adage, having reference to a "cat in pattens," and said, he found the simplest plan was to change the position of his fingers, thus avoiding continued contact with one part of the plate.

A conversation on the use of spirit levels followed. Mr. Dawson had pointed out that the camera was furnished with two, to show the slightest inclination in either direction, which was important in all cameras, but especially so in the panoramic.

Mr. Hill did not see any possible advantage in having two spirit levels of the cylinder form, over one of the circular shape, which would show the inclination in any direction.

Mr. Shave had not either of much use, as he had seen a camera placed considerably out of truth without the spirit level showing it.

Mr. Martin suggested that the level had not been properly adjusted in the first instance. In order that a spirit level on a camera might be of any service, it was important that all the surfaces, that of the top glass, the brass, and the wood on which it rested, should be quite parallel to each other; and, also, that the mixture of spirit and water should be in right quantity. If these things were attended to it could not fail to be useful.

A conversation on the dilute form of developer, recommended by Mr. Dawson ensued. He was in the habit, when using pyrogallic acid, of diluting the ordinary one-grain solution with five of water, in order to cover the curved glass without stains.

Mr. Wharton Simpson referred to the method described some time ago by Mr. Vernon Heath, of first covering the plate with distilled water, and then adding that water to the developing solution, by which means he avoided stains and secured slow development, and consequent softness.

The Chairman thought it would be difficult to make the distilled water flow readily over the curved glass, without causing stains.

Mr. Simpson said, of course the freedom in flowing would depend somewhat on the condition of the bath; in a new bath it would flow easily enough; in an old one, containing much either and alcohol, it would be repellant at first, but that would not cause stains, as there would be no chemical action.

A member suggested that the use of citric acid would retard the action of the developer sufficiently to allow the curved plate to be covered without causing stains.

Mr. Dawson said he generally found the use of citric acid rendered longer exposure necessary.

A conversation on the use of dilute iron developers followed, in which Mr. Hill said, he thought that too little attention was given to the importance of increasing the quantity of acid in iron developing solutions in hot weather.

A conversation on economy of water in the field, cleaning glasses, &c., followed.

Mr. Hill said he used only one cloth in cleaning glasses, and that had been in use for months. The glasses, after being roughly washed, were dried with this cloth, and then a little collodion poured on the plate, and rubbed with one piece of cotton wool, and the plate polished with another piece. This old cloth, and two pieces of cotton wool had been in use a long time, and were his complete equipment for cleaning glasses.

A member suggested, "and a wash-leather;" to which Mr. Mill replied, "No;" and

The Chairman remarked that considerable difference of opinion prevailed as to the use of wash-leather for polishing glasses. For his own part, he considered it a most fertile source of dirty plates.

Messrs. Hill and Moens both agreed in this opinion.

Mr. Dawson said, Mr. Hill's method reminded him of that of the peripatetic photographer, who moistened the plate by a very summary process, and wiped it on his sleeve (with a pantomimic illustration).

Mr. Shave asked Mr. Dawson, if he were going out again on a photographic tour, which camera and lens he would prefer to use, the panoramic or the ordinary form?

Mr. Dawson said it would depend on the class of subjects he was going to take. For some subjects the panoramic lens was pre-eminently well adapted; but for ordinary work the other was better. He was not advocating the universal use of the panoramic lens. It was a special lens, for special work.

Mr. Moens suggested, that in all panoramic views where several plates were now used, the lens would be valuable. He wished to know the price of the curved glasses?

Mr. Simpson believed they were eighteen shillings a dozen.

Mr. Dawson regretted Mr. Ross was not present to answer questions of detail, which he did not remember; but he had in his pocket a letter of apology from Mr. Ross, who was prevented from indisposition from being present. The chief difficulty he had met with was, the glasses not being quite true, or all of the same curve. If they could be bent perfectly to a certain guage it would be a great improvement.

Mr. Simpson believed it was originally intended to do so; possibly, when they were more used, that would be done.

A conversation on the difficulty of getting the glasses perfectly clean followed, in which it was suggested, that as they formed sections of a blown cylinder, if the plates were rubbed crosswise, which would be in the direction of the length of the cylinder, they would be cleaned more easily, as the fine lines formed in blowing would be in that direction.

Mr. Foxlee asked how often the lens required refilling with water?

Mr. Dawson said he had only worked with it for two or three days. The first day, as he had explained, he used common water, and was troubled by the fixed air forming bubbles on the inside of the glass; after using distilled water, he had no further occasion to change the water.

Mr. Moens asked if spirit would not keep better, if the lens were filled with it?

Mr. Simpson said, spirit would have a different density to water.

The Chairman said the calculations were for distilled water; spirit, having a different density, would have a different refractive power. Referring to the shape of the bath, he might remark, that if the inner curve were the arc of a circle, in the slightest degree larger than the outer one, there would be no danger of injuring the film; it might then, also, have as little depth from from front to back as might be desired. The front and back might, in fact, join at the edges, and form a crescent.

A conversation arose on the manufacture of the curved baths in glass. Mr. Dawson, having expressed a conviction that gutta-percha injured the bath,

Mr. Simpson said he believed that if the gutta-percha were pure, no such injury would occur. He had left a bath for four years in one gutta-percha bath, without the slightest injury.

Mr. Hill had met with similar experience. He had his bath of Burgess and Key, and believed all their's were made of pure material.

Mr. Martin suggested that, probably, the baths referred to were purchased many years ago, before gutta-percha was so largely adulterated. Manufacturers of photographic vessels of gutta-percha were dependent upon the purity of the sheet gutta-percha they bought for the purpose.

Mr. Simpson said, the purity of sheet gutta-percha was chiefly a matter of price. Manufacturers of photographic vessels would, doubtless, be able to obtain a pure article if they would pay the price. Pure sheet gutta-percha, of a thickness suitable for photographic vessels, was, he believed, worth about four shillings per pound, whilst an article of similar substance and appearance, but not pure, could be bought for eighteen pence a pound. The latter, he feared, was too often made into photographic baths by some makers.

Mr. Dawson said he had long held the opinion that gutta-percha might be used with impunity, but a careful examination of the matter had convinced him that he was wrong. He had made ten ounces of bath solution, and put half of it into a gutta-percha bath for a short time; he then applied Barber's test for organic matter, making the solution slightly alkaline, and exposing it to the light. That which had been in the gutta-percha turned black and turbid, whilst the other was unchanged.

Mr. Simpson had some years ago given a good deal of attention to the subject, and he then applied a test of a similar character, but, he thought, even more severe. He made a new neutral bath of nitrate of silver, and placed it in a bottle; he then cut up some very pure gutta-percha into fine shreds or shavings, and put a large quantity into the solution, so as to secure as large a portion of acting surface as possible. The bottle was then placed in the light for a few days, without any blackening or change taking place.

Mr. Dawson asked if the solution was made alkaline?

Mr. Simpson said it was nearly neutral, just in fact, in good working condition. A picture was taken with it before this treatment, and another after, without the slightest apparent change in the condition.

A conversation on the subject followed, in which Mr. Sang's suggestion of varnishing the interior of gutta-percha vessels with shellac was referred to.

Mr. Bingham said that the shellac in such cases was apt to crack.

Mr. Moens asked what was the best method of preventing the india-rubber lining of the top from sticking to gutta-percha baths, with watertight tops.

Mr. Simpson suggested the use of vegetable parchment over the india-rubber.

Some further conversation followed on the use of gutta-percha dippers with iron supports, &c., after which the subject dropped.

Mr. Barber exhibited a bottle of a collodion, which was usually known to be quite colourless, and was thought to be a cadmium collodion. This was, however, quite red. He showed this to illustrate the uncertainty of organic chemistry, and the difficulty of making in collodion a perfectly uniform article. After some conversation on the subject,

Mr. Seely showed some negatives recently taken on tannin plates. After some conversation on the subject,

The Chairman asked if any one had tried honey and tannin, as suggested by Mr. England?

Mr. Seely had tried it, but could not get such clean negatives as without the honey.

Mr. Simpson had tried about a dozen experimental plates with honey and tannin, and was highly gratified by the results. The plates were extremely sensitive, and the quality of the negatives was excellent. The manipulation was extremely simple, less than usual care being required apparently in the preparation of the plates.

Mr. Barber could fully bear out Mr. Simpson's remarks. He had added a little methylated finish (methylated spirit with shellac, about an ounce to the gallon added) to the solution of honey and tannin to make it keep better, and he thought the quality of the negative was better for the addition. He had tried a solution of sulphate of quinine, instead of tannin; the results were very similar. He had tried the iodide of quinine without perceiving any advantage.

Mr. Simpson asked the Chairman if his experience in the honey process had led him to the conviction that it exercised a chemical influence on the preserved plate, or merely a mechanical action. It certainly seemed to accelerate materially in the tannin process.

The Chairman said his conviction was that the effect was decidedly chemical as well as mechanical. He had known plates, when kept some little time after exposure, show a developed picture, which proved that the honey had a reducing action.

Mr. Simpson exhibited a print from a negative taken by Mr. Underwood to illustrate the influence of a hot developer. The negative was collodio-albumen, exposed for 45 seconds at six o'clock in the evening, a few weeks previous.

The result was regarded as very satisfactory. A conversation on hot development followed, in which a general conviction was expressed that the term warm development was more safe and correct than hot, as the temperature should not generally exceed 100° Fah.

Mr. Simpson exhibited an iron print on albumenized paper, toned with pyrogallic acid, which he had received from Herr Liesegang. The print very much resembled a silver print with gold toning. He also exhibited a print from a negative by Mr. Penny, to show the injury of delaying the development of tannin plates long after exposure.

The Chairman called attention to a portfolio, containing some very excellent prints by the members of the Amateur Photographic Society.

Mr. King presented some prints to the portfolio of the Society. The proceedings then terminated.

## Correspondence.

### NITRATE OF MORPHINE DRY PROCESS.

Sir,—The solutions used by the Rev. Mr. Law in the Morphine Process are, I think, unfavourable for the attainment of the maximum sensitiveness; he has used an old negative bath, with (it appears) strong nitric acid reaction, and a weak pyrogallic developer. If nitric acid is used in the bath, it should be a very small excess, and the developer a 3-grain one, applied first without silver or acid, to make the image visible, and then with silver and acid to intensify; then, I think, the sensitiveness is considerably more than twice that of Fothergill's. There need be no fear of contaminating the bath for the usual wet process; I have used the same one for some months, and a few days since I precipitated about ½ drachm of carbonate of silver in it, filtered, and took several negatives clear, dense, and with remarkably short exposures; this exactly parallels Mr. Blanchard's experiments. Hardwich says, carbonate of silver is soluble in water, sufficiently to react on litmus—can it be so in the silver solution? Carbonic acid cannot neutralize it, if it were soluble, itself producing an alkaline salt. It has long appeared to me that the higher atomic weight the iodizer and bromizer possesses, the more sensitive is the resulting collodion, and so if a still greater atomic weight than lithium or cadmium could be used, we might reasonably expect greater sensitiveness.

May I suggest the use of Mr. England's tannin and honey solution on the morphine plates; for if the sensitiveness is increased by it *pro rata*, as in the plain tannin process, the exposure would be reduced to instantaneity; they would be eligible for the hot water as well, either plain morphine plates, or tannin and honey combined with the morphine process.

I recommend "Quæsitor" to dissolve the gelatine 3 to 5 grains per ounce, and put the subcarbonate of soda into it, 1 or 2 grains per ounce, and apply at one operation to the plate. Of course, no image will develop on them without the addition of silver to the developer, unless a solution of pyrogallic acid is applied first without acid or silver. Feeling I have taxed your space more than I ought, I am, sir, yours respectfully, Wm. Bartholomew.

*Alum Bay, May 24th*, 1862.

P.S. Whilst writing, I will mention that it occurred to me that possibly a little gallic acid added to the tannin solution would get over Mr. Penny's difficulty in keeping exposed and non-developed tannin plates.

## NITRATE OF MORPHINE DRY PROCESS.

Dear Sir,—There are one or two errors apparent in my letter of the 16th inst., due, I fear, to the illegibility of my writing, which I beg leave to correct in your next number. After "*guard*" insert "*would*," in the ninth line from the commencement; and instead of "*morphine*" in the sixth line of the following page, read "*liberated nitric acid*."

I may add that in making my experiments I employed three different kinds of collodion—Keene's, for the Fothergill process; Thomas's "portrait," diluted with washed ether and absolute alcohol; and some made by myself with mixed acid at a high temperature. The little difference, if any, in the results, pointed to the superiority of Keene's—which, in my hands has always proved immeasurably the best for the Fothergill (my favourite) process, and equal to any that I have ever tried for dry processes generally.

Since my last communication, I have tried other experiments with a nitrate of morphine bath, freshly prepared with pure unfused nitrate of silver; and I am happy to inform you that my opinion as to the *high importance* of Mr. Bartholomew's discovery is fully confirmed by all that I have accomplished.

For printing transparencies on glass, this process answers admirably.—I am, sir, faithfully yours. William Law.

*Marston Rectory, Rugby, May* 24, 1862.

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Sir,—Acting upon the suggestion of Mr. Bartholomew, I took an ounce of bromo-iodized collodion, added thereto a ¼ of a grain of muriate of morphine, and prepared a couple of experimental plates for the dry process.

I exposed one of these dry plates for 30 seconds (view lens 11 inches focus), against a sun-lighted view, at 6 o'clock in the evening, and obtained a very fair negative, the dense foliage, however, being rather under-exposed. The second plate I kept 10 days, and then exposed for *one* minute to the same view, at 1 o'clock, the sun shining brilliantly. Upon development I obtained only the tops of some trees.

As these plates were prepared under precisely similar conditions it would appear that some great loss of sensitiveness must have taken place.

I know that Mr. B. *prefers* the addition of the morphine to the bath, but Mr. Law truly observes, "the introduction of organic matter into the nitrate bath is one of those things which photographers are most anxious to eschew."—I am, sir, your obedient servant, F. M. Y.

*London, May* 26, 1862.

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## PRINTING AND TONING.

Dear Sir,—In compliance with your request, I have great pleasure in forwarding you the details of my printing process, but must first remark that I have really no *secret* to divulge.

The great "*secret of success*" is extreme care in all the operations, and to this I attribute the tones I produce in my prints.

In the first place, I never allow the strength of my silver to get below 80 grains. The prints are *well washed* in several changes of water, for at least half an hour. (In cold weather I use warm water). The toning bath contains, to 8 ounces of water, 1 grain of gold, and 5 grains carbonate of soda. Wash thoroughly, and fix in fresh hypo, 1 ounce to 5 of water.

I have some hundreds of prints, and assure you I cannot find one mealy, or showing the least symptoms of "yellow fever."

I may add, that unless great care is taken in the first washing, the resulting proofs are certain to dry a dingy brown colour.—I remain, dear sir, yours very truly,

John H. Underwood.

*Beech Cottage, Sale Green, Cheshire, May* 20*th*. 1862.

[Our correspondent's prints, as we have recently had occasion to remark, are amongst the richest and most perfect in tone we have seen. Although, as he states, he has no secret to communicate, we always think it of interest to put upon record the process by which the best results are obtained, and especially so in regard to subjects on which troubles are common, and opinions diversified.—Ed.]

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## INSTANTANEOUS DRY PLATES.

Dear Sir,—Being on an extensive photographic tour, far away from the smoke and soot of busy Manchester, obtaining views in England, Scotland, and Ireland, for the purpose of illustrating a new work, I had occasion, when at Glasgow, to go down the river for a view of old Dumbarton Rocks and Castle; whilst operating there I had the pleasure of meeting Mr. Charles L. Floyd, of Birmingham, who, to my great surprise, was taking instantaneous views on dry plates, with Dallmeyer's triple lens. I have had a very large experience in dry plates, but with every system I have used a tedious exposure was necessary. Mr. Floyd was kind enough to send me a print from one of his negatives, which gave the curl on the water, and a steam-boat sailing beautifully. Now, as he appears to be very obliging and gentlemanly, perhaps, if he is asked courteously through your columns, he may be kind enough to give his *modus operandi* to the profession, by whom, I am sure, it would be considered a great boon, and by none more so than—Your most obedient,

John H. Taylor.

*Belfast, May* 26*th*.

[It is scarcely necessary for us to say that we shall receive and publish with pleasure any communication from Mr. Floyd on this interesting and important subject. Dry plates which give instantaneous effects with a lens of long focus and small aperture, like the triple, must unquestionably be as rapid as wet collodion in its most sensitive condition. We shall feel anxious to learn more on the subject.—Ed.]

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Keeping Solutions of Tannin.—Tannin solution sometimes becomes mouldy if kept, particularly when the alcohol has been nearly removed by evaporation from frequent use. A drop of oil of cloves in each bottle entirely prevents this tendency, and does not seem to produce any injurious effect, unless undissolved globules of the oil are poured upon the film. All chance of such globules may be avoided by allowing the oil to remain at the bottom of the bottle, which is never to be quite emptied, and by taking care not to apply the solution to the sensitive surface without previous filtration. Undissolved globules of oil, if poured on with the solution, will adhere to the film, and produce transparent spots of insensitiveness. A quantity of strong solution of tannin, which became very mouldy about four years ago, and to which oil of cloves was then added, settled quite clear, and has remained in the same state ever since, and, although dark in colour, gives as good results as the freshly prepared solution.—*Major Russell's Tannin Process.*

Photographic Society.—At the meeting of the Photographic Society, to be held on Tuesday evening next, Mr. Claudett will read communications on the following subjects:—1. Enlargement of photographs by tracing the image of a negative on any surface upon which it may be thrown, in the camera, by the sunlight, or artificial light. 2. Rule for finding at once the degree of amplification produced by any distance of image, and also, from the size of the negative, having determined how much its image is to be enlarged, to know the distance at which both the negative and the screen must be placed on each side of the object-glass. 3. New mechanical diaphragm, permanently fixed between the two lenses of a double achromatic combination, which, by a rapid expansion and contraction, being capable of opening and shutting the whole aperture, can produce any degree of aperture required, even while the operation is going on.

## Talk in the Studio.

MR. VERNON HEATH'S STUDIO.—Mr. Vernon Heath, who, as our readers know, has recently devoted himself entirely to photography, portraiture as well as landscape, issued cards to the press and a select circle for a private view—on Friday and Saturday last—of his specimens, his fine gallery having just been completed. In addition to his fine series of Scottish views taken last autumn—which, in their entirety, have not, we believe, before been exhibited—and other landscapes, a variety of examples of fine portraiture were shown, amongst which the features of especial interest were various portraits of His Royal Highness the late Prince Consort, the last portraits for which he sat. Two or three specimens of the same portraits enlarged were exhibited, the delicacy and softness of which were much admired.

CARD PICTURES IN AMERICA.—Mr. Coleman Sellers, writing to our Liverpool contemporary, says:—"The card pictures have become so important a branch of the photographic art, that we find several of our leading papers publishing two-column articles on the subject. The *Philadelphia Press* had a very interesting article on the subject, showing the commercial value of these pictures; for, as an article of manufacture and trade, I dare say we shall soon see General M'Clellan, President Lincoln, and so forth, quoted in the price-current lists, as follows:—'Card pictures rather uppish: some slight advance on former rates. Note the sale of 2,000 portraits of *Mrs. Lincoln, in ball dress*, to one *party* at two dollars per dozen. Considerable inquiry for proofs from the suppressed plates, but owners refuse to sell.' I cannot but notice that the name, "*cartes de visite*," is being rather dropped, and the plain English card-picture used instead. Our language is quite capable of expressing all our wants, and there is little need of our befogging ourselves with the belief that card-pictures are not visiting cards, but are *cartes de visite*."

CLEANING GLASSES.—The gentleman above quoted says in the same letter:—"As there is no doubt clean plates conduce to clear solutions, it is of the utmost importance to have a good method of cleaning glass. What seems to be most in favour in New York just now is a solution consisting of equal parts of commercial nitric acid and water, to which a quarter of an ounce of mercury per pint of acid is added, making an acid nitrate of mercury. This solution can be kept in an open vessel in the room, and the plates, whether varnished or not, can be thrown in, and should remain there for some days until needed: they can finally be washed under a stream of running water, and stood up to drain. They may then be used without polishing. There is claimed for plates so cleaned an entire immunity from all metallic irridescence under the films in the clear shadows."

PHOTOGRAPHIC RECORDS OF A STORM.—Mr. E. J. Lowe recently communicated to the *Times* an account of a severe storm, near Newark, of which a photographic record was taken. He says:—"About 3.30 p.m. mutterings of thunder: from 4 to 4.30, heat oppressive; about 4.45 and till 5, exceedingly large and curious hail-stones fell, and the air became chilly. About 5.3, looking out of a window facing the east, our attention was attracted by seeing a small pony, closely followed by sheep and cattle, rushing in terror and at great speed from the S.S.E., opposite the house. The pony stopped and looked back, and then started off at still greater speed, as if pursued. On looking in the direction from which the cattle came, we saw the sky quite obscured by a strange dark wall of cloud, which was approaching us. Then a large quantity of hay and straw, which seemed to fill the air, followed by clouds of the blossom of the horse-chestnut and small twigs; then at once, with a roar that is indescribable, came a furious blast, which seemed as if it would sweep the land of all that stood on it. Great trees went down before it, torn up by the roots, levelled as if by a sudden blow. Our impression was that the house must be swept away. This continued rather more than a minute, and was accompanied by gleams of lightning so frequent as to seem continuous. When it passed, there was a torrent of rain, with extremely vivid lightning. The Rev. W. H. Fox and myself took a number of photographs in illustration of the ravages of this great hurricane; so that I think we shall have preserved, very satisfactorily, a record of one of the most destructive storms that has ever visited this island.'

## To Correspondents.

TO ADVERTISERS.—We have to crave the indulgence of some of our advertising friends this week, whose announcements, from the pressure on our pages, we are compelled on this occasion to omit.

EGAORO YEVRAH.—The cracking or reticulation in your film is caused by the presence of too much water in the collodion, *i. e.*, the solvents have been too weak. The same collodion may not, however, under other treatment, produce the same result; as two or three causes may be in operation to produce it. If the plate be immersed before the film be properly set, a similar effect is produced on it to that arising from water in the collodion. Intensifying with bichloride of mercury will sometimes cause reticulation if there be the slightest tendency to it in the collodion. We shall be glad to see a description of your developing box.

M. A. C.—We have not time to submit your samples of paper hangings to a proper analysis; but from the hasty test to which we have had time to submit them, we have very little doubt of the presence of arsenic. The bright green tint is probably produced by Scheele's green (arsenite of copper). This is very soluble in ammonia, on contact with which it at once turns blue. This occurs, you will find, in both your papers, in the light green ground of No. 1, and the pattern of similar tint on No. 2. If your children suffer from the symptoms you describe, it is very probably the result of arsenic; and we should counsel the removal of the papers at once. In future either avoid papers of the doubtful tint, or before using them forward samples to an analytical chemist for his opinion and advice.

BERMONDSEY TANNER.—We do not counsel placing the print in salt and water immediately on taking it from the pressure frame. If salt and water be used at all, the print should be well washed first. We prefer the bath of acetate of soda to that of chloride of sodium.

A CONSTANT READER AND SUBSCRIBER.—It necessarily follows that in two pictures taken from the same position, on the same sized plates, with a lens of short focus and another of longer focus, the picture by the lens of longer focus must delineate objects on a longer scale, and include a less amount of subject. Of the two lenses by the maker you name, that with the longer focus will unquestionably answer your purpose best if you wish to take card portraits. It also answers admirably for stereoscopic pictures as well; and where you wish to secure more subject and objects on a smaller scale, you can do so by retiring to a greater distance with the camera. You can also secure more rapidity, as the stereo plate will be covered when a large aperture is used. For stereoscopic purposes only, however, the stereo lenses are admirable. 2. The formation of a thick edge of collodion may be to some extent prevented by skilful manipulation; but it is probable your collodion is not sufficiently thin and fluid.

J. N. A.—The most striking defect in your specimens of card portraiture is the cracked, creased condition of the background: it would spoil the effect of the best photography. A little more control over the lighting would be an advantage; this you might secure to some extent by using a white reflecting screen to throw a little light on the shadowed side of the sitter. A little more care in securing perfect focus on the face, and in arrangement generally, may be used with advantage. The photography is promising, and for an amateur of little practice is very creditable.

SIGMA.—There are, of course, a large number of dealers in photographic materials in the United States; we may mention, however, two or three of the principal: Anthony, 501, Broadway, New York; the Scovil Company, 141, Nassau Street, New York; and Holmes, Booth, and Haydens, 81, Chambers Street, New York. We do not at this moment remember the address of any photographic dealer in Holland; but the Industrial Catalogue of the International Exhibition will help you to the address of some photographers there.

X.—See the communications on the subject from the Rev. W. Law in last week's number and the present.

W.—If the practical result of the operation proved correct and satisfactory, it is not necessary to discuss anybody's crochets on the subject. We saw the allusions in the article to which you refer, but they do not come before us in a form to call for specific notice. We may remark, however, that two of the statements made by the writer are incorrect. We said nothing at all about single lenses, but spoke of compound lenses only; and the writer has not "shown" that the equivalent focus of a compound lens could not be obtained in the way described; that still remains to be done. His third charge is correct; we were not quite accurate in stating that an angle of 60° is covered when the diameter of the circle of definition equals the focus of the lens. We were speaking approximately, without exact calculation, and stated the amount too high. We have not tried the lenses in question; but have heard good accounts of them as single view lenses. It does not necessarily follow that a dogmatic writer is incompetent practically.

A CONSTANT SUBSCRIBER.—If your glass positive of a cavalry troop be perfect and sharp, we see no reason why you should not get a good enlarged negative from it. For successful enlargement, it should be well defined all over, and quite clean; as, of course, every defect becomes magnified, and that which may scarcely be noticed in a small picture, might become a glaring defect in the enlargement. We cannot recommend any especial person to undertake the commission; but a reference to our advertisement pages will help you.

E. E.—The faults of your card pictures chiefly belong to the printing, and these probably less of formula than of manipulation. You are probably not sufficiently careful throughout. You will see two or three communications in the present number, which have reference to printing. Be careful to use a strong silver bath: sensitize, print, tone, and fix, all in one day if possible; or, in any case, with as little delay between each operation as possible. Be careful never to touch the print at any stage before fixing, with fingers which have been in contact with hypo. We regret that our engagements do not permit of our fulfilling such a commission as that you ask.

C. W. SMART.—We will take an early opportunity of testing and noticing the sample of silk sent.

F. B.—It is wise in portraiture always, and especially with card pictures, to use a glass a little larger than the picture, so as to allow imperfect margins to be cut away. The thickness of the card for mounting is purely a matter of taste; for album portraits we should say a five sheet board was too thick, a good three or four sheet board would be sufficient.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

VOL. VI. No. 196.—June 6, 1862.



## WHO SHOULD RECEIVE THE MEDALS—ARTISTS OR EXHIBITORS?

"*Palman qui meruit ferat.*"

As the period approaches when the awards of jurors in the Exhibition will be made; a question of considerable interest arises, which is, however, one of not less difficulty. On examination of the pictures, and reference to the catalogue, it will be seen that the contributor and the artist are not always comprised in one and the same person. A correspondent, whose letter will be found in another column, calls attention to the anomaly which may very easily be perpetrated in the award of medals in such cases, by placing the laurels on brows which have not won them, awarding an honour to the publisher, who exhibits, which unquestionably should belong to the artist who has produced.

We think that it would be unhesitatingly admitted, that it is the skill and ability which produce meritorious works which should be recognized in any award of honours. It is the capitalist who generally gets the largest share of pudding: the skilled hand and conceptive brain might at least have the praise. But we are aware of the difficulties which at once beset this position. In the glorious and vast treasures of industrial art now collected in the Exhibition building, it would be found difficult, we imagine, in the majority of instances, to select any object and say, this is due to the skill of one man. Take the Western Annexe, for example, and examine with renewed wonder and admiration the various machines which seem to do everything but think, and on enquiry it will be found that there is scarcely one which is not the joint product of many brains. It is possible, indeed, that the first master conception may, in many instances, have emanated from one mind, but in so crude a form that without the more practical executive skill of others, it could never have had a material existence. Take again examples where the industrial more nearly approaches the fine arts, such as the exquisite ceramic productions of Minton or Copeland. In some of these it is the form or design, in some the colour or painting, in others the material in which the object is produced, and in many the combination of all these which win admiration, and deserve the recognition of the public as well as the jurors. To single out the especial artist would be impossible. The exquisite design of a vase may be due to one, the skilful selection and combination of the materials to another, the manipulation to a third, the painting to a fourth, the enammelling and burning to a fifth, and so on. There can be but one course for the jurors in such cases. It is the skill, the judgment, and the enterprise which directs capital into such channels which the jury must recognize. This enterprise it is, as much as the labour of skilled workmen, which, in a commercial country, raises the standard of its manufactures, and gives its products pre-eminence in the world; and this it is which will always command pre-eminence and win renown.

We submit that the case is different, however, as regards photography. There is no difficulty in deciding to whom the palm belongs. Whatever advantages he may have derived from the purest of chemicals and the best of apparatus, these matters will receive recognition in their proper quarter. Whatever wide-spread publicity his productions may have received through the efforts of an enterprising publisher or employer, there no is room for doubt at any time that the results of the skilful photographer are due to himself alone, and that he alone should receive recognition in an award to merit. Francis Bedford is at this moment in the employment of the Prince of Wales: his pictures are announced for publication by Messrs. Day and Son; but no one will for a moment dream of crediting either his Royal Highness, or the publishing house we have named, with the merit of Mr. Bedford's pictures. As a general rule, moreover, there is no obscurity or doubt existing about these matters. Skilled photographers are well-known and recognised; their productions being more familiar evidence than their sign-manual.

There is, or may be, however, another difficulty. We have said *may* be with a reason: we wish in our brief remarks on this subject to discuss it purely as an abstract question, without regard to individual cases; and since the matter has come under our attention we have avoided examination as to whom it might concern. There may be, however, we have said, another difficulty. The jurors, we apprehend, will be presumed to have no official knowledge of either artists or exhibitors, except that which comes officially before them in the official records. If then in the consideration of a meritorious picture by a well-known artist, the only name before them in connection with it is that of a publisher or exhibitor, they will not, we fear, have any choice or discretion as to whom they shall recognize in making the award. Injustice in such cases is, we regret to say, not a new or uncommon thing. We remember a case in which an amateur, of high repute, received and accepted an award in a French Exhibition for an astronomical photograph, which had been produced and given to him by a friend who was not less distinguished as a photographer. In such a case the jurors would never dream that the exhibitor was not the photographer also. In the International Exhibition we fear that even where they may know it, they cannot act upon the knowledge.

The difficulties may in some cases be still more complicated. In one of the cases quoted by our correspondent, they are so. Mr. Blanchard's instantaneous photographs are published by Elliott, but they are exhibited by the photographic firm of which Mr. Blanchard was a partner, and in the first edition of the Catalogue appeared as the contributions of "Smyth and Blanchard." Since then Mr. Blanchard has, we understand, seceded from the firm; and in the new and corrected edition of the Catalogue, we find Mr. Blanchard's pictures catalogued with the name of "S. Smyth," from which we conclude that the negatives remain the property of his late partner, whose name in case of an award would, we presume from the Catalogue, be the only one before the jurors.

In the Fine Arts Department, where the contributor and the artist are so frequently distinct persons, this difficulty is avoided by discarding medals altogether. In many of the industrial departments we hear loud complaints of the unsatisfactory management in the juridical examinations; in the photographic department we hope and believe things are better managed, and notwithstanding that three of the jurors are exhibitors also—Dr. Tindall having resigned, and his place being filled, we understand, by Mons. E. Delessert, who is an exhibitor in the French Department—we hope for a satisfactory result. In any case, we commend to the attention of the jury the anomaly which may so easily creep into their adjudication, and suggest the importance of exercising, if possible, a discretion which may avoid it.

## THE INFLUENCE OF BROMIDES IN COLLODION.

BY ALFRED KEENE.

THE experiments both of Mr. Sutton and Mr. Blanchard, given in the NEWS of the 16th ult., for elucidating this subject, appear to me open to objections; those by the former gentleman, as you correctly observe, from being performed with a collodion containing a bromide only, instead of the combined salts—iodide and bromide; also, probably from Mr. Sutton being so strong an advocate for excess of alcohol; the normal collodion he used was of that character, and if so it may account, not only for the length of time he has found necessary for the decomposition of the bromide in the collodion, and its conversion into bromide of silver, but also in some measure for other opposite peculiarities in his experience. Paradoxical as it may appear, collodion containing a large excess of alcohol is *less* quickly acted upon by the bath than one containing excess, or equal portions of ether, which may be explained by the fact that alcohol, though having great affinity for water, makes a film of a very homogeneous nature, that sets more like albumen or gelatine, and therefore offers little facility for the bath to penetrate, and produce the chemical change. Ether, on the other hand, though possessing little affinity for water, gives more porosity to the film, which allows the bath to penetrate freely, and come in contact with a very much larger quantity of the bromide, and consequently quickly decompose it.

Again, during investigations on the character of alcoholic collodion, I have noticed that the excess of alcohol modifies it in some respect similar to what a bromide does ordinary iodized collodion, for instance, a collodion simply iodized, made with *three or four parts of alcohol to one of ether*, will bear a stronger iron developer, and also its being kept on longer without producing fog or stain, than one made with *three* to *five*, or equal parts of ether. If, therefore, Mr. Sutton has used an alcoholic collodion, and those who differ from him the, I think, far preferable kind, made with say equal portions of ether, *some* of their opposite results may be thus explained.

Mr. Blanchard's experiments appear at first sight satisfactory, and to promise definite results, simply iodized and bromo-iodized collodions being compared with the use of the same bath, same developers, and exposure for each respective set; but the very care devoted to insure uniformity of treatment has defeated his object. All who have experimented largely will have observed that not only must the bath, developer, and collodion bear certain relative proportions—a strong bath or strong developer fogs a weak collodion, *i. e.*, one containing a small comparative quantity of iodide—but also that bromides enable a collodion to bear, and, I may say, cause it to require, a stronger developer, and of its being kept on longer than a simply iodized collodion, the latter fogging all over almost immediately, under the action of a developer suitable for the former, which will account for all the simply iodized collodion plates treated in Mr. Blanchard's experiments fogging, and the bromo-iodized remaining clear and clean, without deciding the respective merits of each. The developer used chiefly being a 30-grain iron one, and the iodized collodion only of the strength of from 3½ to 4½ grains, according to the salt used per ounce, for which a 10 or 15 grain developer would have been more suited; whereas the bromo-iodizer contained from one grain of bromide upwards in addition, and in some instances also *extra iodide*. To arrive at correct conclusions respecting their comparative sensitiveness, we must prepare and *use* the collodions under circumstances best adapted for each.

As regards the respective *merits* of iodized and bromo-iodized collodions, nothing, I think, can be more conclusive in favour of the latter, than the universal preference shown for it when the two salts are judiciously combined with a suitable pyroxyline, in proportions that bring out fully the peculiar advantages of each; but on the other hand there are undoubtedly circumstances, even though they may be rare, under which the former gives the best results. I think, therefore, it cannot be advisable exclusively to advance or condemn either, which is taking too narrow a view of the subject, but consider it desirable instead to ascertain which is best adapted for general use; whether either possesses peculiar characteristics, or offers peculiar advantages under particular circumstances over the other, and if so, what? Having devoted, during the early part of the year, considerable time and attention to the subject, I submit a *summary* of the conclusions arrived at as the result of them. The separate results, amounting to probably several hundreds, were very varied, as might be expected when I explain that collodions made with almost every variety of pyroxyline, and prepared with ether and alcohol, ranging in proportions of from *five* to *three* to *one* to *five*, and containing iodides and bromides in various proportions and quantities, and iodides of various quantities were used; also developers weak and strong, and light varying from the dullest to most brilliant.

*Iodized collodion, characteristics*—Simply iodized collodion, when developers of suitable strength were used, as compared with bromo-iodized with the *same developers*, proved rather more sensitive, developed in less than half the time, and in very dull weather or a badly-lighted room—with light well diffused—*when but little contrast of light and shade*, gave a more brilliant picture—picture with better contrast, but will not bear a developer *half* the strength, or continued on half the time without fogging; is more liable to stains and marks, more quickly solarizes, and very liable to be deficient in half tone, excepting under the circumstances mentioned as favourable for it.

*Bromo-iodized collodion*, as compared with simply iodized, requires rather longer exposure when a developer suitable for the latter is used, but as *short or even shorter* exposure when a strong developer is employed, works cleaner, is not liable to solarize, gives more half tone, softer and more pleasing results, particularly when the light is brilliant, decidedly preferable for general use, and may be considered essential for *cartes de visite* and view purposes. The ordinary bromo-iodized collodion, containing a small portion of bromide, which works quick, clean, and brilliant, I find most suited for all ordinary requirements, but there are circumstances, more especially in view photography, and at times for portraiture, where there are extreme contrasts of colour, or light and shade, or any other cause, rendering the use of a very strong developer, and comparative long continued action of it desirable, without producing fog or loss of definition in the high lights, when a collodion containing as much as equivalent proportions of each salt answers best, or a mixture of it with the weaker bromo-iodized. The larger the quantity of bromide, the stronger may be the developer. I have used with a collodion, containing equivalents of each salt, as much as 80 grains of iron, and 15 minims glacial acetic acid to the ounce, with very good effect, without producing fog, and the negative requiring little after intensifying with pyro and silver.

## ON THE EFFECTS OF AFFINITY IN PHOTOGRAPHY.

BY DR. SCHNAUSS.*

IF gold be separated from its solution by silver, the latter enters into the combination in place of the gold, and, as in photography gold is employed under the form of chloride of gold, or hyposulphite of gold, it is evident that it will form analogous combinations of chloride, and of hyposulphite of silver. It is identical with the chemical process by which the *Tree of Diana* is produced, by immersing a piece of zinc in a solution of acetate of lead. The lead, a very feeble electro-positive metal, is precipitated upon the zinc in the form of a delicate moss.

* Continued from p. 29.

The same thing occurs to silver when we immerse a less noble metal (that is to say, a metal which is more strongly electro-positive, and which, consequently, has more affinity for oxygen than the silver has), in a solution of silver, the nitrate for example. A pin falling accidentally into a nitrate bath must have demonstrated this fact to most photographers, who will, in consequence, have been taught not to place the less noble metals in contact with solutions of silver, such as *mercury*, copper, iron, zinc, tin, lead, &c.; but which may be done with metals more noble than silver, such as gold, and platinum.

*What takes place with paper positives in the gold toning solution?*—The question of ascertaining in what state the silver exists in finished positives taken on chloride of silver, often presents itself to chemists, as well as photographers. In chemical treatises, we find it stated ordinarily, that chloride of silver becomes blackened in solar light, meanwhile, chlorine being liberated, it forms some sub-chloride of silver in a humid state: these treatises say that hydrochloric acid is formed, with disengagement of oxygen gas. As regards the products of decomposition, this latter is correct, but the state in which the reduced chloride of silver exists, depends solely on the intensity of the light. The chemist operates upon compact masses of chloride of silver, and if they be divided ever so much, and if they be suspended and diffused in water, this does not suffice for their complete reduction by light, as the thinnest layer of blackened chloride of silver completely protects the parts it covers from the action of light.

On this point I made the following experiment:—After precipitating some chloride of silver in a liquid containing nitrate of silver, I exposed it in this argentiferous liquid to a very strong solar light, stirring it frequently. Some days subsequently, the liquid smelt of chlorine, but the colour of the exposed chloride of silver remained chocolate brown, without becoming darker. I washed the chloride with distilled water to remove every other substance than the darkened chloride. After exposing the chloride to the solar light for eight days, I treated it with ammonia; this liquid dissolved nearly the entire mass, leaving at the bottom of the flask only some black particles, which dissolved in nitric acid. We perceive that the chloride of silver is decomposed by light only in very small quantities. The decomposition of this body is much more complete in photographic processes. If we float a piece of paper upon a dilute solution of chloride of sodium, and afterwards upon a solution of nitrate of silver, also diluted, this paper presents, in comparison with the extent of surface, only a very minute quantity of chloride of silver; and this latter is not only reduced in the state of sub-chloride, but it is perfectly reduced as *metallic silver*, as my experiments abundantly prove. Only the *metallic* silver may, through the effects of affinity, separate the gold from these solutions; no chloride of silver can do that. A polished silver wire immersed in an alkaline gold bath—

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|---|---|---|
| Chloride of gold | ... ... | 1 part |
| Carbonate of soda | ... ... | 4 to 5 parts |
| Water ... ... | ... ... | 1000 parts |

will be covered with a thin film of metallic gold in 15 or 20 minutes. We know that the alkaline gold bath decomposes spontaneously in a few hours; the gold separates in red flocks; this decomposition is effected in a few minutes if the bath be warmed. The addition of an ethereal oil does not appear to accelerate the decomposition, nor does a mirror of gold form upon the sides or bottom of the flask. Metallic silver in a finely divided state (such as the precipitate formed by adding sulphate of iron to a solution of nitrate of silver), decomposes the alkaline gold bath rapidly: a corresponding quantity of chloride of silver is formed, and silver containing gold in mixture: the gold may be readily found by treating the precipitate with ammonia to dissolve the chloride of silver, washing it, and dissolving the metallic silver in nitric acid; a brown residue remains, which dissolves in *aqua regia*, and gives the reactions of gold.

To obtain a correct idea of the decomposition of chloride of silver paper by light, and of the gilding (toning) of the proofs, I proceed as follows:—

I expose paper prepared with chloride of silver for a long time to light, until it has acquired a uniform bronze colour, and changes no further. By washing this paper thoroughly in *distilled* water, I remove all the nitrate, and other soluble salt of silver. After drying the paper, I replace it for half an hour in the ordinary alkaline gold bath. At the expiration of this time, the bronze colour is changed into a deep bluish black.

Freed by thorough washing from the adherent gold solution, the paper was immersed in a concentrated solution of hyposulphite of soda, in order to remove all the chloride of silver. There now only remains the last decisive proof to be made: if the silver were perfectly reduced, by the light, to the metallic state, it should, by the long action of the gold bath, be completely replaced by metallic gold, while all the salts of silver should be removed by the washing, on the one hand, and by the hyposulphite of soda solution on the other.

If these suppositions were correct, no silver should be found in the paper, but only gold. I dry the paper, after having *thoroughly* washed it, and burn it in a platinum crucible, and treat the ashes with nitric acid. Very little is dissolved with slight effervescence; the addition of hydrochloric acid to the solution causes only a slight opacity, proving that there is no silver present. The brown-red residue dissolves immediately in *aqua regia*; the yellow solution, which contains some white gelatinous flocks, gives, with chloride of tin, a blue violet tint (purple of cassius), and a black precipitate with sulphate of iron.

The *presence of gold* in the toned and fixed positive paper, also surely proves the *absence of silver*. The same conclusion is applicable to every proof which is toned with chloride of gold, or in an alkaline gold bath, always supposing that the exposure to light has been sufficiently long, and that the toning, fixing, and washing, have been completely and carefully performed. A paper exposed to light for a long time, and gilt in this manner, resists for some time the action of the nitric acid, notwithstanding the extreme tenuity of the film of gold; while silvered paper which has not been toned with gold, is immediately deprived of its colour by nitric acid, and even by the acid nitrates, such as the nitrate of copper. Chloride of copper, and other metallic chlorides, also deprive the silvered paper of colour, by forming chloride of silver, which blackens if subsequently exposed to light.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.

WITHIN the last few days a corrected and more complete catalogue of the photographs exhibited in this department has been issued. An introductory chapter, or preface, glances at the progress of photography since the Exhibition of 1851, and briefly summarises its present position, as illustrated in the present Exhibition. Referring to the position of photography eleven years ago, the writer remarks:—

"In the Great Exhibition of 1851, Photography had not sufficiently advanced to be placed in a separate Class,—Photographs, and the apparatus used in producing them, were included among Philosophical Instruments. It has now a class of itself (XIV). The art was, in 1851, represented by a large number of Daguerreotypes, some Talbotypes, or Sun Pictures, as they were then frequently termed, and by a few specimens of the albumen process on glass. The collodion process, to which is due the enormous development which has taken place since 1851, was not known previously to the opening of the Exhibition in that year. Photographers were anxiously looking for some material which should be free from the defects of the paper on which the Talbotype negatives were taken.

Albumen on glass had been tried with some success. Archer turned his attention to the use of a film of collodion, and was experimenting on it previous to the opening of the Exhibition; and Dr. Diamond, in company with him, took a portrait with some collodion given him by that gentleman, as early as September, 1850. A collodion portrait, taken by Mr. Archer, assisted by Messrs. Fry and Horne, early in May, 1851, and what is termed a positive picture,* was placed in Messrs. Horne and Thornthwaite's case in the Exhibition, with their Daguerreotype and Talbottype apparatus. Towards the end of June in that year, Mr. Rippingham, by permission, placed in this case some prints from negative collodion plates, the collodion for the purpose having been given him by Mr. Archer. The description of the process was published by Archer, in March, 1851, when it appeared in *The Chemist*. In the Jury report no other notice is taken of these pictures than that 'Rippingham has exhibited several Talbotypes, being a series of untouched positives from collodion negatives on plate-glass.' No medal was given—indeed no one could have then foreseen the influence which these experiments were to exercise on the Photographic Art—and the Jury may well be pardoned for passing them over. In a short time, however, the simplicity of the process and the beauty of the results caused its almost universal adoption, though numerous improvements had, in the mean time, been made in the negative paper processes, more especially that known as the wax paper process, invented by Le Gray."

Commencing with the first number in the catalogue, we find a valuable application of photography, but possessing no pictorial interest, as it is simply an enlarged copy of a map by Mr. G. Downes. It is from several negatives, printed separately and joined: so far as we can see, is sharp all over and free from distortion or curvature of lines. A frame of *genre studies*, by Rejlander, come next: most of these, we have seen, and noticed before; but we may again call attention to the wonderful truth and pathos of "A Night in London." The subject is a half-clothed outcast boy, seated in "looped and windowed raggedness" on the step of a doorway, his head stooped to his knees, and buried in the folded arms, which grasp the knees. The face is hid, but the picture is still eloquent with expression, and tells unerringly its sad tale: desolation and wretchedness are more forcibly told by the position and the hidden face than they would have been by the most woe-begone countenance. The management of light and shadow, and tone, all contribute admirably to the effect, and place unmistakeably the subject of the sketch amongst the class to which Victor Hugo is just devoting his great work, "Les Miserables."

The next pictures which attract our attention, less by their beauty than by our interest in the process, are some views exhibited by Cramb Brothers. These are views of Palestine, on dry albumen plates. The subjects have an interest of their own; the pictures are clean and sharp, and in many respects are good as photography, with the exception of being generally somewhat under-exposed.

Dollomore and Bullock exhibit a variety of landscape and architectural photographs, amongst which we may mention a view of Christ Church, Oxford, as an exceedingly fine, harmonious, and atmospheric picture. No. 16, by Mr. J. Sands, is a view of St. Paul's, from the Thames, of unusually large size, the plate being about 20 by 16. The negative is, we understand, by the collodio-albumen process, and the result is, in our estimation, decidedly successful, especially when the conditions of atmosphere usually surrounding St. Paul's is remembered.

Dr. Wright exhibits a frame of pictures as illustrations of what may be produced in his field box or tent, of which we shall have subsequently to speak. These pictures are exceedingly good, and indicate that no manipulatory difficulties are experienced in working in the tent referred to.

No. 24 is a frame of photographs executed by Mr. Herbert Watkins, of various sections of the brain of a chimpanzee, dissected by Mr. J. Marshall, F.R.S. These possess an especial interest, as affording the basis for comparative examination and estimate of the difference between man and this travesty of humanity.

Cundall and Downes, amongst other excellent contributions, send one possessing unusual interest—a copy of the original manuscript of "Gray's Elegy." Also, reproductions of some fine pen-and-ink sketches entitled, "Waifs and Strays," by E. V. B. Ross and Thompson, of Edinburgh, have a good frame of portraits of children, in which the feeling reminds us considerably of Rejlander; from under-exposure in some, however, and heaviness of accessories in others, there is a general sombre effect which would have been better absent.

Paul Pretsch contributes largely of his specimens of photographic engraving, both from blocks in relief and intaglio. Some of these are reproductions of drawings, some of engravings, and some are photographed from nature; some of the plates have been retouched by the engraver, and some are untouched. All possess many excellent qualities, but we do not notice any especial progress during the last year or two. There is some ground for regret, that the descriptions attached are not always sufficiently explicit. Some of the prints which are marked as from untouched plates, leave us in doubt as to whether they are exhibited as photographs from nature or from engravings of photographs. We may mention the print of the "Venus Callipyge," which, whilst marked untouched, has the appearance of possessing an acquatint ground or grain. It would have been desirable, in relation to the specimens of a process so interesting, that the descriptive particulars should be fuller. The specimen, which strikes us as best of those exhibited by Herr Pretsch, is No. 162, a large sized copy of the "Venus de Milo." The picture is hung somewhat high, and is, therefore, beyond the reach of minute criticism, but seen from this distance it leaves nothing to be desired.

The various specimens of Col. Sir Henry James are at present perhaps the most interesting and perfect produced by any adaptation of photography, to the ordinary methods of printing by means of ink and press. The process has the merit of being perfect in its kind; all that it aims at or makes claim for, it accomplishes. Its object is to reproduce by photographic agency a printing surface from anything delineated in lines or dots. The specimens sent in by Col. James show at once how extensive the range of application is, and how perfect the results. Its value in the reproduction of old, scarce, and valuable engravings, is shown by copies of Hogarth's "Canvassing for Voters;" "Antique Vases," drawn by Piranesi; and some panels in the Vatican, painted by Raffaelle, and engraved by Volpato, in 1776. Its value in the reproduction of maps on any scale is now familiar to every one; the specimen here exhibited is a plan of Edinburgh Castle and its environs. No process ever before discovered could in any degree rival this for the production of fac-similes of old documents, such as the Domesday Book. What other method of reproduction could yield anything possessing the interest and value which one of the first editions of Shakespeare so rendered would have, and which the two specimen pages of an edition of 1623, here exhibited actually possess. The exact value as reproductions of some of the specimens, is here exhibited by the display, side by side, of the originals, of prints from collodion negatives, and prints by the zincographic process; and increased interest is given to the contributions by the exhibition of different stages of the process, such as the transfer, the completed zinc plate, &c. Here also are some specimens of the process which Col. James has named photopapyrography, by which copies of documents, of which not more than two or three are required, rendering the process of transferring to stone or zinc undesirable, can be produced in printing ink, thus securing the most indisputable permanency. The *modus operandi* of photopapyrography is not described, but any one familiar with photolithographic processes will readily understand how the image obtained on paper, in gelatine and bichromate, may be used to obtain copies in printers' ink.

* Very few pictures of this character are shown in the present Exhibition, though the process is that by which the cheap portraits, so common now-a-days, are taken. Some may be seen in frame No. 43.

Mr. Field exhibits some very excellent specimens of photolithography, but they are unfortunately hung so high as to render critical examination impossible. In this case the image, it is stated, is impressed on the stone by photography, and not by means of a transfer as in Col. James's process. From the preface we learn that Mr. Field's process is based on the special action of light on a surface of bitumen of Judea covering the stone, which was one of the first photographic processes which received attention from early investigators. Mr Contencin exhibits some photo-lithographs, regarding which we have no particulars, except that the image is impressed on the stone, and not transferred. Mr. Ramage also contributes some of his very fine copies of engraving by photolithography. His image is also, we understand, produced from the negative direct on the stone.

Mr. Pouncey exhibits some specimens of his carbon printing, which will not enhance its reputation. In fact we see nothing in carbon printing by means of light, in our own gallery, which will at all compare with the specimens in the French department.

Many of the specimens executed in printing ink by the aid of photography, leave, however, little to be desired. This, in an economic point, is one of the most important and interesting applications of the art. Here the images are depicted in carbon, one of the forms of matter least changeable under the influence of moisture, light, or atmosphere, in fine particles, which are enveloped in a resinous coating, manifestly one of the least alterable conditions of this permanent substance. If photography had done nothing more than produce and perfect such processes as the known processes of photolithography and protozincography, it would have been entitled to higher consideration from Her Majesty's Commissioners than it has received in this Exhibition.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

### Plate Holders, Developing Stands, &c.

Plateholders are required for holding the glasses while the collodion is being poured on to them, and during the process of development.

For the first-named use, or coating the plate, many photographers, especially professional men, prefer using the hand alone, the plate being held by a corner between the forefinger and the thumb of one hand, while the collodion is poured on with the other, the small portion which is in contact with the hand being left bare. Although it is desirable that the photographer should be familiar with, and practised in this way of coating a plate with collodion, so that he may not be awkwardly inconvenienced if the usual appliances be not at hand, still I do not think that, as a rule, the bare hand is the proper or best thing to use for this purpose. There are other reasons against it, besides the chance of absolutely dirty fingers. A very large proportion of photographs are taken in summer, during the hot months of the year, when the hands are liable to be moist; and, besides this, at all seasons, the fingers have a certain amount of natural greasiness, which, when they are laid on highly-polished surfaces, leaves a mark. I think these considerations are sufficient to advise the use of a plateholder when it is possible, in order to avoid the chance of soiling and staining the glass.

In the early days of collodion, a piece of heated gutta percha, or india rubber, was mostly used to hold the glasses while they were coated with collodion, and the plate stuck on, or fell off, as the case might be; the chances were about equal. For a long time past the pneumatic holder has been almost exclusively employed for this purpose, for which it is admirably adapted. There are several modifications of it in the market, all of which, as far as efficiency in principle is concerned, are equally good: though I must add, I think it to be regretted, that at least a portion of them are not made a little better than they are, as regards workmanship. Their solidity is sacrificed to cheapness, and most of them soon go to pieces if they are much used, while, if they were properly made, they would bear very rough handling for a long period without getting out of order. Many, I think most, photographers would prefer to spend an extra shilling or so for a more substantial article, if they had the option.

The special requirements for a holder to be used for developing the picture upon vary considerably from those for coating with collodion. The operator must be able to hold the plate firmly in any position, horizontal or vertical, and, at the same time, it is absolutely necessary that he should be able to look through the plate, and examine every part of the picture by transmitted light. The ordinary pneumatic holder evidently does not admit of this, as its bulk obstructs the view through the part to which it is made to adhere; which being, for the sake of safety, generally about the middle of the glass, contains frequently the most important points of the picture. This is of less consequence if the plates are stereoscopic, as a portion of each, or, by placing the holder a little out of the centre, one whole picture can be seen; also, if the plates are of considerable dimensions, the examination of one proportionately small part in the middle may be of diminished importance, but, unfortunately, as the size and weight of the plates increase the security of the pneumatic holder to sustain them during development is less to be depended on; and as nothing can be more annoying than to lose a picture by breakage at this late stage, it is well not to trust large plates too confidently on the pneumatic holders for so long a time, and to such active movement, as the proper development generally demands.

The prepared plate being wet during the process of development, and constantly covered with fluid, the *clean* hand will not have any deleterious effect upon it, and as it is found to be the most efficient holder without any additional apparatus, it is the most generally adopted, the plate being held, as for pouring on the collodion, by a corner between the fore finger and the thumb. It may safely be said, that of all the appliances suggested up to the present time, for the purpose of developing collodion plates the bare hand is the very best, and the "tripod developing stand" is the very worst.

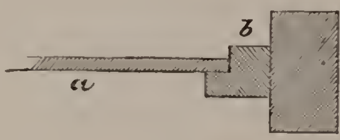
The tripod developing, or levelling stand, is a useful and serviceable apparatus for developing albumen or collodion plates with gallic acid, or for any operation which requires time for its fulfilment, and does not need constant attention or movement. But the case is very different with collodion plates developed with pyrogallic acid or iron solution, in which the changing effects must be noted from moment to moment, and the reaction stopped exactly when the best results are obtained, which requires to be kept in continual movement, and never to be left an instant alone. Here the developing stand is evidently unsuited to the work, and to supply its deficiencies the operator has constantly to lift up the plate in his fingers, both to keep the liquid in movement and to examine the progress of the development, and then to put it on the stand again, until he thinks he had better look again. It is needless to remark, that he would be able to observe much more minutely if he never laid the glass down at all on the stand, and the constant and repeated handling of the plate is more likely to injure it, and more *certain* to stain the fingers, than if it were grasped once for all in one place, and not set down till the operation was over.

Although clean fingers have no injurious effect upon a plate when it is being developed, the said plate, unfortunately, does not reciprocate the compliment, for it has a very marked and unpleasant effect upon clean fingers. This is doubly inconvenient, for it necessitates abundant use of cyanide of potassium to remove the stains, and this poisonous substance is never applied to the skin without some being absorbed, which has a deleterious effect on the

* Continued from page 257.

health; also, it is very unsightly to have the fingers in mourning while engaged in posing sitters, especially ladies, who are not always convinced by the assurance that "it will not come off." And yet developing is the very part of the process that a photographer who really cares to excel cannot trust to an assistant; in witness of which it may be remarked, that all those gentlemen who most illustrate their profession by their photographic gems are in the habit of developing every picture they take with their own hands. It is evident, therefore, that any apparatus that could efficiently replace the hand for sustaining the plate during development, would be a great boon to all grades of photographers, both professional and amateur. But, although several holders have been brought forward from time to time with this object, in the construction of which considerable ingenuity is evinced, they are not up to the mark sufficiently to induce their adoption in preference to the hand, for which not one of them is an effective substitute. One of the main objections to their use is, that—I think in all cases—the instrument is made to grasp the glass plate at several points by means of certain parts upon which it rests, and which are also kept pressed against its edges by means of springs or other appliances. These parts, which vary in form in different holders, may be generalized by fig. 27; the plass plate ($a$)

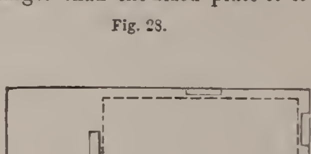
Fig. 27.




being held in pads of glass or gutta percha, or other neutral material ($b$). These pads being of a material not affecting silver solutions, are without any chemical influence during the process of development; but they act mischievously by serving as conductors to lead the liquid off the surface of the plate, which is soon left nearly dry, unless more than ordinary caution is used. This vice would be corrected if the shoulder of the pad pressing against the edge of the plate were made of less thickness than the thinnest plates used, but in such a case it would have only a very insecure hold upon the glass, and one evil would probably only be exchanged for another. Besides this common fault, most of the holders have other objectionable features peculiar to their several instances, which need not be noticed here.

I have used considerably a very simple holder for developing plates up to whole-plate size, withing soiling the fingers, which, although much inferior to the unassisted hand, has proved, in my experience, more practical than several others which I have bought and tried. It has the advantage of cheapness and simplicity; anyone can make one for himself. It has not, necessarily, the disadvantage named above, as common to nearly all holders, but it has others, from which some are free. It consists simply of a piece of glass larger than the sized plate it is intended to

Fig. 28.



hold, with one of the corners cut off. Upon this glass plate are fixed with cement four very thin slips of glass, as shown in fig. 28, to serve as pads for the plate to rest against, ample space being provided, so that the glass cannot touch both sides or ends at one time. In use, the plate to be developed is laid on the glass between the pads, the holder is held by the further end, and the developing liquid is poured off and on at the corner which projects over the cut off portion. It can be held safely at an angle of about 80° to examine the progress of development, which can be seen through the glass holder. It is needless to remark, that this holder, like every other, must be scrupulously washed after every plate that is developed upon it.

The principal disadvantages of this holder are, that each one is only suited to one sized plate, consequently several are necessary for those operators who work with different sizes. Also, sometimes a portion of the developing solution will get between the holder and the plate, and if it be discoloured, or if any deposit be formed betwixt the glasses, it hinders to some extent the examination of the progress of the development. A little care will generally prevent this from occurring.

(*To be continued.*)

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Potash salts* (continued).—Of all bases potash possesses the strongest affinity for the greatest number of acids, and neutralizes their effects in the most perfect manner. Its alkaline characters are so intense that when the acid is weak it is unable to mask the alkaline reaction of the base, unless several equivalents are taken. All potash salts are colourless, except when the acid is coloured. In the absence of soda they communicate a violet colour to the blow-pipe, or spirit flame, but this reaction cannot be observed, if the slightest trace of soda is present. All potash salts are soluble in water, except when they are united with a great excess of silicic, titanic, or other insoluble acid. Some of its salts are, however, sufficiently sparingly soluble to admit of their being employed as tests for the presence of this element, when it is not in too small proportions; thus perchloric acid, tartaric acid, carbazotic acid, sulphate of alumina, hydro-fluosilicic acid, and chloride of polatinum, form precipitates when a moderate quantity of potash is present, the precipitant being added in concentrated solution. Potash has a great tendency to form double salts, its combinations of this class, with many metallic oxides, forming crystals of extreme beauty and permanence. Potash is obtained commercially almost solely by means of the vegetable kingdom, it is present in small quantity, as far as percentages are concerned, but in enormous quantity, when the mass is considered, in felspar, granite, and many other rocks which, by the disintegrating action of the atmosphere and weather, constitute the great bulk of earthy soils. Plants and vegetables growing in this *débris* of the primitive rocks have the property of absorbing and concentrating the potash from it, and it is from the ashes of these that potash is almost universally extracted on the large scale. Another source of potash is from tartar, this is a deposit consisting of the alkali combined with tartaric acid, and is deposited in enormous quantities from grape juice during the manufacture of wine, the source of this being, of course, the same as in the preceding instance.

From the crude ashes of inland plants the potash is obtained by soaking in tubs of water; the alkaline solution thus obtained is boiled down in iron pans until it solidifies on cooling. It now forms a brown mass, which is placed in a reverberatory furnace, and the flame allowed to play over it with constant stirring with an iron rod, until the organic matter is entirely consumed; in this state, it forms what is called burnt or calcined potash. To purify it, it is dissolved in two parts of boiling water and the solution after being filtered through white blotting paper, or bleached linen, is evaporated in an iron pot to the proper degree of concentration: it is then allowed to stand for some days, when the sulphate of potash crystallizes out, and may be strained off.

Upon boiling the clear solution down to the density of about 1·43, most of the carbonate of potash will crystallize out on cooling and stirring. The crystals of carbonate are lastly washed with a small quantity of cold water, and then rendered anhydrous by ignition in a cast-iron, silver, or platinum vessel.

When prepared from crude tartar this is to be purified by one or two crystallizations, and then heated to low redness in a covered iron crucible, the mass is then extracted with hot water. After filtration the liquid must stand for some days in order to allow the carbonate of lime to settle, and the clear solution is then evaporated to dryness in a vessel of either cast-iron, silver, or platinum. (As a rule we may observe that whenever alkaline substances are to be evaporated down, or to be ignited, the operation should always be performed in vessels made of one of these three metals, silver being the best.) The dry residue is covered with three times its weight of cold water, and allowed to stand for three days, and the solution is then filtered or decanted from the insoluble matter and evaporated to dryness. It is necessary to purify the crude tartar before employing it for this operation, as otherwise the carbonate of potash would be contaminated with cyanide of potassium formed from the nitrogenous matter which it always contains.

What is known as *black flux*, a substance of considerable use in reducing photographic residues to the metallic state, is a very impure mixture of carbonate of potash and charcoal; it may be readily prepared by mixing together two parts of crude tartar and one part of nitre. The mixture is then to be thrown into a red-hot iron crucible. Upon cooling it will form a black mass which may be powdered and kept for subsequent use. It thus forms a mixture which, from the presence of carbon (from the decomposition of the acid of the tartar) and cyanide of potassium, has eminent reducing properties. The *white flux*, which is a constant accompaniment of the former mixture in chemical laboratories is formed in a similar way, but with an increase in the quantity of nitre, equal weights being taken. In this way all the carbon is burnt. It is used as a flux when no reducing action is desired.

The impurities found in commercial carbonate of potash are very numerous, and as a knowledge of the means of detecting them is of some consequence, we will proceed to notice them in detail.

*Sulphate of potash* is detected by adding an excess of hydrochloric acid, and then chloride of barium; the formation of a white insoluble precipitate is a conclusive proof of the presence of this substance. For many purposes it is important that it be got rid of; this is effected without much difficulty by dissolving in water and evaporating once or twice to a syrupy consistency. The sulphate of potash, being much less soluble than the carbonate, crystallizes out and may be strained off.

*Chloride of potassium.*—This impurity is detected by adding an excess of nitric acid, and then a drop of nitrate of silver; it may be removed in a similar way to the sulphate of potash.

*Phosphate of potash* may be detected by adding an excess of hydrochloric acid, and boiling for some time until all the carbonic acid is expelled, and then adding an excess of ammonia and a little solution of chloride of calcium. A flocculent precipitate indicates the presence of phosphoric acid.

*Nitrate of potash* is detected by dissolving the salt in excess of sulphuric acid, and then adding a crystal of sulphate of iron; the well-known reddish halo will be produced round the crystal if the slightest trace of nitric acid be present.

*Nitrite of potash* may be detected in the same way.

*Cyanide of potassium.*—To detect this add excess of hydrochloric acid, and then a little sulphate of iron which has become partially per-oxidized by exposure to the air. (Positive developing solution will answer the purpose very well.) If the smallest trace of cyanide of potassium be present, a precipitate of prussian blue will be formed.

*Soda.*—This is a very common, but not a very important impurity; it may be detected by heating a little of the dry salt on platinum wire in the flame of a spirit-lamp; if soda be present the colour of the flame will be a pure yellow: the separation of soda from potash would be attended with too many difficulties for an amateur to attempt to perform.

*Carbonate of lime* is also sometimes present. The solution in this case deposits crystals of carbonate of lime when allowed to stand for some time; if it be neutralized with acetic acid, and then a drop of oxalic acid added, a white precipitate of oxalate of lime will be produced. Silica is a very common impurity in commercial carbonate of potash. When it is present in large quantities the solution yields a gelatinous precipitate of silica when an excess of hydrochloric acid is added, especially on boiling. Smaller quantities may be detected by evaporating the acid solution to dryness and gently heating, the silica will be left behind upon redissolving in water.

*Oxide of copper*, which is sometimes present, is detected by adding an excess of hydrochloric acid and then an excess of ammonia. A blue colour will show the presence of copper, which may be verified by adding to the solution a drop of ferro-cyanide of potassium, a brown precipitate will in that case be produced.

Pure carbonate of potash forms a white solid mass, fusible at a bright red heat. Being only united to one equivalent of carbonic acid, it has a strong alkaline reaction both to the taste and litmus paper. It rapidly deliquesces in the air, forming an oily liquid. If this liquid is allowed to stand in a dry atmosphere for some time, it forms crystals. Carbonate of potash is capable of absorbing another atom of carbonic acid, forming a bicarbonate. This salt is much less soluble in water than the mono-carbonate, and therefore may be precipitated from a strong solution of the latter by passing carbonic acid through it, or better still by only conducting it to the surface of this solution. The absorption takes place completely, although slowly, sometimes not being finished by the end of a week. The crystals are washed in a little cold water, and then drained on blotting paper. They form large oblique prisms, transparent, of a saline and slightly alkaline taste, but no longer caustic. Its reaction is still slightly alkaline to test paper. When dry, the crystals remain unaltered in the air; but when heated strongly, they lose half the carbonic acid, and then return to the condition of mono-carbonate.

## ON THE PRACTICAL WORKING OF THE PANORAMIC LENS.

BY GEORGE DAWSON,*

*Lecturer on Photography at King's College, London.*

This paper is meant to be thoroughly practical. I do not, therefore, intend to discuss the scientific principles on which the panoramic lens has been constructed; nor, indeed, is this course necessary, inasmuch as Mr. Sutton, the inventor (to whose papers I refer you), has on several occasions fully entered into that portion of the subject, and explained the circumstances which compel the use of a curved glass for the reception of the negative. For my own part, I confess that the extraordinary appearance of the whole apparatus, so different to the traditions and ordinary requirements for the practice of photography, prejudiced me strongly against the estimation of it for practical utility. The difficulties attending the coating with collodion and evenly developing curved surfaces seemed to me almost insurmountable, and it was with strong misgivings as to the result that I determined to spend a few days of my holiday in trying the capabilities of the lens, and how far the difficulties above indicated could be overcome. I have succeeded beyond my expectations, and can now truly say that there is no pleasure greater than that of agreeable disappointment. The specimens before you, good, bad, and indifferent, are my first attempts. Some of them, the architectural for instance—in

* Read on the evening of Wednesday, May 21, at the North London Photographic Association.

subject and treatment are far from artistic, and evidently unfitted for the panoramic lens; others again, such as the general landscapes (deducting for faults of inexperience), have a breadth of effect and completeness totally unobtainable by aid of any other form of lens. I was well aware before commencing operations of its unfitness for rendering pure architecture; but I wished to satisfy myself, by experiment, of the extent of error and distortion arising from the necessary curvation of the glass. On examining the specimens you will observe that, except in cases were a straight row of houses runs across the plate, the horizontal curvature is quite inappreciable by the eye, and I can vouch for it that for ordinary landscapes the effect is apparently perfectly natural.

I now proceed to the principal object of this paper, viz., the practical details. My short experience of a few days will not warrant me in saying that my mode of procedure may not be considerably modified by future practice and improvement in the apparatus. On the latter point I have some suggestions to make, which will fall in their proper place at the close of this paper. It would have been more satisfactory to myself, and probably to you, could I have been able to lay before you a larger number of specimens; but it was impossible for me to get together more than eleven plates, on all of which I took pictures once, and some twice. Failures are awkward things to deal with in any way. I shall not detail mine; but if the instructions and precautions about to be given seem in some respects too minute, you may be assured they are for the purpose of avoiding failures experienced by myself.

*The Camera and Lens.*—The camera having two spirit levels fixed at right angles on its upper surface—a plan, by-the-bye, I should like to see introduced into all cameras—is readily adjusted to the level. The lens when unscrewed in the middle should be filled with distilled or boiled spring water. If ordinary water be used the consequence will be that, in the course of an hour or so, the air contained in the water agglomerating into a multitude of little bubbles will adhere most obstinately to the inside surface of the lens, and cause irregular refraction and confusion in the image. Care also should be taken that the stop inside the lens—an ingenious contrivance called, I think, the "*butterfly stop*," from its not bearing the most distant resemblance to that insect—be adjusted with its longer axis quite horizontal: this is in the direction of the greater length of the plate.

*Cleaning the Plates.*—The plates should be ground or roughed on the surface all round, to the distance of about $\frac{1}{10}$ inch from the edge. This may readily and quickly be done by tiling a rectangular notch in a piece of copper—an old penny piece will do very well—and rubbing along the edge with some rather coarse emery powder and water. The collodion will hold on to this rough part with great tenacity, and prevent, what is otherwise most inevitable, the total destruction of the film during some part of the after process. The thorough cleaning of the surface, is a much more difficult operation than with plate-glass, arising probably from it being originally unpolished. Nevertheless, the fact is certain, and recourse must often be had to strong solution of soda, and afterwards nitric or sulphuric acid, to remove the last traces of dirt. In all cases, when the plate has once been varnished, strong acid will be required to remove impurities from the rough edge of the glass. A padded cushion for the purpose of polishing is sold along with the apparatus; but I have found it more convenient to dispense with this, and in one hand, covered with chamois skin, to hold the plate and polish with the other.

*Coating the Plate.*—The collodion should possess no glutinous or contractile properties, and still contain a large proportion of alcohol to allow the film to set slowly, and thus give more time for coveringly the plate evenly. The operation will scarcely be intelligible from a mere description. I hold the plate in the left hand balanced on the tips of the fingers and steadied by the thumb of the same hand resting with gentle pressure against the corner. Pour on that end a body of collodion sufficient (but not in great excess) to cover the whole: then with a tremulous motion of the hand, which prevents streaks, and by gradually tilting the held end, direct the wave of collodion evenly and slowly till it reaches the other end. At the moment of its arrival there, pour off the excess from the corner into the bottle; but this must be done very quickly, and the plate turned back into its original vertical position, otherwise ridges will be formed diagonally across, and will be very conspicuous in the finished negative. Excite in the usual way.

The time of exposure seems to me to be rather less than that required for Ross's 4½-inch single lens. The longest exposure, under a rather dull leaden sky, was 20″, and the shortest, under more favourable circumstances, 2″ or less—in fact, as fast as I could open and close the shutter. Still you will observe in the latter cases very considerable detail in the dark green foreground, and the driving clouds in the distance show their outline and shading very distinctly.

*The Development.*—First, with pyrogallic acid.—Dilute a one-grain-to-the-ounce-of-water solution of pyrogallic acid with four or five times its bulk of water, which pour over the plate in the same manner as the collodion was applied. Tilt it backwards and forwards till the picture has begun to develop evenly all over. A stronger solution, with a few drops of nitrate of silver solution added, may then be applied without danger of streaks and uneven development, until the requisite intensity has been obtained.

Second development, with iron.—In some of my preliminary experiments I developed with pyrogallic acid, and would have continued to do so from choice had not my collodion contained a pretty strong proportion of bromide, which I find contributes much to slowness and thinness of negative with that developer. I had no alternative, then, but to use an iron salt; and as, under any circumstances, it is rather difficult to cover even a flat plate always evenly with that solution, the difficulty is much increased in the case of a curved surface. I have, therefore, devised and constructed, very roughly as you see, a kind of rocking dish of gutta percha, the bottom having the same curve as the plates. Two ounces of about a fifteen-grain iron solution poured into this was amply sufficient for one negative. The plate, gently dropped in and quickly rolled about, will develop very evenly. The iron solution thus used need not be thrown away, but with the addition of another ounce or so will serve over and over again without any seeming bad effects. The negative may now be washed gently; intensified to the proper degree with pyrogallic acid and silver; fixed in the usual way, by pouring on and off a saturated solution of hypo; and, finally, well washed.

It was occasionally inconvenient for me to intensify immediately after the iron development, on account of scarcity of water, and for other reasons. Under such circumstances I fixed with hypo, after the application of the iron developer, partly washed, and then stowed the plates away in the box for future treatment at home when more at leisure. I am not sure but this mode of re-development gives a more vigorous picture than the other, provided the iron developer has acted long enough to bring out all the details; it is, at all events, more convenient for field-work. It requires great care and some precautions, but may be safely done in the following manner:—

After drying and slightly warming the plate by the fire, apply with a camel's-hair brush Sœhnée or other varnish all round the edge to the depth of one-eighth inch or thereabout, taking care to fasten in the same way the edges of all incipient cracks or rents in the film. This prevents water, &c., from finding its way underneath the collodion, and renders it so strong and adhesive that the plate may now be washed without danger and intensified to any extent with pyrogallic acid and silver.

Having thus detailed, I hope clearly enough to be understood, the manipulations I have found to be the best for insuring good negatives, I would now suggest some improvements in the apparatus which will make this object more easily attainable.

With respect to the lens and camera nothing better fitted for their purpose could possibly be devised. They are perfect. The former, being only rather over five inches focus, gives exquisite definition to the very edge of a rectangular field 9¼+4¼ inches, comprehending an angle of about 105 degrees; and the camera is in every way well fitted for giving effect to this enormous angle. In one of the specimens on the table—"Pulteney Bridge"—I had the curiosity to measure the angle included after trimming the print for mounting. It was rather over 97° and is of course pretty nearly the same in all other cases.

On the other hand the material of the bath—gutta-percha—is apt to contaminate the nitrate of silver (especially in warm weather) with organic matter. I do not see any formidable difficulty in constructing receptacles of glass covered only externally with gutta-percha; or, indeed, what prevents them from being cast in sold glass? I object also to its shape. The sides, as you may observe, are arcs of two concentric circles of nearly the same radius as the curve of the glass. The practical effect of such an arrangement is, that during the act of immersion or removal of the plate, unless extraordinary caution be used, the film is liable to come in contact with the inner surface, and suffer injury. I propose that the side against which the plate leans should be of the same curve as, or rather larger, than the glass, and the opposite side an arc of a much larger circle, or indeed quite straight. We can thereby prevent the least chance of any part of sensitized surface from becoming injured by coming in contact with the sides. A larger quantity of silver solution will necessarily be required; but that I consider not only no disadvantage, but an actual gain, inasmuch as the bath will keep in good working condition for comparatively a much longer period.

*Plates, Defects in.*—If I call your attention now more closely to the specimens on the table, you will see that some of them are sharp and well defined up to the very edge of one side of the plate, but less so towards the other end. This arises from no defect in the lens—which, as I have said before, seems perfect—but from some slight variation in the curve of the plates. A variation of less than $\frac{1}{12}$ inch in the curvature will throw the image considerably out of focus, when working with a lens of which the range of focus from near to distant objects is very limited. I feel certain our glass manufacturers can easily get over this difficulty, so I need say no more about it. In all other respects a limited range of focus is advantageous, for, the point of best definition having been once ascertained and marked, no more focussing is required.

Allied to the previous defect, and partly dependent on it, is the difficulty of obtaining an even pressure on the printing-frame. No matter how many folds of flannel or felt may be interposed between the prepared paper and the pressure-board, there will still be some part of the proof not so well defined as the sharpness of the negative would lead us to expect. An air-cushion of Macintosh cloth, or other air-tight material, and covered on one side with thin felt or fine flannel, seems to me a simple and certain remedy.

In conclusion, I trust Messrs. Sutton and Ross will receive these suggestions of mine in the same spirit in which they are offered, viz., a desire to improve and extend the use of a lens and camera which have proved highly satisfactory in my short practice, and which in subjects of a particular class will, I believe, exercise no small influence on the future of photography.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 4th June*, 1862.

"Blessed among modern inventions be photography. It has no rival on earth except the printing-press, but it works a thousand times quicker; it sheds a light upon all mysteries; it rules over darkness as a sovereign power, and brings to light, by light, an inexhaustible quantity of hidden treasures which mankind would, without its aid, have remained ignorant of for ever."

Such is the eloquent apostrophe to photography written by the eminent publisher, L. Curmer, in his prospectus of a magnificent edition of *Les Evangiles*, he is now publishing. Remarkable as are all the productions of this enthusiast, especially his *Imitation de Jesus Christ*, his *Heures de la reine Anne de Bretagne*, this new edition of the Evangelists surpasses them all, and this excellence is due entirely to photography. A short description of this bibliographical curiosity may be not without interest. The work consists of 400 pages of text, each surrounded with the richest ornamental borders, beside 100 miniatures from coloured photographs, copies of rare manuscripts executed by Jean Fouquet, Hans Memling, Albert Durer, Julio Clovis, Angelico da Fiesole, Atavante, Lorenzo Monaco, and others, and preserved in the libraries of Paris, London, Oxford, Brussels, Munich, Turin, Milan, Venice, Bologna, Florence, Rome, Naples, St. Gall, Rouen, Lyons, Grenoble, &c.

M. Curmer speaks with gratitude of the readiness with which the precious manuscripts contained in the hidden recesses of various libraries were placed at his disposal. He has good reason to be grateful to photography. In the library of Brera he copied forty magnificent pages of the rare *Antiphonaries* preserved there. At Venice he found himself in the presence of that miracle of art, the *Breviary* of Cardinal Grimani, with its eight hundred leaves of vellum radiant with the genius of Memling, Gerard d'Anvers, and Lieven of Ghent. At Florence he copied the six-and-twenty precious *Antiphonaries* of the Duomo, representing the miracles and sufferings of Christ. At Rome he obtained an audience with Cardinal Antonelli, in order to procure admission to the manuscripts of the Vatican. Permission to *view* these treasures was readily accorded, but, in obedience to inviolable rules, photography was strictly prohibited. The Cardinal himself could not exceed his powers. What was to be done? An audience with His Holiness the Pope was sought and obtained. An offering of the publisher's previous publications so won upon his Holinesses admiration and sympathy, that he wished a gold medal bearing his effigy to be presented to the favoured publisher, as a mark of his esteem. Now was the critical moment! Could his Holiness permit any obstruction to impede the publisher's project of an unique edition of the Evangelists? Certainly not. The necessary permission to photograph the MS. of the Vatican was graciously accorded, and the *Bible* of Matthias Corvin, *The Bible and History* of the Dukes of Urbino, and the *Dante* of Julio Clovis contribute some of the most beautiful pages to the Evangelists.

Should any of your rising young artists ever find themselves at a loss for a subject for a cartoon I think this little episode, suggestive of a scene representing *the Pope interceding for Photography*, well worthy their attention.

In Italy M. Curmer was fortunate in meeting with artists who could colour his photographic copies in a style equal to that of the originals. These, again, are reproduced in facsimile by chromolithography, and the result is truly wonderful. The cost of such a work must necessarily be high; this, when completed, will amount to twenty-five pounds sterling; but its publication in parts renders it accessible to persons of very modest income.

You may expect to see shortly some truly mammoth specimens of photography, being copies of some of Kaulbach's cartoons, the figures as large as the original drawings. The specimens measure some six feet by three feet. Your Great Exhibition contains photographs of Kaulbach's drawings to illustrate Göethe's Heroines, and it is not unlikely that these colossal specimens will soon form an addition.

### CARBONATE OF SILVER IN THE NITRATE BATH, &c.

Sir,—You were good enough some few weeks ago to insert a short communication of mine on some "Experiments with a Nitrate Bath." I find in the last number of the *Photographic Notes*, Mr. Sutton has done me the honour to reprint it; but, as in doing so, he has introduced some additional comments which, I think, not altogether warrantable, I shall be glad if you will give me a corner in your journal for some remarks thereon.

Mr. Sutton thus comments upon my communication:—

"Mr. Blanchard says, 'before adding acid to neutralize the alkalinity,' &c. This is an error. A nitrate bath, to which carbonate of soda has been added, may be rendered neutral, but never alkaline. The carbonate of soda continues to throw down carbonate of silver, as long as any silver remains in the solution, and this does not render the bath alkaline," &c.

Now, the Editor of the *Notes*, in his comments, has overlooked the important fact of the case, viz., that carbonate of silver *is* soluble to a very considerable extent in the bath, under certain conditions.

When salts of ammonia are employed in the collodion, nitrate of ammonia is formed in the bath. Now, it will be found, that carbonate of silver is soluble in a solution of nitrate of ammonia.

You will possibly remember that my experiments were performed upon an old bath that had been some time in use, which will account for the peculiar condition brought about.

Mr. Sutton goes on to say : "The iron developed negatives to which Mr. Blanchard alludes, and which appear to be a novelty to him, are no novelty to us. We have frequently told our readers in this journal of negatives developed with iron, which required no after-intensifying, and came out very quickly in the development. We strongly advise Mr. Blanchard to use purer chemicals than he has evidently been in the habit of using, and he will find quite a new field open to him in photographic chemistry. In particular, we recommend him to try the use of pure iodized collodion, containing no bromide—a pure nitrate bath, without any doctoring—and the common proto-sulphite of iron developer, strength from only 5 to 10 grains to the ounce, and no after intensifying. He will find that process twice as sensitive as that by which he usually works, and more suitable for taking instantaneous views in diffused light. In a strong glare bromide in the collodion is certainly an advantage."

Now, I consider these remarks entirely without warrant. I commenced to use iron for development at a time when *not* a single photographer of my acquaintance employed it, and have used it constantly ever since. It is now about six years since I took several portraits of you, which, as you may remember, yielded good prints, with no intensification whatever. I have a high regard for Mr. Sutton's attainments as a practical photographer and good optician, and think very highly of many of his ingenious inventions, but am sorry that there is not sufficient *lead* to counterpoise the *mercury* that enters so largely into his chemical composition, and causes him to jump so hastily to rash conclusions. The nine years I have spent in wading through the *slough of despond* in my desire to reach the portals of success in photography would have been sadly mis-spent if I had now to learn, for the first time, the importance of pure chemicals. I think the name of Hopkin and Williams sufficiently well known among photographers, and that I may therefore sleep contentedly, without any fear of the visitations of any impure *spirits*, methylated, ethereal, or otherwise.

I have now been engaged some years in the manufacture of collodion, and have had, consequently, to make at least some few experiments, but if Mr. Sutton will, some time, when in town, find leisure to produce an instantaneous negative of any crowded thoroughfare in London, with simply iodized collodion developed with iron, 5 to 10 grains to the ounce, and with no after intensifications, I shall then think that I have spent two years in working hard in the wrong direction, but not until then.

Valentine Blanchard.

## COLLODIO-ALBUMEN PROCESS: SHORT EXPOSURES.

Dear Sir,—Much has been said and written about the *long* exposures necessary to produce good negatives by the collodio-albumen process. Now I wish to prove that when *short* exposures are required, pictures of average merit may be obtained. The stereos enclosed are intended to illustrate what I wish to convey in this letter. No. 1 was taken on a dull day, and exposed half-a-minute. The plate was excited in the morning, and developed in the evening of the same day.

Knowing the conditions of my plate, I commenced the development by pouring over the film a few ounces of boiling water, then immediately applying a warm pyro solution, when the image began gradually to appear. I continued the plain pyro until the details were out, and then strengthened cautiously. The negative is very clean, and has no appearance of fog, or anything to indicate the harsh treatment employed to produce a picture. If the light had been good, and the subject a more *open* one, I should have given a only a few seconds.

The other two stereos are to illustrate what may be done in the development of a plate. No. 2 was exposed one minute, and No. 3 three minutes, both in a moderate light. The first was treated with hot water, and the second developed in the usual way; yet, you see the resulting prints are very similar.

I *always* give long exposures when I can, but if I am compelled to shorten the time, I feel no anxiety about my negative; for if care and *thought* be employed in the various operations, a *fair* picture is sure to be the result.—I remain, yours truly, John H. Underwood.

*Beech Cottage, Sale Green, Cheshire, June 3rd, 1862.*

[Our correspondent's specimens are valuable illustrations of the latitude which an intelligent photographer may possess in the exposure of dry plates, if due care be taken to use the resources which heat and plain pyro give him in development. There is no trace of fog in these pictures, and, photographically speaking, the plate which received one minute's exposure, is better than that which received three; although, artistically, the latter is a charming bit. —Ed.]

## WHO SHOULD HAVE THE EXHIBITION MEDALS.

Sir,—As the time for awarding the medals to those photographers who have distingushed themselves is now drawing near, it is most desirable that no anomaly should be added to the already long catalogue of official blundering, or any opening made for such severe strictures as those elicited by the course pursued in Edinburgh. Perhaps a word of caution may not be out of place. I know not whether the medals will be few or numerous, but it has been observed that many of the photographs, &c., are exhibited by publishers and others. In some cases, such as those of Heath, Mudd, and others, the photographer is also the publisher. Due care must be exercised in distinguishing the *picture* from the *picture-dealer*, or the jurors will fall into an error such as that—to take a parallel case—of bestowing the honours due to Frith's last celebrated painting upon M. Flatow.

Of course, in some of the best known cases there can be little fear of error; such as those of G. W. Wilson—Marion and Co., Regent Street; W. England—London Stereoscopic Company; Blanchard—Elliott and Co., Aldermanbury; W. Russell Sedgfield—A. W. Bennett, 5, Bishopsgate.—I am, Sir, your obedient servant, X.

# Proceedings of Societies.

### London Photographic Society.

The usual monthly meeting, being the last of the summer recess, was held in King's College on the evening of Tuesday, June 3, C. B. Vignoles, Esq., F.R.S. in the chair.

The minutes of a former meeting having been read and confirmed, the following gentlemen were elected members of the Society: Messrs. Lenthall, Roberts, Fenn, and McLean.

The Secretary said he had received a letter from Mr. Foster, who presided at the last meeting, saying that he on that occasion had remarked that certain pictures sent to the International Exhibition by Mr. Warner were not from enlarged negatives. From the pressure on his attention at the time, and the excellence of the pictures, he had overlooked the intimation attached to the pictures, which explained that they were from enlarged negatives, and he now wished to correct his former mistake.

Mr. Dallmeyer exhibited a new form of Instantaneous Shutter. He said the shutter was not his own invention, but that of Mr. Mann, of Bruce Castle, Tottenham. Its claim to attention was that it would give the maximum of exposure in a minimum of time. It opened from the centre on pulling a string, on releasing which it closed at once. There was another modification of it with a trigger movement. He believed it one of the best shutters for the purpose which had yet been produced; and as instantaneous photography seemed to be receiving increased attention, such a shutter was a decided advantage to photography.

The Chairman called attention to some fine reproductions from Turner's paintings, by Mr. Thurston Thompson; to a large view of St. Paul's, by Mr. Sand, exhibited by Horne and Thornthwaite; to some views in Australia, by Mr. Haigh; to some portraits of the Japanese Ambassadors, by Caldesi, exhibited by Mr. Kater; to some views of Genoa, by Messrs. Fothergill and Branfill; to a photograph of the Cripple's Home, by Mr. Greenish; and to a large number of fine stereoscopic views of the International Exhibition and its contents by Mr. England.

M. Claudet then proceeded to read his communications on the subject of enlargement, which will appear in our next. The papers were illustrated by the production of the apparatus used. Various images were projected on to a screen by means of the solar camera, the light obtained from a gas jet and a bull's eye condenser, in addition to the solar camera condenser being used. The object of the various images was to show the effect produced by various degrees of enlargement, to illustrate the working of his system of ascertaining the respective distances at which the negative and the screen required to be placed, and finally to illustrate how a drawing in outline of an image thus thrown on the canvas might be traced by anyone without a knowledge of drawing, from which, by the aid of a photograph printed from the small negative, the painter might easily produce a large coloured portrait. M. Claudet pointed to a fine large portrait of Professor Faraday, and to some others which had been produced in this manner.

In the course of his experiments, M. Claudet explained and illustrated a very simple process, which he stated he had found very efficient as a remedy in cases where the film or varnish had cracked. Few photographers but were familiar with this evil, which rendered a negative quite worthless for printing. He had found a very simple remedy, which rendered the cracks invisible, and restored the printing powers of the negative. It consisted in taking a piece of cotton wool, and applying charcoal in a very fine powder to the face of the negative; this seemed to fill up the cracks, without showing or in any way affecting the perfect printing qualities of the negative. M. Claudet then took some negatives quite honey-combed with cracks, and after applying the charcoal, passed them round for examination; it was found that the cracks were in most cases rendered quite invisible. In answer to questions as to whether this improvement would not soon wear off in printing, M. Claudet said he had not observed it, but if it did it was easily renewed.

M. Claudet now referred to Mr. Heath's challenge at the last meeting, and called attention to the prints he had produced from Mr. Heath's negative, and also to those from his own negative, which had been handed to Mr. Heath to produce an enlargement from. He now asked if Mr. Heath had brought his specimens with him.

After a few words from the Chairman,

Mr. Heath produced his prints from his own and M. Claudet's negatives, enlarged four times. He said he could not help feeling that he could not possibly have found a better advocate for the method he had described than M. Claudet had proved during the evening. He had listened with great attention and interest, and he hoped with profit, to the able communication of M. Claudet; but he had been struck by the difficulties to which he had referred, as to the question of sun-light. If he remembered rightly he said he had despaired of getting the sun to help him. Now he (Mr. Heath) would undertake to produce results, by the process he had described, at any time, winter or summer, sun or no sun, at any time when ordinary photographic operations could be conducted. In regard to the results of the friendly rivalry which had resulted in a challenge at the last meeting, he would now submit them for examination, and he felt no hesitation, whatever in soliciting a comparison of the definition as compared with the results of the solar camera. He felt the less hesitation because, as he had before said, he claimed nothing for himself in the matter, beyond an attempt to improve the manipulation. All he had done was to take a well-known method of enlarging, and by some careful experiments endeavour to fix more definitely the conditions yielding the best results. As regarded the character of positive, he thought he had entirely succeeded, and he invited attention to those on the table. He now just wished to say one word on the question of focussing. He had described at the last meeting that having been supplied by Mr. Dallmeyer with the exact equivalent focus of his lens, he simply measured the distances required by means of the scale he had attached to his camera. The best proof of the correctness of the calculations upon which this operation was based, was the fact that by measurement merely, without focussing at all, he obtained definition such as might be seen in the transparent positives on the table, in which he would venture to say every hair was most perfectly defined. He would now leave the specimens in their hands.

Mr. Mayall, having been engaged and interested in enlarging for a number of years, wished to make one or two observations. He thought there could be no doubt about one thing, namely, that the solar camera properly constructed was the best enlarging instrument in existence, because it effected its work without distortion. He was aware that Mr. Shadbolt dissented from this view, but he thought it was because he had not seen the instrument in operation to any extent. He was not aware whether M. Claudet had mentioned the fact, but it was important to know that in the solar camera distortion was avoided by the rays being made cross on the front of the enlarging lens at a mere point; every other part of the lens might be cut off without affecting the result. There was, consequently, no distortion, even if they magnified an image to twenty-five feet high. He thought the method used by Mr. Heath was a round-about method of producing what might be obtained at one operation. As regarded the novelty of the solar camera, he had a word or two to say. Two years ago, when Mr. Woodward was in this country, he offended some people by saying that the solar camera was not a novelty. Fifteen years ago Mr. Willatt made such an instrument for Dr. Carpenter, the aim being to enlarge microscopic objects for illustrating his work on physiology.

M. Claudet enquired if it were arranged for focussing the image of the sun upon the front lens?

Mr. Mayall said it was. Mr. Willatt then came to consult him upon the subject, and he told him that it would be quite possible to produce a combination which would enlarge without distorting. He now held in his hand the identical instrument which was then made, and as its value, historically, was greater perhaps than intrinsically, he thought it should be in the possession of the society rather than of an individual. He begged, therefore, to present it to the society. Regarding the solar camera, has advice was to use albumenized paper, and print entirely without development, and he believed very fine results could be obtained. It was, he thought, going backwards to attempt to revive the old method of enlarging at two operations, as Mr. Heath did; and the results were certainly not to be compared with the images produced by the solar camera. He believed, with good light and sensitive paper, direct prints might be obtained in from an hour to an hour and a half. He would say, in conclusion, that great praise was due to Mr. Atkinson for the effort he had made in perfecting and adapting the solar camera to the requirements of the country.

Mr. Warner said as his name had been referred to at the last meeting he might be allowed to remark, that whilst M. Claudet had been waiting months for the sun, his own (Mr. Warner's) enlarged pictures in the Exhibition had been commenced in the month of February in the pouring rain. He found that nothing short of fog stopped his operations.

Mr. Heath wished distinctly to remind the meeting that he had not introduced the question of the solar camera at all. It was not a question of his method *versus* the solar camera method, but simply thus: he desired to enlarge small pictures up to 12 by 10, and he described a method by which he could effect it with better results than he had seen by other methods. He had said nothing whatever in depreciation of the solar camera except that it required the light of the sun, which in this country could not always be obtained.

The Chairman said it must not be forgotten that there were other countries besides England, where sunlight was plentiful and powerful. Referring to M. Claudet's method of focussing, he offered his opinion as a mathematician, that it was mathematically correct.

Mr. Dallmeyer referring to an expanding and collapsing diaphragm which M. Claudet had shown and described, said that

M. Dafft had some time ago invented a similar diaphragm for a similar purpose, which worked a little more perfectly he thought than that of M. Claudet.

Various specimens of enlarging were shown by Mr. Warner and Mr. Gilling.

After some further conversation, and votes of thanks to M. Claudet and others, the proceedings terminated.

## Talk in the Studio.

South London Photographic Society.—The South London Photographic Exhibition, at the Crystal Palace, was opened to the public on Monday last. The display, both as regards numbers, quality, and arrangement, is, as we anticipated, exceedingly good, the general effect far exceeding that at the International Exhibition. The number of frames contributed is between four and five hundred, which include excellent specimens of every process in use. We shall notice the pictures in detail in our next.

New Industries.—Mr. Hawes, in a recent lecture on the International Exhibition and the Society of Arts, makes the following remarks on photography as a "new industry" since 1851:—"Then, as regards new industries, or those which, from the change that has taken place in the mode of manufacture, have become almost new industries: first, we will call attention to photography, that now branch of fine art still in its infancy, but employing many thousand persons, and which is most admirably represented by English and foreign artists. It is not for me to say which country exhibits the finest specimens. French, Austrian, and English artists have all produced pictures showing great taste and most skilful manipulation. So great has been the progress in every branch of this art since 1851, that we may fairly expect, with the aid of chemical science, to see still greater advances in the next ten years. The apparatus and appliances exhibited for working in and out of doors are of much interest. One striking fact conveys a clearer view of the value of this art as an industry than any description. M. Voigtlander, a manufacturer of the most expensive lenses only, has just celebrated with his workmen the completion of his 10,000th lens; this gives some idea of the immense demand for apparatus of this character that has been created in the last few years."

The Copyright (Works of Art) Bill.—This Bill has been submitted to a select committee of the House of Lords for revision. The *Athenæum*, whilst recognizing the importance of such an Act, objects entirely to the framing of the present Bill. It says:—"This great principle, of the right of property of an artist in his works, being admitted, it only remains to carry it out by such an equitable measure as will equally protect *all* parties interested under it. These parties are the artists, the purchasers of their works, either when commissioned or otherwise, and the public. Does the Bill, as it is now framed, accomplish all these objects? We submit that it entirely fails to do so, and that Lord Overstone is perfectly accurate in denouncing the measure as being inequitable; as being simply an artists' Bill for protecting their interests, and without any reference to the interests of the general purchasers of pictures, or of the public. The Lord Chancellor advocated the general principle of the measure, and carefully avoided committing himself to its details. Indeed, both he and Lord Granville, as we have shown, invited suggestions for its amendment. Now, Lord Overstone had pointed out three vital defects in the Bill. For the first time in the history of our legislation upon copyright, it proposes to give that right without limiting it to new works: secondly, it ignores the principle established by all the statutes upon copyright, that when the author of a work is employed to execute it, the copyright shall vest in the employer, and not in the author; and, thirdly, that the registration proposed by the Bill is useless for protecting the public. It is contrary to common sense that it should do so when the contract for the preservation of the copyright may be registered at any time within twelve months after its date, and then only a short written description of the nature and subject of the work is to be registered. How is it possible to identify any work of art by a written description?"

## To Correspondents.

V. B.—The addition of water to collodion has a tendency to make the film more porous, but it requires adding with care and judgment, as too much will cause reticulation in the film. The best method of making horny collodion powdery for use in dry processes is to add a little bicarbonate of soda, and shake it well up with the collodion. This will entirely remove the horny texture of the film.

J. H. Meays.—The mottled appearance of your mounted prints is caused by the material with which you state they are mounted. Gum, when thin, is very apt to sink in through the paper, giving the dirty mottled effect of which you complain. In some of them it seems to have caused fading or discolouration as well, which if it were acid, and the prints not well washed, it would be very apt to do. Starch paste newly made, or good glue or gelatine, are best for mounting.

Amateur.—Crapy diagonal lines occurring at the corner of the plate where the collodion is poured off, arise from the plate being immersed in the silver bath before the film is well set. The corner where the collodion is poured off is, of course, least set of any part, and there the lines and reticulation occur.

A New Subscriber.—The Latimer Clark stereoscopic camera and lens which you describe will be well fitted for all the purposes you mention. For copying engravings, &c., you will probably require some means of lengthening the body of the camera; that is, if you wish to copy objects of the same or nearly the same size as the originals. We should scarcely recommend you to use the calotype process for anything so small as stereoscopic pictures.

M. J., Berlin.—The letter has been forwarded.

A. B. C.—The print appears imperfectly fixed. Probably your hypo has been too weak, or too much used. 2. The time required for toning will depend on the temperature and on the quality of the paper. The appearance of the prints is the proper guide; they should be a little blacker than they are required to be in the finished print. A grain of gold is generally calculated to tone a whole sheet of paper, but with care, and a good sample of paper, it will tone considerably more.

Lens.—Entirely a fallacy to believe that in such a case "Jack is as good as his master." It is not the merely mechanical process of grinding which affects the question. Do not rely upon such a fallacy at all. We will answer you more fully in our next than we have time to do just now. 2. It is very difficult to eliminate acetic acid from a silver bath. On adding carbonate of soda to neutralize it, acetate of silver is formed. To get rid of this when the bath is supersaturated place the bath in a cool place, when needle-like crystals will form, which may be filtered out. Acetate of silver is stated to be less soluble in a strong solution than a weak one; therefore by strengthening the solution you will more easily get rid of it.

James Dale.—The sole cause of the poor brown tone of your pictures is the thinness of the negative, which manifestly does not possess anything like sufficient vigour. In order to get a rich, deep tone, no matter of what tint, you must have a sufficient depth of reduced silver. If your negatives have not enough vigour you are obliged to stop the printing before this depth of reduced silver is obtained, and thus you fail to get good tones. If you tone lightly you get poor browns, if deeply you get weak, slaty, greys. The appearance of a print from a weak negative before toning, is often very deceiving, as its want of depth is not then very apparent.

Oxygen.—The method referred to is that used by the Lime Light Company. It is not adapted to operations on a small scale.

W. Matthews.—We had replied to your first letter privately before receiving your second, and answered your present queries.

Ancient Photo.—The new work of M. Disderi on Photography can doubtless be obtained through any foreign bookseller in London, such as Dulau, Trubner, and others. The price, if we remember rightly, in Paris, is ten francs.

J. A.—Your negatives appear to be too weak, and you do not print nearly deep enough. See answer to James Dale.

C. Smartt.—A notice in our next. 2. The advantages claimed for formic acid in the developer, are great detail, delicacy, and gradation of tone. The formula given by Lieut.-Col. Stuart Wortley, who has produced some of the finest pictures we have seen, and attributes great virtue to formic acid, stands thus:

| | |
|---|---|
| Water ... ... ... | ... 18 ounces |
| Sulphate of iron ... ... | ... 200 grains |
| Formic acid ... ... ... | ... 3 drachms |
| Acetic acid ... ... ... | ... 4 ,, |

Negatives developed with solutions containing formic acid are said by some to continue blackening under the influence of light.

Photos.—A piece of glass half an inch or an inch square is sufficiently large for a spectroscopic examination. 2. The cotton wool seems in every way well suited for the manufacture of pyroxyline. If your acids are somewhat weaker than the formula, you may, as you mention, increase the quantity of sulphuric acid; but the difference between yours and those of the proper strength appears so little that you may with propriety try them as they are in equal quantities first. If the cotton dissolve in the acids, or when made give a collodion too powdery, then add more sulphuric acid next time. Please notice in your copy of the Almanac whether the quantities of acids are stated in drachms or ounces. Some copies went out with drachms of acids, which for the cotton stated should have been ounces. 3. In our practice, we have rarely used more than a grain of bromide to an ounce of collodion, and we have generally found that proportion work well. Much depends upon the character of the pyroxyline and other circumstances, which can be best ascertained by experiment. Bromides generally serve a treble purpose: they increase the sensibility, they reduce over intensity, and go far to ensure clean pictures. The proportion in which they are required depends much upon the tendency to the opposite evils present. It is probable that you will find from a grain to a grain and a half sufficient for your purpose. We prefer the collodion a few weeks iodized, and we have some equally good at the end of two years, iodized by the formula we give in the Almanac.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to 32, Paternoster-Row.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 197.—*June* 13, 1862.

## THE SOUTH LONDON PHOTOGRAPHIC EXHIBITION.

We cannot help coming to the conclusion that the Crystal Palace at Sydenham possesses, for a Photographic Exhibition, many advantages over the building, which is no palace, at South Kensington; and we fancy that those least disposed to admit this some months ago, will now, in view of the absolute fact, be quite prepared to agree with us. We admit the occasional distraction of music and "frivolous amusements;" but the music is not perpetual; and even the agile Blondin cannot risk his neck for more than an hour a day; whilst the minor claims on attention, such as distant music of the organ or pianos, the plashing of water from fountains, the murmur of a happy multitude in the magnificent grounds, &c., add, we think, to the pleasure—rather than cause any distraction—of examining the photographs. These, and the ready access to the department, the ample space afforded, the good array of pictures, and the excellent arrangement, will all contribute, we think, to make the South London Society's first Exhibition a successful one.

The first feature which strikes us is a very fine display of reproductions exhibited by Mr. Hering. These consist chiefly of what, perhaps, present the fewest photographic difficulties—reproductions of engravings. It is somewhat singular, however, how very rarely this kind of work is well done; if the copies are soft, they are dingy; if brilliant, they are crude, hard masses of black and white, with the most delicate touches of the graver entirely omitted. The specimens here exhibited are admirable examples of good judgment and manipulative skill, combining to give the best results; the softness and delicacy, as well as the vigour of the originals, being well preserved. Another point appears to have received attention here, which is too often neglected: good copies of the engravings have been selected, as the basis of the reproduction; the difference between the photographic reproduction from a proof impression of an engraving, and one from a feeble, worn-out print or lithograph, is even more striking than in the originals, because, in the photograph of the latter, in the attempt to get vigour, it is almost impossible to avoid hardness. The majority of these reproductions are from the works of the best masters, and few things are more calculated to cultivate the art taste of the young photographer than a careful examination of such pictures. Here is Guido's "Cenci," for instance; it is but a bust, but look at the winning grace in the turn of the head; or, as an example of dignity, in a standing position, take the figure of Christ in Signol's "Qui sine peccata," &c., and mark, also, the value, in completing the composition, of the unobtrusive column in the background. We might multiply examples; but we counsel photographers, who have the opportunity, to make a collection of photographic reproductions from the best masters, and study them carefully as one of the best means of art culture which they can adopt.

There are some other interesting and valuable reproductions besides those of Mr. Hering, of which we have just been speaking. Here are copies of the grand etchings of Albert Durer, exhibited by Mr. Jeffrey, who also exhibits a reproduction from Turner's well-known "Windsor Castle, from Eton;" and a frame containing three views of the same head, right and left profile, and full face; the subject is a bust of William Fairbairn, by Woolner. Mr. Dodd also exhibits some copies from Durer's etchings.

The display of portraiture is very good. The most noticeable picture in this department is the colossal group by Mr. A. Brothers, of Manchester. The size of the picture is 48 inches by 21 inches: it consists of between forty and fifty figures, all, or nearly all, of which, if we remember rightly, were on separate negatives. The design and general arrangement of grouping must, of course, have been conceived beforehand. The grouping and composition are so skilfully managed that the art critic of the *Athenæum*, when noticing the picture, could not conceive that this was due to the photographer, but attributed it to a happy fortuitous arrangement, remarking that:—"with the felicity that sometimes attends chromatic combinations in the kaleidoscope, they are perfectly grouped in simple masses." As regards the photographic merits of the picture, the negatives have manifestly been for the most part excellent; there is perhaps a slight tint of yellow in the whites of the picture, but when it is remembered that it was produced by not less than forty-five different printings, and that the paper was fifteen days in hand before the printing was completed, the marvel will be that the colour of the whites is so good. It is, of course, touched, but with care and judgment.

Mr. C. T. Newcombe exhibits some very large portraits taken direct, which are very good; but we must confess that we think that for portraiture of this size, enlargements, from small negatives, permit scope for better results. Mr. Newcombe also exhibits a frame of card portraits, in which the feeling and manipulation are alike good.

Messrs. Maull and Polyblank exhibit some whole-plate pictures as well as card portraits, of which the former are much the best; of the latter we cannot say much. They also exhibit some whole-plate pictures with the general characteristics, as regards proportion and accessory, of card portraits: the result is decidedly successful, and we think worth the attention of photographers generally.

A frame of portraits is exhibited by M. J. de Mouxy. One of these is a photograph on ivory: it is very exquisitely coloured in water colours; from the purity of colour exhibited by the ivory, of which, as the portrait is vignetted, a good deal is seen, it may be fairly assumed that the printing—the chief difficulty on ivory—was successful. In the same frame is a vignetted print executed in a style which is worthy of attention: the general background, instead of being, as is customary in vignetted prints, white, is of a middle tint, into which the image is graduated. This, of course, gives greater force to the lights, and is pleasing in general effect. In this instance the result is, in our estimation, spoiled by very elaborate "touching."

A frame of portraits, exhibited by Francisco Sargent has very considerable merit; a vignetted group in the centre is exceedingly good.

Mr. Macandrew, of Regent Street, contributes a large number of portraits of public characters, chiefly large busts, the heads being from two to three inches long. Those who have seen the large heads of Pierre Petit, in Paris, will be familiar with the fine effect attainable in photographs in this style. The majority of Mr. Macandrew's are very excellent indeed, vigorous, delicate, round, and well modelled; No. 67, a portrait of a lady, is especially fine.

Mr. H. P. Robinson's "Lady of Shalott," "Holiday in the Woods," "Elaine," &c., our readers are already familiar with. Mr. Noel Fitch's portrait of a sleeping child is a decided gem. Mr. A. H. Wall exhibits a frame in which the central vignette, and some vignetted card pictures are very pleasing.

Passing from the portraiture, we come to a screen covered with the well-known pictures of Francis Bedford. Most of these are very familiar; but from their real excellence they always seem to possess the charm of freshness. The interiors have unquestionably never been surpassed. Mr. E. C. Buxton contributes a frame containing shipping, genre studies, &c. "The Pickle" yacht, on one of the Scottish lochs, is a very good picture. Messrs. Jackson, Brothers, of Jumbo, near Manchester, contribute a series of their charming studies of rustic grouping and scenery. We have more than once on former occasions referred to these pictures, which are, of their kind, amongst the very finest which have been produced by our art. The subjects are for the most part familiar and accessible to every one; but by careful and judicious selection of position and lighting, we have pictures such as would have delighted Gainsborough. We especially commend these pictures to the attention of those visiting the Exhibition.

Four fine instantaneous pictures, two of which are glass positives, are contributed by Mr. Kibble, of Glasgow. They are chiefly studies of clouds, with sufficient of foreground and water to give force and effect to the compositions. The bank of clouds in one of the glass positives is wonderfully beautiful, and will repay careful examination. Two frames of Mr. Blanchard's instantaneous stereographs, consisting of marine subjects and London street scenes, are contributed by Smyth and Blanchard; we have before noticed the beauties of many of these slides. Mr. Lennie, of Edinburgh, contributes a frame of similar pictures to those of Mr. Blanchard, some of which possess merit.

Mr. Lyndon Smith contributes some specimens, which are unworthy of his powers. Mr. S. Thompson contributes some of his series published as "Cabinet Photographs," which we have noticed before. His "Tomb of Edward the Black Prince" is, perhaps, the best exhibited, and is a really fine picture, free from the flatness and imperfect lighting which characterises some of his photographs. Mr. Morgan, of Bristol, exhibits some very fine landscapes, at once forcible and delicate. Mr. Ernest Edwards sends some exceedingly fine pictures, of which we may mention one of King's College Cambridge, and another of Netley Abbey, as especially fine and worthy of attention.

We shall resume our notice next week.

## HOT DEVELOPMENT FOR TANNIN PLATES.

We have recently received a letter from Lieut.-Col. Stuart Wortley, in which he details his experience as to the great advantage of heat in development. It will be seen from the extracts which follow that not only is the exposure less, but in some cases the negative is of a better character than could have been obtained even by a prolonged exposure. Colonel Wortley says :—

"I have found in one of the last numbers of the News that you have taken sufficient interest in the hot development of tannin plates to induce you to devote a leading article to the subject. As I have worked the process through the past winter on 12 by 10 plates, my experience may perhaps be of some use to yourself or your readers. I was first led to use warm water (80°) by finding that the use of cold water to wet the plates previous to development, unless continued for an inconvenient length of time, had a tendency to leave the tannin solution not evenly dissolved on the plate, producing marks on the sky during development. When Dr. Draper's process appeared I increased the heat of the water, with the decided advantage not only of shortening the exposure, but of obtaining a detail and intensity in the case of very dark shadows and insufficiently lighted objects, and which, working with lenses covering my plates properly, I had before found the tannin process inadequate to, even with a prolonged exposure.

"I have seen several letters and remarks in the different journals on hot water development, but with few exceptions no allusions to the temperature of the water. In my opinion the value of the process lies entirely in the adaptation of the heat of the water to the amount of exposure given to the plate. I find by repeated experiment that if I expose one plate six minutes and another twelve minutes, by heating the former with water at 180° and the latter with water at 100°, I obtain as nearly as possible the same negative, but I should be inclined to give a slight preference to the former. According to my subject, and to the exposure that I have given, I vary the temperature of the water from 80° up to 200°, beyond which heat I have never yet gone.

"I use no preliminary coating under the collodion, yet out of sixteen plates, 12 by 10, brought home and developed after an excursion some short time since, not one of the films showed any tendency to leave the plate under the influence of the hot water, and I only lost one of the number, which, being an interior, and requiring a very long development, cracked across the plate during the final application of pyrogallic and silver; and, as I have frequently noticed this effect on films during a prolonged pyro development, this loss cannot be laid to the charge of the hot water.

"The one thing to be avoided in working this process is over exposure and too hot water together. In a case of this kind the picture appears rapidly, very red and weak, all detail coming out at once, and the silver added deposits itself at once on the shadows as much as on the lights, and the result is a negative deficient in contrast, though full of detail in even the darkest shadows. I have seen complaints of fog and stains on negatives developed by this process, the first I believe to arise solely from the want of sufficient acid in the bath or developer, and the second from insufficient washing after removal from the nitrate bath.

"In my own practice, I have found that with a bath made of pure neutral (or, indeed, slightly alkaline) nitrate of silver, $1\frac{1}{2}$ minim of pure nitric acid to the ounce of solution has not been too much to secure clear plates. And in my developer, I use citric acid in the proportion of from 4 to 6 parts to 1 part of silver.

"With regard to the washing of the plate after removal from the nitrate bath, I can only say that it must be *thoroughly* done, and it is impossible to do it too much. In my own practice I have six horizontal baths full of water, and as the plates leave the nitrate bath, they go from one to the other, and then when the six are out of the bath they go one by one under the tap, and then are covered with tannin. The three first baths contain distilled water, and I invariably find, that after preparing 15 or 20 plates, there is no appreciable amount of silver in the fourth bath, and I feel sure that the soaking of the film (face downwards) in the six baths is a far more certain mode of removing the free nitrate than mere washing under a tap, which might, I should be inclined to think, leave sufficient nitrate of silver entangled in the pores of the film to produce stains in the development; and in the case of careless washing, the silver might accumulate in one of the corners, and the stain would commence from there.

"I do not use alcohol in the tannin solution, as I have found it apt to cause marks to appear in the film, as if the resinous substance in tannin did not dissolve thoroughly, remaining in undissolved lumps in various places.

"After what has been written in America, about the instantaneous results obtainable on tannin plates with hot water, I have felt surprised, that in my experience, there is still a very wide difference between the exposure required for wet collodion, and for the same collodion prepared with tannin.

"I am afraid I have made this letter prolix and uninteresting, but it appears from the letters I have seen, that the process has been so mismanaged, that I have been induced to write to you rather more fully than I should otherwise have deemed necessary. I hope on my return to show you my results, and we can discuss the subject at greater length."

On the subject of intensifying, our correspondent makes some remarks which may be found useful.

"I see in Mr. Heath's remarks before the Photographic Society, that he complains of being unable to obtain intensity in the intensification of an iron developed negative during his enlarging experiments, and invites suggestions thereon. I have obtained good printing qualities from the weakest negatives by the application, first of bichloride of platinum, and iodide of ammonium, and then, after thorough washing, bringing up both detail and intensity by the use of pyrogallic and silver. Or, after the application of the bichloride and iodide, pouring an acid solution of silver on and off the plate, and then, re-applying the bichloride and iodide as before, bichloride of mercury has answered in my hands as well as the platinum.

"I must not conclude this letter without mentioning that I feel indebted, in a great measure, for whatever successful results I have obtained, to the invariable excellence of the chemicals supplied to me by Messrs. Hopkin and Williams. I had, and still have in my experiments, myriads of failures; I never do a day's work without learning something, or noting some important fact, and it all leads to my being convinced of one fact, viz., that the purity of the nitrate of silver bath is the all important foundation of perfect photography; and that to attempt to work a delicate instantaneous process on large plates would simply be a waste of time without the use of pure silver. Many things tend to put a bath out of order, bad ether, bad distilled water, and, in fact, many causes, the discussion of which, I will not trouble you with at the end of so long a letter. But start with pure silver, and keep deteriorating causes as far as possible from the bath, and what a difference one finds between one's work, and the unhappy wearying state of things which the use of bad chemicals entails.

"I have used Messrs. Hopkin and Williams's preparation of pure nitrate of silver constantly during the last year, and have found every sample equally good, as well as all the other chemicals that I habitually use of their preparation.

"I may mention, that a sample of silver from Messrs. Bailey gave also very satisfactory results, and the collodion with which I have principally worked the process alluded to above, has been a mixture of one of Mr. Rouch's manufacture according to Mr. Hardwich's formula, and a preparation of my own. These two I mix in various proportions, according as it seems fit.

"I think I had better leave off, or I shall be induced to begin on the subject of collodion, and bore you utterly to death, so I shall beg you to believe me, very faithfully yours, STUART WORTLEY."

## PHOTO-CHEMICAL RESEARCHES UPON THE SALTS OF SILVER.

BY DR. D. VAN MONCKHOVEN.

The history of the salts of silver is one of the most curious that can engage the attention of physicist or chemist. A common property, so to speak, that of being decomposed under the influence of light, distinguishes the salts of silver, generally, from the salts of all other metals.

It must not be supposed that, beside the salts of silver now employed in photography, there are not other salts susceptible of similar application. This would be a serious error, and the object of this essay, which is a summary of elaborate researches during many years, is to show that it is more than probable that the processes now adopted will receive many important modifications.

Our desire is to aid earnest experimentalists by pointing out to them the route they should follow. They must, indeed, be thoroughly imbued with this idea, that research becomes fruitful only in proportion as the thought precedes the experiment. The following, then, is the order to be pursued in a given research.

For example. Suppose it be desired to substitute more rapid collodion processes than any of those now in use. The process to find is threefold. First, to substitute a more sensitive salt for the alkaline iodide, or rather, to compose a silver bath with a soluble salt of silver, which is more readily decomposed under the influence of sulphate of iron, or, what would be still better, to discover a new developing agent, which will permit the time of exposure in the camera to be diminished.

The experimentalist will perceive, upon reflection, that these are the only processes possible. It is not the addition of new alcohols or other substances that will give greater rapidity. There remains then the substitution of a salt of silver for the iodide of this metal. Certain considerations thereupon present themselves which it is important not to lose sight of.

The salts of silver divide themselves into two very distinct categories. The first includes the salts directly sensitive to light, that is to say, those which, when exposed to daylight, assume a violet hue after a few moments' exposure. It will be remarked that, strictly speaking, the iodide of silver is scarcely sensitive to light, while the chloride and bromide blacken very rapidly.

The second category includes those salts of silver which are easily reduced after being exposed to light, and it seems that the salts possessed of this property are very little endowed with the first. Thus, of three collodions prepared exclusively with a chloride, a bromide, and an iodide, the latter will be the most rapid, while the bromide will be slower, and the chloride much slower still—in contact with the developing agent be it understood.

Under the direct influence of light it is the bromide that becomes coloured the quickest, then the chloride. As to the iodide, it is only slowly that it assumes a light grey hue.

Among the salts of silver which may be substituted for the chloride of silver for use under the action of direct light, as in positive printing for example, we may mention the chloroacetate of silver, the cholate, the malate, &c. We shall, however, recur to these in other articles upon this subject, for the present, the better to show the importance of these researches, we shall instance a familiar example.

To whom has it not occurred, while preparing positive paper, to touch the paper with his fingers? Now persons who perspire freely stain the paper they touch. But if we experiment with the paper so touched, we shall find that it possesses greater sensitiveness to light. If we collect the perspiration with a hair-pencil, and spread it upon the surface of the sensitized paper, we shall perceive that it very rapidly augments the action of light upon the chloride of silver.

Analysis clearly demonstrates the presence of chloride of sodium in the perspiration, but this is not the cause of the acceleration of the luminous action, it is due solely to organic matter.

If space permitted, it could easily be shown, by curious examples, that we are very far from having attained perfection in our present method of printing positives; on another occasion we shall enlarge upon this subject.

With respect to the salts of silver, which are developed after a short exposure to light, a strange fatality seems to prevail, namely, that we have at first sight hit upon a salt unique in its rapidity. In fact, among the hundreds of experiments we have made, no compound, after a very short exposure, developes so well under the influence of reducing agents. From this point of view, the question becomes difficult.

Our researches have led to the discovery of salts of silver perfectly fixed in the light; that is to say, of such as do not in the least change colour after many days' exposure to the sun. Among these we may mention the cobalticyanide, and the sulphomellonate, which after exposure to the sun for several days remain perfectly white.

The most curious salt is the resinate of silver, which may be very readily prepared. This substance enjoys the very curious property of being soluble in spirits of turpentine. This solution, spread upon paper, leaves resinate of silver in the substance of the paper, and this resinate is very sensitive to light. It is the same with resinate of gold.

Another curious compound is the chloro-succinate of silver. This salt is produced in the paper by double decomposition, and is very slightly sensitive to the light of the sun; but if the paper be placed on a sheet of glass heated to 212° Fah., the action of the light becomes very active, and the salt decomposes rapidly and turns black.

Moist nitrate of silver is very sensitive, but dry, it is discoloured very slowly.

All the salts of silver are not white; some are red, green, yellow, brown, &c. The *picrimate* is of a very beautiful *red* colour, and unchanged by light; the *phloroziate* is *blue;* the *nitrophtanilate* is *orange*, &c.

We shall give hereafter a summary of the general properties under the influence of light of a great number of salts of silver, from which the experimentalists will probably derive very useful suggestions: as to the means of procuring these substances, most of them will be found in commerce.

It is evident that with regard to greater sensitiveness under the influence of *direct* light, there is little to be hoped from the substitution of new salts of silver for the iodide now employed. It is not the same, however, with regard to the substitution of soluble salts of silver for the nitrate of silver, of which negative baths are composed.

It is well ascertained at the present day, that it is not the sensitiveness to light of iodide of silver which gives rapidity in our present processes, but rather the singular property possessed by this substance of being the *motive* of the local decomposition of the nitrate of silver by the developing agent. Thus pure iodide of silver is not of itself sensitive to light, but it fixes the molecules of silver set at liberty wherever they have been struck by light. This is perhaps a physical property, and not a chemical one, of the iodide.

But according as we mix sulphate of iron or pyrogallic acid with a more or less stable salt of silver, the reduction takes place more or less quickly; it is also very probable that other salts of silver may be substituted for the nitrate now employed. Our task in this place is to give a list of these salts, such as are easily prepared and quickly reduced.

In the first place we name the *chlorate of silver*. This salt behaves exactly like the nitrate.

The *sulphoglycerate*, the *ethyl sulphate*, which is also very soluble in alcohol, the *amyl sulphate*, the *amyl citrate*, and the *lactate*, are the salts best adapted to these researches, and to which we shall recur in another article.

Such is the list of the organic salts of silver, or, at least, of such as possess properties which cannot be doubted, and upon which experimenters will, doubtless, be glad to obtain some details.

Our aim, it must not be forgotten, is not to dilate upon the researches we have accomplished in this direction, but rather to aid experimentalists by condensing the most striking properties of these organic salts of silver. The enquirer in this direction will, probably, find many useful hints; it is our intention to publish our researches upon these salts at an early date.

## Scientific Gossip.

Japanese Crystal Spheres; Danger of Fire at the International Exhibition Building—Paraffin and American Oil, their Dangers and Methods of Testing—Fusion of Platinum—Injury to M. Deville by the Fumes of Osmic Acid.

A curious accident lately happened at the International Exhibition, by which, had it not been for the promptness with which it was discovered, the building might by this time have been reduced to ashes in a very scientific manner. Among the most noteworthy objects in the Japanese court were two spheres of rock crystal, about five inches in diameter, ground and polished with mathematical accuracy. They were exhibited by Messrs. Baring Brothers, and attracted very little attention from the general visitors. One very sunny day, however, a person rushed into the superintendent's office with the alarming intelligence that "the two glass globes had caught fire." On hastening to the spot it was found that the spheres had acted the part of burning glasses, and had concentrated the rays of the sun, which was shining full upon them, on to the mahogany stand, which was then in a blaze. These globes have now been removed to the Chinese Court, where the curious visitor may see two holes in the stand large enough to insert the top of the finger. These holes are of some interest, as they are each double, showing in a very perfect manner the double refracting properties of the quartz.

A very important report on paraffin oil has just been made by Mr. Charles O'Neill. This oil is now so generally used for illuminating purposes, and on account of the purity of its light is of somewhat frequent employment for microscopic photography, that a knowledge of the properties of the multitudinous liquids sold under this name, and of the simple methods of ascertaining whether their employment would be attended with danger, cannot be too generally made known. In deciding whether a sample of oil is dangerous or not, reference must always be had to the lamp in which it is used; some of the dangerous oils might be used with safety in lamps of a different construction, and the most harmless of them would be dangerous, if used in a moderator or carcel lamp. Special lamps are now constructed for burning this oil in, and Mr. O'Neill's report must be considered as referring to the oil when burnt in these lamps. From his experiments, it results that the chances of accident from the use of these oils may be referred almost exclusively to their greater or less proneness to form an explosive mixture with the air contained in a partly-filled bottle, or lamp reservoir. Nearly all the accidents arising from the use of the new illuminating oils have been primarily caused by the ignition of the explosive mixture of combustible vapour and air, either in the bottle in which the stock of oil is kept, or in the reservoir of the lamp. Thirty-two samples of oil, from as many different establishments, were examined, chiefly with a view to ascertain whether any of the oils would form an explosive mixture with air at a mean temperature of 60° Fah.; this representing the average temperature of domestic rooms where the bottles of oil are kept. To ascertain this point, about a quarter of an ounce of the oil was put into a six-ounce stoppered bottle, the stopper inserted, and the bottle shaken and moved about, so as to facilitate the escape of vapour from the oil; in three or four minutes the stopper was taken out, and a lighted match held to the mouth of the bottle: if there was a rush of pale blue flame through the bottle, the oil was said to give off an explosive vapour at the ordinary temperature of the atmosphere, and to be highly dangerous. Only two out of the thirty-two samples exploded when tested in this way. This temperature can, however, be only considered as the lowest limit of possible danger; the actual limit of danger being the highest temperature to which, under all ordinary circumstances, the oil is likely to be exposed, either in storing or while burning in the lamp. A temperature as high as 85° to 90° may be calculated upon as often existing in the cistern of a lamp; this high temperature being produced by a long-continued burning in a warm room, and on a table near the fire. Any oil, therefore, giving off combustible vapour, and forming an explosive mixture with air at this temperature, must be looked upon as unsafe for ordinary use. Out of the remaining thirty samples, three were found which were dangerous at a temperature of 85°. With these five, therefore, it would require the constant exercise of skill and care to prevent serious accidents. The remaining oils were then successively tested at temperatures of 100°, 120°, and 150°. Four of them were dangerous at the first, three others at the second, and the remaining twenty at the highest temperature. This is, however, beyond the limits of actual danger, and these twenty may, therefore, be looked upon as a very safe oil. The classification of these oils presents several points of interest. The whole of Young's paraffin oils were found to be safe, whilst the whole of the oils which exploded at or below 120° were American, only two of the latter sort being considered safe. Another method of testing, which, although not quite so effectual as the above, may be of more use, as it is easier to employ, for our readers, is to try the liability of the various samples to inflame upon contact with a lighted body. This inflammability is in close, if not in exact, relation with the explosibility. None of the samples of Young's paraffin oil were found to take fire at 130°, whilst out of fourteen samples of American oil, eleven inflamed at this temperature, whilst three did not. It must, however, be carefully borne in mind that whenever the oils are scattered upon linen or woollen rags, at even the ordinary temperature of the air, they burst into a violent flame upon the most momentary contact with a lighted match or candle. This is the most dangerous property of the oil, and in it there is no considerable difference between the best and the worst samples of paraffin or American oils. It is generally considered that the specific gravity of an oil affords a good test of its quality, and several methods of examination founded upon this have been frequently described in newspapers; but O'Neill finds, however, that the specific gravity of the sample does not give any idea of its liability to explosion, but it forms a tolerably reliable means of distinguishing between the British paraffin oil and the American substitutions. Young's oil has an average density of ·833, whilst the American oils are generally below ·816; a sample of coal naphtha, however, which was incomparably more combustible and dangerous than either of them, had a specific gravity of ·865. The boiling point is no better guide, for, though volatility is generally in close relation to the boiling point, the vapours of many of these oils have a diffusive power sufficient to counterbalance a very high boiling point.

It is seen, therefore, that these illuminating oils are midway between the oil-lamp oils, which cannot explode in any kind of lamp, and the very volatile and inflammable liquids such as naphtha, camphine and spirit, which are liable to explode at any time. The common coal naphtha is infinitely more dangerous, more explosive, and more inflammable than any of the American or paraffin oils, and yet it is largely consumed as an illuminating material with but few accidents, because its dangerous properties are known and guarded against. The real danger to society consists in selling one species of oil for another; if paraffin were sold for sperm oil it would be very dangerous, genuine paraffin oil is perfectly safe in a paraffin lamp, but a majority of the American oils are not safe in this lamp.

In a recent number we gave an account of a wonderful metallurgical feat which had just been accomplished, the fusion and casting in a mould of upwards of 2 cwt. of platinum, by M. H. Ste. Claire Deville, in the workshops of Messrs. Johnson and Malthey; during this operation considerable quantities of fumes of osmic acid were given off, which so seriously affected M. Ste. Claire Deville, that he was obliged to return to Paris, where he has since been suffering severely. We are happy to say that he is now recovering from the ill effects of this very poisonous metallic vapour.

## ENLARGEMENT OF PHOTOGRAPHS.*

BY M. CLAUDET, F.R.S.

The possibility of enlarging small photographs is at present engrossing the attention of the photographic world; and there is no doubt that it is a considerable advantage in many respects. Small pictures are produced with the greatest facility, and with a perfection which cannot be obtained by large lenses and complicated apparatus. For taking views the operator need not encumber himself with a heavy baggage, and he may carry all his appliances packed in a moderate compass. Small glass negatives are less subject to be injured or broken in travelling, and may be contained in a light box. For taking portraits the preparation of plates is very simple and rapid, the pose is nearly instantaneous, and consequently the expression is not constrained and unnatural. Small lenses operating at a great distance from the sitter give an image without distortion and exaggeration of perspective. All is perfect in small pictures; and before an audience of experienced photographers I need not do more than mention the fact that if we enlarge such small pictures we can obtain portraits of great beauty, characteristic in countenance, and correct in forms.

The solar camera is the means by which we are able to enlarge photographs, and if we could depend upon the sun more than it is possible in our latitude and climate, nothing would be easier than this operation; but, unfortunately, the sun does not shine every day, and we may be sometimes waiting for his beneficial influence during many long weeks.

This difficulty has induced some persons to replace the light of the sun by artificial light, and the electric light has been tried with some success; but this is a very difficult and expensive process, which very few operators could practically employ.

During the months preceding the reception of photographs at the International Exhibition, wishing to prepare enlarged photographs for my contribution, I was constantly watching for the appearance of the sun; and I may say that during five months I hardly saw it more than ten or twelve days. Still I have been able to produce all the specimens which have been admitted at the International Exhibition; they are all from negatives of *cartes de visite*, enlarged seven or eight times, and I hope the result will prove what can be expected from the solar camera during the clear days of the fine season.

The enlargement of negatives, however, has some limits, when we wish to produce black photographs. I think that an enlargement of six to eight times is the greatest proportion which ought to be employed. But if you wish to enlarge *cartes de visite* to the size of nature, the small defects imperceptible in the negative are magnified to a degree so apparent that the picture requires considerable touchings up and correcting, in order to give to the picture the appearance of a perfect and clean drawing worthy of being framed. These corrections, however, can be made without altering the character of the photograph, which has all the qualities of the small *carte de visite*, preserving proportions of all the forms, and the natural expression of countenance. The result is far preferable to all the attempts made for producing at once large portraits with lenses of considerable aperture, which require a long sitting, distort the proportion of the figure, and, if the model has not moved, exhibit the forced expression of a sitting too much prolonged. Although, as photographs, many parts of the figure which may be in the right focus require very little touching up, still the greatest part is so ill-defined and so much out of proportion, that it is absolutely necessary to modify them considerably. The touchings of enlarged photographs, at all events, can be done without altering any proportions; and when these pictures are destined to be painted or coloured, they are even in a better condition for the artist than more strongly marked photographs taken direct in a large size.

Large photographic portraits are, in general, not very agreeable in effect, and, to please the public, they require colour. The more perfect the photograph is, and the more it shows all the defects of the face. It is not very desirable to exhibit all the roughness and every wrinkle of the skin in black lines. For this reason some artists, not understanding the impossibility of imparting the same degree of softness to the whole picture by it, have recommended to operate a little out of focus. Certainly, if all the parts of the picture had the same focus it would be of some advantage, for the artistic effect, to obtain an image in which every

* Read at a Meeting of the London Photographic Society, June 3, 1862.

part would be slightly out of focus to the same degree—just enough to soften the hardness of the lines; but this cannot be obtained, because if some parts which would have been in the right focus were softened by a slight alteration in focussing, this would render the other parts already in bad focus perfectly confused and indistinct.

The principal object of taking photographic portraits as large as nature is to give to the artist a ground to paint upon, containing a correct representation of all the features, forms, and draperies, which he can follow until the picture is so far advanced that a short sitting of the person is sufficient to impart the exact colour of the eyes, hair, and complexion. But it is evident that as soon as the artist has begun, and the more he advances his work, his colours cover and hide the photograph, and that it becomes very difficult for him to go on without losing the likeness if he had not always before his eyes another copy of the same photograph, to which he can constantly refer, in order to see when he is erring, and which enables him to correct any false touches of his brush. It would really seem that a skilful painter does not strictly want to paint upon the photograph; that he might as well trace the enlarged photograph upon his canvas to form the base of his painting, and to keep the photograph for his guide. In this case he might paint upon a canvas properly prepared to receive the colours, and not affected by the strong shadows produced by the nitrate of silver, upon a surface of paper which has had to undergo a quantity of washings and manipulations. While speaking of the immense difficulty of producing a photograph upon a surface of paper large enough for a portrait of natural size, the chemical substances forming the photograph are capable of affecting the durability and constitution of the colours forming the picture.

Considering all these difficulties, and while waiting in despair for the sun which was to enable me to produce enlarged photographs, it occurred to me that if I could supply the artist with a canvas upon which, while the image of the negative was thrown upon it by the light of the sun, and in its absence by the light of a gas-burner, I had traced every part of the picture with a black pencil, this would form a base even better than any photographic impression for the painter, who, being supplied with such a perfect lightly-drawn portrait, and, with a photograph for his guide, would have all which is necessary for his work.

I have tried the experiment, and it has answered beyond my expectations. In the British Department of Photography at the Industrial Exhibition may be seen several portraits as large as nature, which have been painted on canvas upon which a small negative had been enlarged by pencil-drawings. I have done it myself; and when I add that I am quite incapable of drawing, it must be acknowledged, by the inspection of the result, that it is entirely due to the help of photography, and is one of its most useful applications. The artists whom I have employed to paint these enlarged photographs have found them preferable to those produced by the chemical operation upon paper, because they have been able to lay their colours in all their brilliancy, without being impeded by the dark shadows of the ordinary photographs.

As an example of the result, I call the attention of the meeting to a portrait of a boy painted in pastel, and to another of Professor Faraday painted in oil—both of which have been completed without sitting. Those to whom the features of the eminent Professor are familiar will be able to judge of the correctness of the likeness, and to appreciate this new mode of applying photography to the production of large portraits.

I have thought that this mode of turning the base for large portraits upon canvas, the usual and most suitable surface for the work of the painter, deserved the attention of photographers, who, to satisfy the want of the public, are obliged to employ artists to produce painted portraits. If it is found that this mode of operating is capable of results entirely satisfactory, and that it can be effected at any time when wanted, without the light of the sun, surely this must be considered as a great advantage in one of the most important applications of photography, which consists in furnishing the artists with a perfect base for painting portraits—having all the truth and character of painted photographs, and so easy to be obtained.

Having been the first to practise this process, the idea of which I have no doubt must have occurred to many others, and the productions having been received in the British Department of Photography at the International Exhibition, I have considered it my duty to explain before this Society how these large portraits have been obtained, in order to prevent any misconception as regards their nature.

It is known in optics that when an image is considerably enlarged by a lens, the centre only of that image is in correct proportion, because the screen being flat and the image being curved the parts thrown on the margin of the screen have a focus nearer than the screen, and consequently being represented on the screen at a farther distance, they are out of focus and enlarged. In order to obviate that defect the negative should present, alternately, all its various parts to the centre of the lens, and at every change, horizontally and vertically, a different image should be taken. Having taken the various parts forming the whole picture, and cutting them all in order to mount them in one picture, we obtain a representation without distortion. When we wish to draw the picture by hand we have only to bring the various parts of the canvas in the place corresponding with the movements of the negatives, and we have a perfect picture of the whole.

This plan has another advantage: it enables us to enlarge a negative to a degree at which it would be impossible to light the whole picture, by the limited centre of light of the condenser. The arrangements by which I move the negative vertically and horizontally will be better understood by the inspection of the apparatus and its action.

## RULE FOR FINDING AT ONCE BOTH THE DISTANCES OF NEGATIVE AND SENSITIVE SURFACE FOR ANY DEGREE OF ENLARGEMENT, AND VICE VERSA.*

BY M. CLAUDET, F.R.S.

In a former paper, which was published in the number of the *Journal of the Photographic Society* for March, 1861, I have given a new theory for the measurement of the focal distances on one side of the lens, and the distance of the object on the other side. I have explained why both these distances must be measured, not from the surface of the lens, but from a point before it, which is the nearest distance at which an object may be placed for producing the largest image possible, and another behind which is exactly the focus for parallel rays giving an image as small as possible. The space between these points and both sides of the lens is a nonentity, being in fact nothing more than the thickness of the partition dividing the two sides of the camera-obscura without lens.

These two points are the zero of the scales of measurement for the focal distance and distance of object. When these two points have been determined, if we find two other points at which the object must be placed before the lens to produce behind it an image of the same size, these two points form the other extremity of the scale, and that scale is the unity which serves for measuring all the distances and determining exactly the proportion between the size of the object and that of the image.

To facilitate all the calculations these scales are divided in one hundred equal parts.

When we want to have an image of the same size as the object, we have only to place both the object and the screen on the 100th division of each scale. For an image double the size of the object we place the object on the half of the scale precisely on the division 50, and the screen destined

* Read at a meeting of the London Photographic Society, June 3, 1862.

to receive the image at a distance equal to two unities, or to $\frac{200}{100}$ divisions. For an image half the size of the object we reverse the proportionate distances.

If we want to enlarge the object 100 times we place it on the division 1 of the scale, and the image will be at a distance equal to 100 times the unity.

All intermediate distauces and proportions are calculated and fixed in the same manner.

Let us suppose that we have a portrait on a negative, which is twenty times smaller than the natural size, and we want to enlarge the image to its natural size. We have only to place the negative on the fifth division of the scale, and the sensitive surface for the image at a distance equal to twenty times the unity.

If we wish to enlarge the same negative only five times, we place it at once on the twentieth division of the scale, and the screen for the image exactly at a distance equal to five unities.

These few examples will be sufficient to show how all the calculations can be effected by means, firstly, of a scale marked with all its divisions fixed on the table containing the camera, and secondly, by means of a tape long enough to extend to twenty-five or thirty unities and marked all over its length with these unities and subdivisions.

The scale fixed in the camera contains opposite each of its one hundred divisious the number indicating the corresponding distance of the screen, and the tape upon which all the distances of the screen are marked indicates also the corresponding divisious of the scale fixed in the camera, so that if the the two measures have been once for all correctly constructed, it is no more necessary to examine on the screen if the image is in good focus. It must necessarily be so, and that will save an immense trouble and all possible errors.

I think that nothing is more interesting than to examine and study the law by which these scales of measures are regulated. We can see the curious progression of foci, which increases and diminishes exactly in the same proportion as the distance diminishes and increases. The two quantities, whatever they are, being multiplied one by the other, must have for product the unity forming the scale; and if that unity is divided in one hundred parts, the product must be equal to one hundred: so that, knowing any distance either of the image, or of the object, we have only to divide one hundred by the quantity known, and the quotient is the other. For example, if the distance of the image is found by the tape to be 17·67, we have only to divide 100 by 17·67, and we have 5·66 for the distance of the object.

## NEW METHOD OF EMPLOYING WAXED PAPER WHEN TRAVELLING.

BY CAPT. CHAMPLOUIS.

Waxed paper, by its lightness and the convenience of its negatives, is one of the most convenient processes for travellers. In warm countries especially, the absence of collodion gives to this process a much greater value, as the chemicals its process requires are not decomposed by the highest atmospheric temperature. The traveller, however, experiences some inconvenience from the numerous washings the preparation of dry paper requires, as well as for development and fixing in hypo-sulphite of soda.

During an expedition into Syria, Captain Champlouis, seeking to obtain photographic views by the quickest and simplest process available, finally adopted the following, by means of which he always obtained satisfactory proofs in whatever circumstances he happened to be placed.

*Preparation of the nitrate of silver bath.*—The sheet of iodized wax-paper is immersed in a nitrate bath (aceto-nitrate of the strength of 8 per cent.), and immediately afterwards it is laid, still wet, upon a glass plate intended to be placed in the slide; the paper is carefully applied to the glass by means of a piece of sponge, which, by gentle pressure, expels the air-bubbles, which if allowed to remain between the paper and the glass, would cause the silver to be reduced. Then with the same sponge a sheet of bibulous paper is applied to the sensitized wax-paper, and upon this a sheet of waxed paper, or a piece of water-proof cloth, which serves to exercise a last pressure: these two sheets must be moistened with distilled water; they form a cushion upon which a second plate of glass, of the same dimensions as the first, is placed. The whole is placed in a slide, and the paper thus prepared will serve to take a view at any time, even within ten or twelve days, perhaps even longer, as there is no reason to believe that the sensitized paper will undergo any change, as it is out of contact with the air, and cannot become dry except after a considerable lapse of time.

*Development with gallic acid.*—After exposure the negative is submitted, the same. or the next day, to the action of gallic acid, previously immersing it in the nitrate bath to restore its humidity, if it has lost it. A glass plate is covered with a thin layer of a saturated solution of gallic acid, and the picture is developed very rapidly, under the influence of the silver solution with which it is moistened. This method is preferable to immersing the proof in the developing solution.

*Temporary fixing.*—When the negative is properly developed, it may be temporarily fixed, by once washing in common water, and then immersing it for five miuutes in a solution of iodide of potassium, strength 8 per 100. A single washing in ordinary water afterwards will suffice, and the negative is then dried between blotting paper. The negatives thus treated require nothing more until the photographer returns to his operating room. Before printing positives from them, they are completely fixed in hyposulphite of soda.

*Advantage of this process.*—This method of operating offers: 1. Economy of time; 2. Economy of water. Economy of time in the preparation of the paper; as it does not require to be washed or dried before exposure, nor fixed as by the ordinary methods. Economy of water, as there is no water for washing required, but only the silver bath and a bottle of distilled water to moisten the cushions with, which is preserved after each operation; and one or two litres of distilled water, which is used in successive small quantities for thirty or sixty negatives.

The slight washing of the negative, between the gallic acid and the iodide of potassium, beiug only to maintain the purity of the iodide, requires very little water. The iodide bath lasts a very long time, and seldom requires to be renewed, and is only diminished by evaporation and the operations to which it contributes.

An experience of five months travelling in the method above described has given the most satisfactory results.

## ACARI IN THE NITRATE BATH.

Dr. Maddocks communicates to our contemporary the *British Journal* a most singular discovery in connection with his nitrate bath, in which he has found some *acari*, apparently generated and living there. We append an extract from his communication:—

In the early part of December a twenty-ounce nitrate of silver bath, forty grains to the ounce, which had been in use during 1861, and placed for a month previous in a stoppered bottle, was returned to the bath, and set aside in a cupboard partitioued off in my working-room, so as to convert it iuto a dark chamber. It remained unopened until the 12th of April. The bath is of cemented glass, covered outside with asphalte varnish, and kept in a vertical wooden case with the cover shutting down to half the depth of the bath. When the solution was returned to the bath, half a sheet of white foolscap paper was first folded down on the top, and then the cover placed over it. The bottle was a perfectly clean one kept to receive the nitrate bath when filtered, or when the sides of the bath were to be cleaned. The bath, after cleaning, was always washed out finally with boiled and filtered or simply filtered fresh-caught rain water—not out of the butt. I am thus particular in these details for reasons that will appear.

Late on the afternoon of April 12th I moved the bath from the dark cupboard to the table in the room. On removing its cover, lifting off the paper, and looking along the surface of the liquid (as is my habit) to see if any scum be visible, and remove the same by a little blotting paper wrapped round a strip of whalebone, I noticed on the surface numerous bright glistening points, the mass altogether in length about $1\frac{1}{4}$ inch and $\frac{3}{8}$ inch in width. Supposing these to be crystals, I proceeded to remove them with the blotting paper; but I could not gather them up, for they floated by and opened out on the surface. A thin piece of wood was then turned up, and with this a few of the points were lifted out. Examining these with a doublet, I found them to be insects, with beautifully-curled and long straight hairs. Sixty-six were in this way taken from the surface of the solution. Not knowing exactly what to do with them, some were placed in a spirit of wine and acetic acid, which happened to be at hand, and the rest in water in a test-tube. These were replaced in the dark cupboard; the others left to diffused daylight. On the first appearance they looked like very miniature FAT SHEEP, with eight legs, curled and straight feathers from the back, a long depending snout, which was always turned down in the liquid, and some with a very short tail or tubercle. On a slip of glass they resembled a particle of a fat of a dirty yellow colour, the snouts and legs of the parentals being darker and more defined than in the rest of the progeny. Sunday intervening, they were further examined on the Monday. Those in the acetic acid were all at the bottom of the tube. Their colour had altered to a darkish brown. Of those in the water a few were at the bottom, the rest floating on its surface. None were found in the stoppered bottle, which had also been kept in the dark, wrapped in paper.

A few were now mounted in a cell with a little alcohol and water, and placed under the compound microscope, but I could not discern their general structure. They appeared to be covered with a granular deposit. Concluding this to be some silver compound entangled at the surface, it became a question how to remove it. At first washing with water, and a fine sable pencil was tried; but the insects got so injured, and were so exceedingly tender, that this plan was set aside, and they were soaked for a short time in a solution of cyanide of potassium. This quickly cleared off the deposit, and also seemed to abrade or break up the substance of the body; for they became more tender, so that I could not keep the form at all perfect under the slightest pressure. Alcohol mixed with the cyanide solution answered no better. Others were now placed in a solution of iodine in iodide of potassium. This turned them yellow; and, on being replaced in a watch-glass with a little water, gave a well-marked precipitate of iodide of silver. They were now removed to a solution of hyposulphite of soda. By alternately treating them to these baths, and finally washing, the general structure was rendered very visible under the microscope, though still very fatty in appearance. Wishing to preserve some of the specimens, I proceeded to put them upon the usual slides—first trying washing in spirits of wine, then drying, soaking in turpentine, and setting up in Canada balsam diluted with benzole. I could not set them out in this, as the parts gave way very readily from the tenacity of the balsam, and portions were rendered too transparent. Others were first cleared of the deposit, soaked in glycerine and camphor water, and finally mounted in the glycerine and gelatine *medium*: this proved the most successful, though I found that they still so retained their fatty quality that I dared not use sufficient pressure to flatten out their rotund bodies, ere the skin gave way. They gave me considerable trouble, although long accustomed to put up objects of various kinds. Further observation led to the opinion of their being *Acari*, though not like any that I was acquainted with.

The insects are very visible to the unaided eye, being a little larger than the cheese mite. They are variable in size. The sexes are evident, the females being provided with a curious short protuberance or tubercle at the end of the abdomen, nearer the dorsal surface; and at a slight distance from it, on the under surface, when seen sideways, are two thin projecting flaps, which meet at the free edges, thus forming a sort of deep and long triangular space, sack, or groove, protected at the anterior entrance with a few short crossing hairs. Looking down on this structure, it has an elliptical form: the edge of each flap has from four to six reddish marks—query glands or hooklets of apposition. In this pouch I was fortunate enough to find a body suspended, which I considered to be an extruded ovum. Pressure in several cases, especially after the cyanide solution, forced out larger ova or ovisacs through the same groove. The ova or ovisacs in some were eight in number: in others I could only find six. The males are rather smaller than the females—no projecting tubercle, no groove nor pouch. In some I found a very curious structure, visible only from the abdominal surface, but the exact plane of which, even by the most careful focussing, I could not decide on, as it was only seen when the two surfaces were closely pressed. It was oval in shape, with a slight projecting limb from the upper part of the oval on each side. In the centre of the ellipse was a well-defined line, and, abutting against this, on each side, short, slightly-curved marks or lines, looking somewhat like the gizzard teeth of some insects; but whether it belonged to the digestive or genital system I could not satisfy myself. Many attempts were made by pressure to separate these parts, but yielded no good result, the whole breaking up into a sort of fatty sarcode. The outer surface of the skin is covered with minute granulations, which, seen edgeways, are resolved into very minute points—not *cilia*, being much shorter and stouter. The long curled hairs on the back, and the straight ones near the posterior end of the body, are finely barbed or feathered. The insects are provided with a pair of terrible, strong-looking mandibles, each composed of two claws with irregular teeth, four or five that interlock. The labia are notched at the end like a small reversed ∧ set in a larger V. The legs are furnished with sharp bristles, the ends of the foot padded, and on some of the feet I noticed a sort of short rod with a knob at the end. No eye spots were visible.

This description of the insects is very imperfect. I had purposed to have enclosed a drawing, with measurements, &c., but severe indisposition has disappointed me in the attempt. Of their life-history I know nothing, nor do I attempt to advance a theory of how they came into the bath. After the strange incidents met with by the late Mr. Cross, the celebrated electrician, of the Quantock Hills, when forming crystals by the agency of his small but numerous-celled water battery, we may well pause before the portals of creative power, without bringing to our aid equivocal or spontaneous generation, as some of the critics of his labours ventured unreasonably to apply to him. No doubt the ova were there in the exact conditions to furnish forth their dormant energy, though strange to us may seem those conditions:—the liquid a solution of a caustic salt capable of seriously injuring animal membranes, at least in ourselves; the light *nil* or non-actinic; the creatures themselves highly organised, yet not high in the scale—a genus of *Arachnidæ*. Few, I think, would look for animal life in their nitrate baths; yet these remarks may, if of no further use, now call the attention of photographers to the fact of its supporting living organisms, even to fatness, and elicit perhaps more of their history and structure.

## PRINTING, TONING, AND FIXING OF DIRECT POSITIVES ON ALBUMENIZED PAPER.

BY PROFESSOR TOWLER.*

AMMONIA-NITRATE of silver is more sensitive to light than nitrate of silver, as is also the chloride of silver produced by double decomposition with ammonio-nitrate of silver and any of the alkaline chlorides; it produces more vigorous pictures, and sensitizes the paper more quickly than the simple nitrate of this metal.

2. These are three very important qualities in photography; it has, however, its disadvantages or difficulties, which are the following:—Free ammonia easily dissolves the albumen from the surface of the paper, whereby the solution becomes discoloured, forming albuminate of silver; this deteriorates the effectiveness of the solution for future operations; the paper is reduced again to plain salted paper, and the picture is mealy, imperfect in the middle tones, and possesses but very little vigour.

3. The question therefore arises, how can the ammonio-nitrate process be modified so as to obviate these disadvantages? I have experimented with various re-agents, such as ether, hot water, acids, &c., and have selected, as success-

* From *Humphrey's Journal*.

ful in a high degree, the following method, by which the albumen surface is preserved entire, the tone is a rich purple black, all mealiness or snowiness avoided, and uniformity of action maintained.

*Silver Bath.*

4. Dissolve one ounce of nitrate of silver in six ounces of rain water; of this solution take two ounces, and add ammonia until the precipitate is dissolved; afterwards mix these with the remaining four ounces. Now add four drachms of *alcohol* and allow the oxide of silver to settle. If any particles still swim on the solution, remove them by drawing a small sheet of paper two or three times over the surface. It is not necessary—it is even injurious—to filter the solution; for the sediment is oxide of silver, which is afterwards dissolved by the addition of ammonia.

The paper, already cut and prepared according to art, is made to float on the silver for about ten seconds; all bubbles and particles that may adhere are carefully removed from its surface, and afterwards it is dried in the usual manner. Every time this bath of silver is again used fresh crystals of the nitrate are added together with a few drops of ammouia and about one drachm of *alcohol*.

*Toning.*

5. The prints are first well washed in several waters; this operation may be performed in teu minutes or a quarter of an hour; if the time is much longer the tone is impaired. They are then passed through hot water previously to their immersion in the toning solution. This solution is formed as follows:—From the stock bottle containing one part citrate of soda and six parts water, take two ounces; to this add one pint of warm water, one ounce of rain water, holding in solution one grain of chloride of gold, or more, according to the number of prints to be toned, and two drachms of *alcohol*. The toning soon commences, and is soon finished if the gold is in sufficient quantity. The temperature must be preserved at a blood heat, or about 100° Fah.; if it were greater the gold would become decomposed, and the solution blackened instead of the prints; if lower, the time of operation will be prolonged, and the operation itself tedious. The alcohol in this solution prevents all action of the alkali on the albumen, whereby the vigour of the print is preserved. I do not use the same bath twice unless immediately, and then of course with the addition of more gold. After the toning is finished, any gold that may remain is reduced by sulphate of the protoxide of iron, and collected.

*Fixing.*

6. The fixing medium consists of the ordinary solution of hyposulphite of soda. Every time I use this bath I add fresh crystals of the salt, two drachms of *alcohol* and an ounce or two of warm water, so as to raise the temperature. The prints, previous to their immersion in this bath, are again passed through warm water. The colour of the prints is not much changed when they are introduced, or if slightly changed, they soon regain their original and final tone. In two or three minutes the prints will be sufficiently acted upon by the hyposulphite, and are then removed into the water bath and thoroughly washed. The material point in these operations is the use of alcohol in each sub-division; because upon this re-agent success depends. Carbonate of soda may be used instead of citrate in the toning solution; the tone, however, is a richer purple black with the latter than with the former.

I would finally remark that unless the negative be properly and successfully taken with due contrast of light and shade, and without a universal fogginess over the whole surface, deep purples or blacks can never be obtained by any process; the silver salt has to be thoroughly acted upon by light in order to receive the desired toning.

## ANNUAL REPORT OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

At the conclusion of this, the third year of its existence, your Committee have much pleasure in assuring you of the satisfactory and promising aspect of the Society's affairs. At our last three or four meetings we elected sixteen new members, many of whom have already displayed the most laudable activity in forwarding the interests of the Society. At no one of our pleasant monthly meetings have we lacked either an interesting and useful paper, or the elements necessary for originating an animated discussion, and our Treasurer's account will show that—despite unusually heavy expenses, we have, for the first time, a balance in our favour. The papers read were as follows:—

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| Oct. 10. | Photography at the International Exhibition of 1862 ... ... | C. J. Hughes, *v.p.* |
| | On the Photogenic Action of Colour | Thomas Clarke. |
| Nov. 14. | On Mounting Photographs ... | G.W.Simpson, *v.p.* |
| Dec. 12. | A Prologue for the Seasou ... | V. Blanchard. |
| Jan. 9. | On Mealiness in Toning... ... | S. Fry. |
| Feb. 21. | On the Manufacture of Collodion | S. Davis, *v. p.* |
| March 13. | The Experiences of an Amateur in Portraiture ... ... ... | N. E. Fitch. |
| April 10. | On Photographic Reproductions.. | A. H. Wall, *hon. sec.* |
| May 8. | On the Use of Bromides in Collodion ... ... ... .. | V. Blanchard. |

The Committee take this opportunity of thanking the authors of the above for their generous labour in the Society's behalf. It is hoped that the useful little papers which were first introduced to our meetings by Mr. Hannaford, under the title of "Photographic Jottings," will not be entirely absent from our next year's list of papers as they are from the above.

The society has another source of gratification in the successfully organized Exhibition at the Sydenham Crystal Palace, which, it is hoped, will be the first of a series of annual exhibitions, each at least equalling it in the number of contributors and in the quality of the contributions; for it should not be forgotten that painting, sculpture, engraving, and other branches of fine art, all date their prosperity and influence from the establishment of periodical exhibitions. The present exhibition of this Society has been brought to its very satisfactory position mainly by the untiring energy of the Exhibition Sub-committee, to the members forming which, and to the Secretary of the Society who assisted them, the best thanks of the Committee are very gratefully awarded.

The Committee also desire to express their thanks to those gentlemen, friends and members of the Society, who have kindly contributed to the folio during the past year.

Special thanks are also due to Mr. Samuel Fry, Mr. C. J. Hughes, and Mr. J. J. Cole, to whose kindness the Society is indebted for the gratuitous use of apartments in which the Committee and Sub-committee have held somewhat frequent meetings.

Availing themselves of the present opportunity, the Committee also desire to thank the exhibitors whose productions are now at the Society's Exhibition.

Among the few sources of regret which have arisen during the past season have been the retirement from an active participation in the proceedings of the Society—in consequence of a change of residence—of our Vice-President, Mr. Hughes; and that of one of the most active members of the Experimental Sub-committee, Mr. Hannaford. We have another source of such feeling in the fact of our Secretary and Treasurer having tendered their resignations. The Society owes its existence primarily to the efforts of these gentlemen, and having now held office for three years, their retirement cannot but prove a source of regret to the members generally. It is part of this evening's business therefore to elect their successors.

In reviewing, as is usual, the progress of photography during the past year, we find such progress chiefly made palpable in an artistic direction. No new scientific facts of particular importance have been developed in connection with the art, no particular novelty in process or apparatus has been introduced to notice; but in every department, artistic, chemical, and optical, very rapid strides have been made in the direction of pictorial truth and beauty. Every paper read at our own meetings, and nearly every paper read before kindred associations have had their bearing more or less direct on the perfection of photographs as pictures, and in the Photographic Journals the principles of art in their applications to landscape and figure compositions have received regular and continued attention. We think this is an advancement in the right direction.

The claims of photography as a fine art have been put prominently forward since our last annual meeting, and no little controversy has arisen in all quarters from the fact of the Commissioners for the International Exhibition having classified photography under the term "mechauical." The Central Society took an active part in opposing such an arrangement, and called upon all societies devoted to the art to join them in protesting against its injustice. In reply to a circular letter from Dr. Diamond, the South London Society, while thanking and applauding the Couucil of the Central Society for tbe energy and character of its proceedings, aud fully approving the object thereof, expressed a hope that it (the Central Society) would not take snch steps as might tend to exclude British photography from competing upon equal terms with its foreign brethren and rivals. The controversy between the Commissioners and the Council of the Central Society which commenced in the May previous having terminated very unsatisfactorily in August last, and all appearances seeming to argue the entire neglect of the interests of photography, so far as regarded its conuection with this country and the Great Exhibition, the South London Society took action in the matter, and memorialized Her Majesty's Commissioners, urging the importance of making arrangements which might induce photographers to co-operate iu the production of such a result as should best serve the art, and do most honour to the country. Steps similar to those proposed in the memorial were taken by the Commissioners, and shortly after, their secretary, Mr. Sandford, politely acknowledged its receipt.

Much dissatisfaction has been pretty generally and pretty justly expressed with the position assigned to British photography in the International Exhibition. The art has been located in the smaller portion of a comparatively small apartment, situated in the most remote part of tbe building, and approached by a most nninviting entrance, with scarcely notice to indicate where it may possibly lead to, the said entrance appearing more like the opening to a ventilatiug shaft than anything of greater consequence.

Despite the insult to which photographers generally have been subjected in the catalogue classification, however, photograpby is to the full as attractive as any other portion of the great show, aud will undoubtedly carry off high honours, of which the share of this country will be by no means insignificant; for, contrary to pnblic expectation, British photography ranks proudly with the best of its foreign companions.

Tbe out door meetings, which were so pleasantly taken advantage of during onr past recesses, will be resumed during the present, only instead of meeting once a month, it is proposed that we meet once a week; and, to avoid some of the chances which led to uo little apprehension and disappointment last year, the dates and places of meeting, with the hour at which we shall assemble, will be anuounced before the close of this evening's proceedings.

The presentation print selected for the past year, in pursuance of the plan adopted by the first managing Committee, of selecting from the works of some eminent photographer a specimen illustrative of a distinct phase of the art in connection with some one distiuctive process, was selected from the works of Mr. H. P. Robinson, of Leamington, being a landscape by the wet process.

## FUSED NITRATE OF SILVER.

BY PROFESSOR E. EMERSON*.

"Commercial crystallized nitrate of silver is frequently contaminated with traces of an impurity, which is probably produced by organic matter falling into the nitric acid employed in dissolving the silver. Repeated recrystallization is required to remove this substance. If allowed to remain, it injures the sensitiveness of the film to obscure radiations, makes the negative weak and metallic, reverses the action of the light, and produces either foggings or markings of various kinds, the result of irregular reductiou of silver."—*Hardwich.*

I cau furnish an illustration of the truth of the above passage by detailing the experience of a young friend of mine, who is deeply interested in amateur photography. His silver bath was carefully made witb pure rain water, and crystallized nitrate of silver, iodized in tbe usnal manner, and was used at first at a temperature of 50° Fah. The collodion was a sample giving intense resnlts in my own practice; but in my friend's hands the resnlt, in every case, was very weak and metallic. Tbe following changes were then made, in a course of careful experiments extending through three weeks :—

1. The acidity of the bath was varied.
2. The strength of the developing solution was modified.
3. The amount of acetic acid in the developer was varied.
4. The sample of sulphate of iron was changed.
5. Alcobol and ether were gradnally added to tbe silver bath.
6. The bath was exposed to the sunlight for a day, after being made neutral.

The result in each of the foregoing cases was feeble negatives.

7. The temperature was now raised to 60° Fah.
8. The bath was boiled down, and carefully diluted again with pure pnmp water, and slightly acidified; but with no change for tbe better.
9. The developer was again varied in several ways. N improvement.
10. Care was now taken to see that the batb was fully iodized.
11. The temperature was raised to 70° Fah. for all the solutions.
12. The bath was again exposed to the sunlight for a day. Until finally, every condition had been repeatedly changed, except that of the nitrate of silver, and the uniform results were great slowness, and a weak and metallic image.
13. The nitrate of silver was now carefnlly fused, and the bath again made with pure pump water. The immediate and permanent results were rapidity and intensity with tbe same samples of collodion.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 9th June*, 1862.

M. Becquerel, in presenting to the *Académie des Sciences*, a treatise on photolithography, and on printing photographic positives in carbon, and other indelible colonred powders, stated, that he had no hesitation in affirming that the process of carbon printing, to which the French Photographic Society lately awarded the prize offered by the Duc de Luynes, is the greatest progress realized in photography since its discovery by Daguerre.

Dr. Ozanam asserts that carbonic acid gas, when inhaled, is a most efficacious anesthesiac agent, entirely free from danger. Ether and chloroform are unquestionably anesthesiac agents, of great energy and value, but they often cause death, even under circumstances where no reason to expect a fatal issue existed; it is therefore greatly to be desired to substitute for it a succedaneum of equal efficacy, but more inoffensive. This succedaneum, Dr. Ozanam thinks will be carbonic acid. Forty experiments made upon the most

* From *Humphrey's Journal.*

delicate animals, in which sleep was prolonged from one to two hours, were followed by no ill consequences, and it was expected that the same result would follow its application to human beings: the following observation proves this to be the fact. He states—"I had to open an abscess that penetrated deeply into the inner and lower part of the thigh of a young man. It was necessary to dissect it layer by layer, to a considerable depth. The patient, dreading the pain, asked to be put to sleep; I consented, and informed him that I should cause him to inhale an hypotic gas in lieu of chloroform. A mixture of three parts carbonic acid, and one part of atmospheric air, was put into an india-rubber bag, of the capacity of about five gallons. To this was attached a long flexible tube, terminating in a mouth-piece in the form of a funnel, which could be applied to the nose and mouth of the patient. The mouth-piece was not applied hermetically, on the contrary, a small space was left, so that the patient could at the same time inhale carbonic acid and a certain quantity of atmospheric air. Sleep ensued after an inhalation of about two minutes, with accelerated respiration and abundant perspiration over the face. This latter phenomenon appears peculiar to carbonic acid, for it is even produced locally on parts submitted to douches or baths of this gas. The patient being asleep, I made an incision into the skin and subjacent tissues, without his making the slightest motion, or uttering the slightest complaint; there was complete insensibility. Just before the operation was concluded I interrupted the inhalation, and then gave the last stroke with the bistoury. Very different from the others, this stroke was felt, although bearable, and the patient immediately recovered his consciousness. I thus proved that the anesthesia produced by carbonic acid ceases immediately the inhalation is stopped, and that the awakening is almost instantaneous.

The innocuousness of carbonic acid seems evident, *à priori*, because it deprives the blood of no vital element, nor does it bring to it any toxical element, while chloroform, by becoming decomposed in the circulation, deprives the arterial blood of oxygen, and places it in contact with oxide of carbon. Therefore, I conclude that *carbonic acid is the most innocent of all anesthesiac agents;* it is the natural moderator of organic sensibility, and its employment in medicine will constitute a real progress.

M. Flourens gave to Dr. Ozanam's communication not only an impartial but a generous and warm reception. "Although it was I," he said, "who discovered the anesthesiac properties of chloroform, which has become so generally substituted for ether, although this immense surgical progress has been to me a source of renown, it is sufficient on the one hand, that the employment of chloroform has been once the cause of death, and it has often proved mortal; on the other hand, if carbonic acid proves to be as efficacious and more inoffensive, I shall sacrifice all pride, and become the apostle of this new anesthesiac agent."

A cement for uniting wood to metal, glass, stone, and other materials, is prepared by Dr. Elsner in the following manner. Carpenter's glue is dissolved in water and boiled to the usual consistence for joining pieces of wood together. Then add sufficient sifted wood ashes to render the glue of the consistence of varnish. It is to be applied while warm to the objects to be joined together, which are to be tightly pressed. When cold and dry, the surfaces will be found so strongly united, that it is seldom possible to separate them, and the fracture is quite different from that of surfaces joined with common glue. Hones, mullers, and similar articles have remained perfectly united after being submitted to rough usage for upwards of a year.

## Photographic Notes and Queries.

### The Manufacture and Prices of Lenses.

Sir,—Being in search of information with a view to purchasing a pair of stereoscopic lenses, will you have tho goodness to explain to me how it happens that the prices of various makers differ so very considerably.

If I understand tho manufacture of lenses rightly, the glass is ground in moulds, or basins (or whatever the term may be), to certain curves, and the moulds being accurately made, it follows (?) that the lenses ground in them, whether by Ross, or Dallmeyer, must be the same as those ground in them by Tom, Dick, and Harry.

Dallmeyer charges for stereoscopic lenses £3 10s.; Ross £4 0s., I think. Here, however, there is but little difference; but a man who ground lenses for *Ross* for *several years* (and consequently those which were and are sold at £4 0s.), having left his employment, grinds lenses on his own account, and sells them for one half the above sum.

What I, therefore, want to know (being not over rich), is whether Ross and Dallmeyer charge this extra amount on account of their "standing" and professional knowledge (which would be quite legitimate), or whether their lenses are actually and *bonâ fide* 50 per cent. better than those made by other persons, considering that in all cases the work is not performed by the *master*, but by the *workman*. My object is simply to get a good lens at a cheap rate, and I shall feel much obliged by your giving me information on the subject.—I am, sir, your obedient servant, Lens.

*London, June* 2, 1862.

[We insert this letter *in extenso*, instead of replying in our "Answers to Correspondents," for the purpose of more fully pointing out the fallacy in the idea involved, and which we have heard not unfrequently before expressed. At the outset it must be apparent that a workman who had been in the employment of either of the opticians mentioned could scarcely be in possession, honestly, of his employer's moulds; but even if presented with a complete set, it would amount to little or nothing; as modifications in one part of the process require making continually to meet modifications existing in other parts. Every fresh sample of glass, for instance, may have a different density and refracting power, this will render necessary perpetual modification in the curves of the lenses to suit each sample. It is not the mechanical workman, or machine, who grinds the lens, but the intelligent head which devises, superintends, and controls the operations, upon which the excellence of the result depends. And it is to the scientific skill and careful personal superintendence of our first English opticians that the reputation for the universal excellence of their work is due, and not simply to any merely mechanical excellence in the workmanship. That their lenses are as much superior as the price is higher may be easily deduced from the fact that some of the best Continental artists use them, notwithstanding the skill of Continental workmen and the low price of French lenses. —Ed.]

### Plate Holders.

Sir,—Presuming that you fully endorse the special article by Mr. Window in your last number, as to the great importance of an efficient glass plate holder for the collodion photographic process, and as to the manifest deficiency of every description of such in the market up till the present date, as elucidated by him, even for the single purpose of developing the image; and also that you would consider the production of one, in every way suitable for that purpose alone, as "conferring a great boon to all grades of photographers both professional and amateur," I hereby beg your permission to announce through the medium of your ably conducted, and extensively circulated Journal, that unless I am surreptitiously forestalled, I trust I shall shortly be able to produce in the market, under my own personal superintendence, one suitable for all sizes of glass plates, at a very small cost, which, after seven years' personal practical experience, supported by a special endorsation from two of the most scientific and eminent photographers in this country six years ago; and which I guarantee will not only effectively meet the desired want, but through which, during all the various processes of grinding the edges, cleansing, sensitizing, developing, fixing, and varnishing, absolute immunity from staining or injuring the hands is secured, and and other manifest advantages realised.—I am, Sir, yours, &c.,

*London, 12th June*, 1862. Donald McNicoll.

## Talk in the Studio.

A COUNTRY FAIR IN THE STEREOSCOPE.—Mr. Elliott has just issued half a dozen instantaneous views for the stereoscope, the subjects being the various scenes in a country fair, photographed by Mr. Valentine Blanchard during the past spring. Few subjects could present greater difficulties to the artist, nor would many be more effective in the stereoscope. The scenes, in many instances, have had to be taken at close quarters, which would have rendered the slightest movement glaringly apparent, but in this respect the slides are, on the whole, very successful. Some of them present hundreds of medley figures in surging confusion amongst stalls, booths, raree shows, &c. The scene of some of the slides is the front of the "Female Blondin's Travelling Circus," on the open stage or platform of which are clown, pantaloon, sprites, and others, gentlemen in tights and ladies in spangles, and all in motley; a placard informs us that admission to the theatre is one penny, whilst from the position of the clown we feel sure that he is adjuring us to "Walk up," and "be in time." The majority of the figures are very sharp, and the effect good. The series forms an interesting record of a time-honoured institution, which is dying out, we believe, for in many places already the statute fair has ceased to exist within the last few years.

THE INTERIOR OF THE EXHIBITION.—Perhaps the most complete record of the International Exhibition, the record which will enable persons in other countries or in after times to form the best idea of its contents, will be the Stereoscopic Company's stereoscopic views of the interior and its contents, by Mr. England. From a sample dozen or two before us, we ascertain that he is much more successful than from the difficulties existing we had believed possible. The photography is characterised by that delicacy and softness, combined with vigour and roundness, which have generally distinguished Mr. England's pictures; whilst the selection of subject, point of view, &c., is in most cases very happy. We cannot conceive anything more delightful to those unable to visit the Exhibition than a few hours with stereoscope in hand and this series of slides before them; whilst few who do visit the building will, we apprehend, willingly neglect to secure such a valuable souvenir of its contents. The series, so far as it has gone, consists of general views of the interior from the various commanding points; views of the different national departments; views of various special courts; and views of single objects of interest, such as Gibson's tinted Venus, which, by the way, looks in the photograph still more like an undressed young lady than in the original. If the Stereoscopic Company are as successful in all their views of the interior and contents as in the examples before us, the result will be one of the most interesting and valuable collections of photographs ever published.

PREPARED SILK FOR DARK ROOMS.—Mr. C. W. Smartt has been for some time past devoting his attention to the production of a varnished silk for the windows of dark rooms, tents &c., and has succeeded very perfectly. The silk originally used in "Smartt's Tent" was pretty good, but we found on a spectroscopic examination made some time ago, that traces of actinic light were admitted. Since then Mr. Smartt has experimented largely with a view to obtain a silk which might be used to admit plenty of yellow light, without any risk of chemical action. The two samples he has sent us, are of a rich deep orange tint verging towards scarlet by transmitted light. The first received showed in the spectroscope a mere trace of green light; but a second sample exhibiting a further improvement within the last few days, is quite impervious to all chemical rays. It does not admit quite as much non-chemical light as yellow glass, but this may be compensated for by using a larger area which may be safely done. Mr. Smartt has submitted it to a practical test, which he thus describes:—"I took a dark slide, and having made twelve apertures 1¼ in diameter, I filled each with one of the media in use, as orange flashed glass, orange pot metal, yellow tammy, ditto calico, and the silk I have hitherto made for my tents, &c., also my new silk. I exposed the whole simultaneously to the full sunshine for one and a half minutes, and the result is that the *whole* of the apertures give a deposit on the plate more or less dense, with the exception of the new article, which left the plate perfectly protected, and without *the slightest trace of action*." Mr. Smartt has sent us a print from the negative thus obtained, which altogether bears out his description. The orange flashed glass appears to present scarcely any obstacle to the chemical action of light; the orange pot metal, however, exhibits the merest trace of deposit, whilst the new silk shows no action whatever. We understand it will be sold by Murray and Heath.

## To Correspondents.

J. WIGHT.—One ounce of chloride of silver contains a trifle more than three quarters of an ounce of pure silver. In estimating the value of the chloride you have collected, you must be certain it is quite clean; several washings will remove all soluble matter.

N. J., Berlin, sends us a print, in which, whilst the albumenized face is perfectly pure and white, the back presents a lavender or mauve tint. The colour appears to be the result of a deposit of gold, but what has caused this deposit we cannot tell. The colour is of singularly little depth, as on splitting the print, which can be easily done, the colour does not seem to have penetrated beyond the surface of the paper.

AN ASPIRANT.—We have no information as to the proportions to be used in patented toning formulæ to which you refer. You will find some remarks on the subject on p. 349 of our fourth volume.

J. W. R.—We have taken thousands of Daguerreotypes, and examined tens of thousands, but we have never seen one fade. They sometimes become tarnished by exposure to dampness or air; but may with care be easily restored. Make a fresh 30 or 40-grain solution of cyanide of potassium. Then take the plate, and having first flooded it with strong alcohol to remove any traces of greasy finger marks, &c., wash till the water flows evenly. Now flood with the cyanide, and watch until the tarnish disappears, then quickly and thoroughly wash under a tap, finally rinsing with distilled water. Dry with the flame of a spirit lamp held at the back of the plate, beginning at the top corner, and assisting by blowing gently so as to drive the moisture before the breath to the bottom corner, which is held by the pliers. This precaution is necessary in drying to prevent stains which could not be removed.

A.—The pale green tint of your solution of nitrate of silver made from the coin of the realm, arises from the presence of a little nitrate of copper. We should not apprehend any evil consequences from its presence in a printing solution; we have on the contrary heard of the addition being made purposely. If, however, you wish to remove it, adopt Mr. Barber's method, as follows: evaporate until the mass begins to fuse to drive off all excess of acid. Then rub down the salt in a mortar with a little oxide of silver, add distilled water and boil. The oxide of silver will displace the copper, which will fall as in oxide, and may, with any excess of oxide of silver, be removed by filtration.

A NEGLECTED ONE.—In societies where the duties of all the officers are unremunerated, it is desirable to limit these duties as much as possible. Hence it is generally customary for members to obtain information on all necessary points by attending the meetings, and thus save the honorary secretary from unnecessary trouble in letter writing. Mr. Wall has been a very hard working officer; and the unavoidable duties of the office have now accumulated to such an extent as to compel him to resign. The presentation print is obtainable at the meetings on the second Thursday in the month, or of Mr. Wall, 35, Westbourne Grove, Bayswater. Tickets for the Crystal Palace were sent, we understand, to all paid-up members. If you have not received yours it is from some mistake. Apply either to Mr. Wall, or to Mr. Howard, 12, Whittingham Villas, Studley Road, Stockwell.

P. X. Y.—It is not an invariable rule that when the picture flashes out rapidly it has been over-exposed Some conditions of chemicals will cause this rapid development when the exposure is just right. No definite rule, as regards time, can be laid down for development. Photography cannot be thus reduced to a matter of rule and line; observation and judgment must continually be used to vary the manipulation to the varying conditions. As a general principle, however, the high lights are visible within a second or two after the developer is poured on a properly exposed wet plate. As a general principle development with iron may be continued as long as any additional detail can be brought out; if the chemicals are in proper condition, the model properly lighted, and the exposure right, there is no danger of producing flatness. The chief fault in the print enclosed appears to have been over-development or over-intensifying.

W.—In some cases the front lens of a portrait combination may be used without much disadvantage for views; but as all portrait lenses are not exactly alike, it follows that all these front lenses will not be equally suitable for view purposes. One disadvantage which generally attends the front lens of a portrait combination is the improper position of the stop which is generally placed in the groove which serves, in the compound, for the Waterhouse diaphragm. This is too near to the lens to produce the best result for landscapes. You may try the front lens of any of your portrait combinations, and use them if the result be satisfactory; but it would not be wise to purchase a portrait lens chiefly with this view. We should prefer an ordinary view lens to the Petzval for landscape purposes. As a general rule, the single lenses of all respectable opticians may be relied upon for doing their work.

R. TAYLOR.—Try the process with honey and tannin, recently described in our pages.

A. B. C.—For converting positives into negatives, see article on Intensifying Processes in the PHOTOGRAPHIC NEWS ALMANAC for this year; in which you will also find the information required on printing, toning, &c. For a dry process, try the honey and tannin.

W. MATTHEWS.—The pyroxyline made as described ought to dissolve in the proportion of five or six grains to the ounce of solvents without difficulty. It seems probable that your temperature was not high enough, or that the acids were somewhat too strong. With the cotton already made, you must use less in the solvents. To the collodion made add ether until it is of the right thickness. With the next batch of pyroxyline, use the temperature higher, or add a little water to the acids. The flocculent particles in the collodion indicate that the whole of the cotton had not been perfectly acted upon. They will gradually settle.

PUNJABEE, M. A., C. B., J. W. T., J. TULLY, and other correspondents, and several articles already in type, in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 198.—June 20, 1862.



## MODES OF ENLARGING PHOTOGRAPHS.

A challenge given and accepted, is at any time certain to excite a certain amount of interest, especially if some important question is to be settled by the encounter. We have no doubt that many of our readers looked with considerable interest for the issue of the friendly contest between Mr. Vernon Heath and M. Claudet, to decide the merits of the modes of enlargement which they had respectively adopted. The little affair "came off," however, as our readers are aware, without materially altering the question, or bringing about any decision. M. Claudet and Mr. Heath each produced very excellent specimens of their methods, which were generally admired: some commended those of M. Claudet because they were developed prints on plain paper, and were soft and round; others admired those of Mr. Heath because they were on albumenized paper, and were sharp and vigorous; but no general decision was, or indeed could, be made.

The truth is, that the question in the form it finally assumed, never ought to have existed. As Mr. Heath stated, he never intended to put the case in such a form; by some misconception, however, it drifted into the position of ordinary camera enlargement *versus* solar camera enlargement, and ended by deciding nothing. The important question for photographers is not so much which of these methods is best, but are either or both good, or at least sufficiently good to be worth practising? Our own conviction often expressed is, that for certain purposes, and within given limits, they both are good and useful; and each is best in turn as circumstances may vary.

That very excellent photographs can be produced by means of the solar camera there is not room for question. Let those who have the slightest doubt on the subject visit the Exhibition at South Kensington, and examine the various enlarged specimens exhibited, the examples in the British department, even despite the very occasional willingness of the sun to lend his direct countenance to photography on such a scale. If any doubt exist after seeing these specimens, then proceed to the various foreign departments, inspect those of Disderi and others in the French Court, of Albert in the Bavarian Court, of Hansen in the Swedish Court, or of Ghémar in the Belgian Court. The last especially: we have no hesitation in pronouncing the full length portrait of the Compte de Flandres the most perfect enlargement in the exhibition, and as little short of perfection as a photograph. The picture is about three feet high, the figure, which is enlarged from a card negative a little over two feet high. Every part of the picture appears to be in perfect focus; head, feet, and hands; carpet, curtains, and accessories; everything is well and delicately defined. The picture is, moreover, at once soft and forcible, free alike from the insipid feeble greyness, or the hard blackness which characterizes some enlargements. To say that it is absolutely untouched is more than we can venture upon; but we cannot perceive any touching; and we are assured by a friend, who had an opportunity of inspecting a copy in M. Ghémar's studio, that the touching is confined to the spot of light on the eyes, and the decorations of gold, silver, and brilliants on the breast: objects like these, reflecting light so vividly from every facet, on the slightest movement caused by the heaving of the chest, become, as every photographer knows, blurred in the negative, and their need of touching in no way detracts from the merits of the solar camera enlargement. The flesh, hair, draperies, furniture, &c., are all, we are assured, pure photography, and quite untouched. We can add that they bear every appearance of being so. M. Ghémar's pictures are not developed, but "printed out" by the sun, an exposure of three or four hours being necessary.

With results like these before us, notwithstanding the force of theoretical objections, we are satisfied that very perfect results are to be obtained by means of the solar camera. There may be theoretically, and to some extent practically, dispersion and diffraction of light, and diffusion or confusion of the image; but if these evils are practically found in such a minimized degree as to be, in good work, imperceptible, photographers may well afford to disregard them; and even if the results were such as served only the purpose of the artist to work in pastels or oil colours, we should still regard the solar camera as a most important aid to the photographer.

It may be urged, we know, that there is no evidence that many of the Continental photographers use the solar camera. On this subject, however, we have evidence that the majority of the Continental photographers do use the solar camera, or some modification of it. M. Ghémar states that he does so, and so do many of the French artists. A very fine enlargement of a portrait of Mr. Negretti, produced in Italy by an artist who is stated never to have seen a solar camera, turns out, however, on a description of the appliances to have been produced exactly on the solar camera principle. Whether that principle be new or old, is now, since the patent has ceased to exist, a question of very little importance. That the solar camera is in principle the same as the solar microscope, cannot be denied; nor can it that the solar microscope was long ago applied to photographic purposes. To Mr. Woodward is due at least the credit of a revival, and also of an extended application of the principle. Practically he brought to bear upon enlarging processes a method of using the maximum of light with the minimum of aperture, and directed that the aperture, or what is equivalent, the focus of the condenser, should be at that point which secures the greatest flatness of field, namely, in contact with the front lens.

Having admitted to the solar camera, however, all which can be claimed for it, the position Mr. Heath assumed before the Photographic Society at the meeting in May, is in no wise altered or destroyed. If the solar camera were more perfect even than it is, and all its perfections universally admitted, there cannot be a question that for the greater part of the year in this country, it must be entirely idle; direct sunshine is imperative; the idea of using a reflector and condenser in diffused light is simply useless. Even in Paris, where sunshine is a little more plentiful and constant than in this country, it is not sufficiently plentiful and constant; as M. Disderi, we understand, has founded an establishment in Algeria for using the solar camera, whither he sends all his negatives, from which amplified prints are required. But even if the instrument were admitted perfect, and the light unquestionably always sufficient, it is not every photographer, especially every amateur, who possesses or would care to possess, a solar camera, and devote a room entirely to its use. Mr. Heath, then, had given considerable attention to the improvement of a method long known, but little practised, whereby enlargements, not simply of the single prints, but of the negative, could be produced by a trifling addition to the appliances already in the possession of every photographer. That the enlargement was the result of two operations, was a small objection, seeing that, as we have remarked, when produced it was a negative, from which any number of prints could be obtained by the ordinary processes of printing.

That such a method must be a boon to amateurs there cannot be a question. To be able, either in the operating-room or the field, to produce small, perfect negatives requiring short exposures, and involving very little labour or difficulty at the time, and afterwards, at leisure, enlarge them easily and perfectly to sizes of, say 10 by 8, or 12 by 10, is such a tempting prospect, that every photographer, certainly every amateur, must covet it. This was the prospect Mr. Heath wished to hold out: the range of enlargement he proposed and that usually effected by the solar camera were two distinct things, in no way competing or clashing with each other, and there was no need to put them in competition, or suppose them to be in any sense antagonistic.

It is a somewhat singular fact that long as the method referred to by Mr. Heath has been known, it has not been successfully practised; hard, coarse negatives being its general results. That this is not necessarily the case, we have long been convinced, and the specimens shown by Mr. Warner and Mr. Fry in the International Exhibition prove; although some of these leave something to be desired. Mr. Heath also, at the meeting in question, exhibited pictures which proved pre-eminently that delicacy could be obtained. He felt, however, that in a process so desirable and yet so little practised, it was worth while to enlist general interest in the improvement of its details. It unfortunately happened that, instead of this result, a dispute as to its merits ensued, and, so far as discussion could aid it, the matter stands where it was. The subject has engaged much of our attention, and we have experimented for many months past at intervals in improving the manipulations. On a future occasion we shall have something further to say on the subject and some hints to offer. In the meantime we commend it as well worthy of attention and experiment, to all interested in obtaining the best results by the simplest means.

## SOUTH LONDON PHOTOGRAPHIC EXHIBITION.

In returning to the South London Exhibition at the Crystal Palace, our attention is arrested to the reproduction of a clever pictorial *jeu d'esprit*, sketched by Mr. Wall entitled "An Essay on Photographic Criticism," and dedicated to the *London Review*, and *Saturday Review*. It consists of seven heads, portraits of the various critics, whose opinions are often heard on matters of photographic. The portraits are described as follows:—

1. The critic who thinks that "photographs always give a receding effect to the forehead."
2. The critic who thinks "photographers should never light their sitters from the top."
3. The critic who states that "photographers always exaggerate the prominent features."
4. The critic who asserts that "photographs make her look so old, quite like a woman of thirty."
5. The critic who thinks "photographs invariably give one such an unpleasant expression."
6. The critic who thinks "you always look so silly in your photographs."
7. The critic who "is generally very well satisfied with a photograph."

We may add that each grumbling critic, if he receive simple justice from the camera, will conceive that he has the strongest facial reasons for spiteful feeling. Nos. 1 and 6 are receding foreheaded, shallow-pated spoonies; No. 2 is a beetle-browed gentleman, the whole of whose brain seems to have taken lodgings in a pent house over the eyes; No. 3 is a youth whose most salient features occupies nearly one-half of his face; Nos. 4 and 5 are portraits of ladies of about —well, a "certain age," and have apparently been disappointed in life; No. 7 is the head of a lovely girl, who may defy the most truth-telling lens to make her other than lovely. In the centre are "That arch caricaturist, the camera, as it appeared (after taking several glasses) conspiring with the sun against the surrounding critics." The camera wears the focussing cloth as a cowl, and seems to enjoy the fun, whilst the sun fully enters into the spirit of the thing. The sketch is a capital pendant to M. Claudet's recent able letter on the subject. We commend it heartily to the critics of the *Saturday* and *London Reviews*, and all whom it may concern.

Amongst the most noticeable pictures at the Exhibition are the contributions of Mr. Earl, with whose large and excellent views of Raglan Castle many of our readers are familiar. His chief contributions here are a series of very large photographs of Witley Court with the surrounding grounds, fountains, &c. These pictures are very large, perhaps 24 by 18, and the photography very good; a photograph of one of the fountains, consisting of a fine Andromeda, is especially good in many respects. We must confess, however, that except for special subjects, we do not admire such large photographs. We give these all praise, however, for the excellence of the work, and the care in preparation.

Mr. Tyley sends some remarkably fine architectural photographs. A view of Bristol Cathederal is equally good as a picture, and as a photograph. Two examples of different photographic treatments given to a "Memorial Design" are both admirable pictures, and instructive illustrations of the effect of dark and light backgrounds.

Some of the most charming pictures in the Exhibition are scenes in Venice, contributed by Mr. W. H. Warner; they are executed, however, by an English amateur, who, for private reasons, is not desirous of appending his name in publishing them. The "Bridge of Sighs" is a very perfect picture, the point of view is well chosen, and the photography very brilliant without being hard. The deep masses of shadow are in admirable keeping with the subject, whilst the soft irregular reflections in the water are admirably rendered. Various other views by the same hand do more or less justice to the "Queen of the Adriatic." Here is the Bridge of the Rialto, and here the Cathedral of St. Mark; here is the Mole past which "silent rows the songless gondolier." The whole of these pictures are good, and the subjects fraught with unusual interest. Here also are a few examples of Ponti's admirable views of Venice, in which the photograph is carefully coloured. We have rarely seen photographic views of architectural or landscape scenery with any attempt at colour, that have not been entirely spoiled by the operation; but these views of Ponti's are tinted in water colours with so much care and judgment, that we are compelled to admit, that, for Venetian scenes especially, the colour is an improvement on the monochrome. The reference to these pictures reminds us, that in a gallery at the Crystal Palace, not far from the Photographic Exhibition of the South London Society, there is a large array of photographs by Ponti and others in every stage of green and yellow decomposition and fading. We do not know to whom they may belong, but we should be glad for the credit of the art to see them removed from public exhibition.

Mr. Spode sends some good landscapes, of which we may mention "Sheephill Cove, Isle of Wight," and "At Armytage, Staffordshire," amongst those which please us best. Mr. Haigh sends several Australian views, which, though photographs, are chiefly interesting from their localities. Mr. Olleys contributes some excellent specimens which interest microscopists; they consist of transverse sections of various trees and plants, and some entomological subjects, enlarged by what is described as the reflecting process. Mr. Mainwaring exhibits some frames containing a class of subjects he has made peculiarly his own; we refer to his exquisite photographs of flowers, singly and grouped; some of these groups are perfect gems. Many photographers will remember Mr. Roger Fenton's groupings of fruit flowers, *bric-à-brac*, &c., *à la* Lance. Some of Mr. Mainwaring's groups are very similar, with this difference and advantage, that they are much smaller, none of them exceeding half-plate size. In Mr. Fenton's pictures, reproducing flowers, fruit, &c., the same size as nature, the absence of the colours of nature was unpleasantly felt; the pictures also were equally unfitted for mural decoration and for convenient keeping in a portfolio. These pictures of Mr. Mainwaring's, are, however, just the size for preservation in albums. The photography, the grouping, the arrangement of background, &c., are all equally good. Some of them are very nicely tinted; we believe by Mr. Mainwaring himself.

Turning to the examples of the dry processes, although we are disappointed at not meeting with works of some of our best men, such as Mudd, Sidebotham, and others, as we have to regret the absence of some masters in the wet processes, yet we find dry photography on the whole ably represented. It is a somewhat singular fact, however, that but one gentleman sends specimens of the Fothergill process, which, but a few years ago, was so largely practised: and what is not less singular, Mr. Fothergill, the originator of that process, himself contributes in conjunction with Mr. Branfill, some admirable specimens done by the tannin process.

By this process some very excellent pictures are exhibited. Mr. Thomas Annan, of Glasgow, who also contributes some good landscapes by wet collodion, sends some very fine tannin pictures: "The last Stooks of Harvest" is a magnificent photograph, and a very fine picture in the most comprehensive sense of the term. The subject, the composition, the lighting, and general photographic treatment, are alike good; and the great breadth of the picture is not spoiled by a mass of white paper for sky. Both this and another large tannin picture sent by Mr. Annan, "Loch Ranza," have fine skies and clouds. These, we have before understood Mr. Annan to say, are printed in separately, but they are joined with sufficient skill to prevent attention being called to the subject. We have before expressed a conviction that this is perfectly legitimate, and as effected by Mr. Annan, there cannot, we think, be the shadow of an objection to it. He remarks in a communication to us some months ago, "my skies are generally dense enough to print pure, or where they are not, I protect them in printing by some simple appliances, *always taking care that the horizon is not interfered with*, and then I print in my clouds which are taken from nature." The words we have italicized are of the utmost importance in such matters; and it is in reference to the impossibility of preserving the delicate aërial line of the horizon that we have always condemned utterly the practice of blocking out the sky. Double printing executed with taste and judgment we hold to be perfectly legitimate; and the success or want of it in the result is the true test. All Mr. Annan's pictures are successful, and his "Last Stooks of Harvest" is a genuine work of art.

Mr. Penney of Cheltenham exhibits a few very fine soft and detailed tannin pictures. Mr. J. J. Cole exhibits some excellent pictures by the same process, to which we refer in another column. It is somewhat singular, that whilst the dry processes generally have had a reputation for hardness, and the tannin process, especially at one time, appeared likely to obtain a reputation for hardness, all the pictures by dry processes, and by this process pre-eminently, are soft and full of detail and of atmosphere. Mr. Cole's architectural pictures, illustrating the works of Sir Christopher Wren, are all extremely delicate and soft. Mr. Cole also exhibits some good pictures taken on Dr. Hill Norris's plates.

Admirably illustrating the possibility of obtaining the utmost delicacy and softness on dry plates are Mr. G. C. Buxton's views in the East. The best views of these scenes by the wet process, produced by the first photographers, do not surpass these in all that constitutes good photography. There is one picture which is a perfect gem in its rare and beautiful rendering of a broad stream of sunlight slanting down on the "Hypathial Temple, Philæ." Mr. H. Petschler also contributes a series of examples of the collodio-albumen process, or rather of his own and Mr. Mann's modification of it. Mr. Petschler's pictures possess great artistic and photographic merit. If we are not mistaken, we saw some of the same specimens at the Manchester Exhibition last autumn, when they struck us as a little heavy; whether that was due to the light in which they were hung, or the special characteristics of the prints then exhibited we cannot tell; but certain it is that these appear in all respects satisfactory. Most of these pictures possess pleasing skies, diversified by low-lying clouds near the horizon. Whether these are natural clouds, or produced at two printings, or the result of skilful working on the negative, after the fashion of Mr. Mudd and others of the Manchester school, we cannot with certainty determine. We incline to the latter view; but when we state that we have heard it very closely discussed by good photographers examining the prints, without any conclusion being reached, our readers will infer that the result is good. It is unquestionably a great improvement to the pictures, and we repeat again the dictum that success is the touchstone of legitimacy. We commend the specimens to the attention of such of our readers as may visit the Exhibition, and especially advise an examination of Mr. Petschler's "Matlock High Tor," "Wingfield Manor," "Haddon Hall," "At Bettws, North Wales." "Stone Quarry, Derbyshire."

The only Fothergill specimens are exhibited by Frank Howard, late Treasurer of the South London Society. We have on repeated occasions before had occasion to speak of the very successful efforts of Mr. Howard with the Fothergill process. The specimens here exhibited, both stereoscopic and whole plate, are distinguished alike by careful manipulation and artistic feeling.

The calotype process, we are glad to say, is fairly represented. We should be very sorry indeed to see the earliest, and still by no means the worst photographic process, entirely numbered amongst the things of the past. We had hoped to see a frame of specimens from Dr. Diamond's exquisite calotype negatives, of which we know he possesses some hundreds. His duties as a juror have, we understand, prevented the fulfilment of a promise to contribute. Captain Sellon exhibits some very interesting prints of Indian scenery, &c., from calotype negatives. Mr. Bayhnam Jones also exhibits one or two good pictures from calotype negatives.

Mr. Bartholomew, whose communications on the value of organic salts in collodion have recently appeared in our columns, exhibits two frames of stereoscopic pictures from negatives produced by the processes described. Besides their own merit as pictures, they possess great value as illustrating the method of production, and we commend them to the attention of visitors. Our space warns us to defer further remarks until next week.

## BROMIDES AND IODIDES: THE IMPORTANCE OF PROPER PROPORTIONS.

BY CHARLES HEISCH, F.S.C.

Dear Sir,—As an early advocate of the use of bromides in photography combined in proper proportions with iodides, I shall feel obliged if you will allow me to say a few words on the subject which is now attracting the attention it really deserves. You will remember, that as early as 1852 I expressed an opinion that iodide and bromide in the proportion of two equivalents of the former to one of the latter gave more rapid and satisfactory results, especially where objects of various colours were to be copied, than anything else. From this opinion no subsequent experience has made me swerve. But it is to the circumstances necessary to render any experiments on various modes of iodizing strictly *comparable* that I wish now to call attention. I do not consider that the truly *relative sensibility* of two collodions to *light* can be tested if different developers be employed. All then proved is that one collodion will bear a stronger developer than another without fogging. On the other hand, no experiments are comparable in which the iodized collodion contains a given quantity of iodide, and the bromo-iodized the same quantity of iodide with the addition of some bromide.

A point of very great importance in attaining the maximum sensibility, either in iodized or bromo-iodized collodion, is the proportion between the quantity of pyroxyline and the quantity of silver deposited in the film, whether as iodide or bromide, and to make experiments comparable this proportion should be constant, so that when bromide is added to a collodion the iodide should be proportionally diminished. If too little silver be precipitated in the film the particles of iodide or bromide are so surrounded by pyroxyline as to lose much of their sensibility, if too much silver be present the precipitated salts hang loose in the film, and are apt to wash out and cause patches. The result of a number of experiments has led me to the conclusion that 6 grains of good pyroxyline will bear satisfactorily sufficient iodide, or mixed bromide and iodide, to combine with 2·5 grains of silver. In all the experiments which I have at various times made on the best proportions of the two salts, this point has been carefully attended to, a result always in favour of the proportion of bromide and iodide before mentioned, the bath and developer being always the same. I believe much of the discrepancy in the results obtained by different experimenters, is to be traced to a want of attention to such points as the above, which would go far to reconcile apparently contradictory results, which, as has been well remarked, "contradictory as they seem, are all true, but are truths imperfectly understood."

*Middlesex Hospital, June 17th*, 1862.

## The International Exhibition.

### THE BRITISH PHOTOGRAPHIC DEPARTMENT.

The Jurors have now completed their labours, and rendered their reports. At what period those reports will be published, we are unable to state; it is indeed undecided as yet by the Commissioners themselves. As one of the primary clauses of "Instructions to Jurors" is an injunction to secrecy in regard to their discussions and awards, information of a definite character cannot at present reach the public; the traditional "little bird," however, which has from time immemorial prated of secrets, has whispered sufficient to make us hope that the adjudication will be on the whole satisfactory, that nearly a hundred exhibitors will be made happy by the receipt of bronze medals, and considerably more than that number will be distinguished by "honourable mention." For details, however, expectants must wait for Time, the revealer.

The irregular arrangement and hanging preclude any satisfactory consecutive notice of the pictures, whether in relation to the numbers, subjects, or artists, we shall therefore pursue such order as we can in glancing at the most noticeable contributions. We may mention here that we are glad to perceive that our intimation as to the effect of the damp walls has induced some contributors of pictures tinted in water colours, to remove those which had been injured. Others remain as witnesses of the destructive action going forward. What will be the state of some before October, we will not at present contemplate.

We commence our present notice by calling the attention of visitors to two of the most interesting contributions in the room, but which are, nevertheless, very likely to be passed over by many entirely unnoticed. They consist of two thin quarto albums, laid upon a table in a corner of the room, opposite the visitor, and at his right hand in entering. They are numbered 906, and 907, and are contributed by Mr. R. Harmer, in whose name we have pleasure in recognizing a member of the South London Committee. The first album contains specimens of photography as it may be applied to book illustration; but it is chiefly interesting to the photographer for the examples it contains of effective fancy printing. The especial object is to show that a proper margin of white paper may be secured round a print of any shape, without the necessity of mounting. Here, each on a quarto sheet of paper, are prints of all shapes, oval, square, &c., with a pure white margin of the photographic paper. Perhaps the most effective specimens are those in which the appearance of an India paper tint is produced around the print, and beyond the tint white margin, giving three distinct tints—that of the photographic background, the India paper, and that of the white margin, but all produced on one piece of paper by skilful masking whilst printing. Another style of printing not less pleasing illustrates the effect of apparently vignetting on tinted paper: the image graduates into a pale warm grey or drab, instead of into a background of white, the whites in the image itself, however, being kept quite pure; whilst around the pale grey into which the vignetting is merged, is a margin of white. This style has somewhat the effect of a crayon drawing on tinted paper, with the high lights put in with white chalk; but is infinitely superior to anything of the kind in its delicacy and force. Other vignettes are printed entirely on a tinted ground, the paper apparently having received a little general exposure before or after printing the negative. This method, which would apparently be so destructive of anything like pure or vigorous prints, becomes very effective in certain cases; for instance, here is a head from a negative which is manifestly hard and over-intense; with ordinary printing it would be chalky in the extreme; but here there are no high lights, the vigour is subdued, the empty patches of white without detail cease to be offensive, as the whole has simply the sketchy suggestiveness of a chalk drawing. Many of the photographs are in themselves very excellent, but under the treatment they have received in printing they become some of the most charming photographic pictures we have seen. Altogether this album is a most instructive contribution, full of suggestion to the printer ambitious to excel in securing the most artistic effects of which his negative is capable; and we heartily commend every photographer who visits the Exhibition to spend a quarter of an hour examining this album. We must not omit to add that the prints are on paper albumenized on both sides, a method proposed in our columns by Mr. Harmer some time ago, as both improving the quality of the prints, and for book illustration giving uniformity of appearance to the paper in prints not intended to be mounted.

Mr. Harmer's other album contains half-a-dozen chromo-photographs, by a method which has been more than once suggested; but not before, to our knowledge, tried. The photographs are printed on papers prepared with the graduated tints produced by lithography, for pencil or chalk drawings. Most of our readers are doubtless familiar with these prepared papers, which are usually sold at repositories for drawing materials, and possess tints graduated for various effects; generally commencing, however, with warm browns for the foreground, running into sunset tints of yellow and red, and these again into the blues. It is upon these tints that Mr. Harmer has contrived by careful printing to produce half-a-dozen landscapes. We understand that no special treatment was adopted; the ordinary processes of sensitizing, fixing, and washing, having been used, but great care exercised throughout. The result is decidedly successful: a new field for the judicious exercise of taste in printing is here not merely suggested, but practically illustrated; and Mr. Harmer, we conceive, deserves well of his photographic brethren for these very pleasing and instructive contributions.

There are scarcely so many subject pieces or *genre* pictures as might have been anticipated; probably from the uncertainty in which photographers were kept as to their ultimate position in the Exhibition. This cause we know operated in a detrimental manner upon the contributions in various ways, giving little time and less heart for the preparation of especial pictures. Foremost amongst the contributors of this class are the two names, often mentioned conjointly, of

Rejlander and Robinson. The former exhibits two or three frames, containing some charming pictures, of some of which we have already spoken; and all of which have, we believe, been before exhibited and noticed. They are mostly hung too high for careful examination: in one frame we can conceive the presence of a variety of little naked cherubs may have influenced this. We should have been glad to see the other frames in a position more worthy of their merits. These contain the well-known art photographs "The Wayfarer," "God Speed Him," "The Scripture Reader," "Absence of Mind," &c., &c. Those who would examine them carefully must provide themselves with a ladder; or better still, visit the publisher, Mr. Victor de la Rue, or the artist himself in the Haymarket, whom we have pleasure in taking this opportunity of welcoming as a resident Metropolitan photographer.

Mr. Robinson sends several old favourites, including the earliest which first called attention to his unquestionable genius, namely, "Fading Away," and "She never told her Love." "Little Red Riding Hood," "Here they come," "Top of the Hill," "Holiday in the Woods," &c., are also exhibited. "The Lady of Shalot," his most recent composition picture is also here, and despite criticism, and despite some real faults, it excites much attention and admiration. The general public, who do not give photography credit for the production of such things, after examining attentively, and admiring, generally pass on, exclaiming, "Undoubtedly a very clever copy of a painting." If photography has contributed, as it undoubtedly has, much to the spread of præ-Raphaelitism amongst painters, unquestionably the præ-Raphaelite painters have reacted on some of our photographers. Mr. Robinson has beyond a doubt come under their spell, and to their influence and example some of the faults in this picture are attributable, as any one examining Millais's paintings in the Picture Gallery in the Exhibition, especially the "Apple Orchard," may readily see. Despite all this, however, it is a noble picture, full of true poetry. Mr. Robinson also exhibits "Elaine, with the Shield of Launcelot," which we noticed at the Manchester Exhibition. We then pointed out some short-comings in the story as told by the picture, and we have since ascertained that it was merely a preliminary sketch for a more ambitious picture, and preserved because of some good points it possessed. It is unquestionably good as a photograph, although defective in some parts as a picture, and we cannot help here defending it from some amusingly ungrounded strictures in a notice of the South London Exhibition appearing in a contemporary. The writer in a notice of that Exhibition, on the whole interesting and well intended, takes entire exception to this picture, especially on the ground of its violation of historic truth in depicting the draperies and accessories, the shield meeting with especial censure. The writer says:—

"Heraldic devices upon the shield were only invented when, locked up in complete steel, the warriors had no other resource left by which to make themselves known to their friends and followers, therefore the rampant lion is out of place. And, once again, the shape of the shield is one which we have every reason to believe our rude forefathers never adopted—all the British shields, of which we have any account or relics remaining, being flat and circular, ornamented more or less with metal knobs and bosses. In the British Museum a shield exists which might well have served as a model for Launcelot's."

We cannot help regretting, whilst reading this waste of historic and heraldic lore, that the writer had not taken the trouble to read the Laureate's poem, a glance at which spares us the necessity of comparing dates and costumes. Mr. Robinson has, we know, studied the poet with a reverent admiration, and has, in these details, at least endeavoured to render him correctly. Let us see how far a device at all, or this especial device is true to Tennyson's description, upon whom, therefore, the onus of its presence must rest, and, who, if *he* failed to make himself familiar with all that pertained to Arthur's time is—well, he is to blame, and the critic is, under such circumstances, right. Tennyson tells us that the "Lily Maid of Astolat," having this shield in her care,

> " ——— fashioned for it,
> A case of silk, and braided thereupon
> All the devices blazoned on the shield
> In their own tinct."

Further, Launcelot going forth in disguise to contend for the diamond at Camelot, asks of the Lord of Astolat a shield:—

> " ——— and the shield—
> I pray you lend me one, if such you have,
> Blank, or at least with some device not mine."

So much then for the presence of a device on the shield. Now let us see if the device be a correct one. Mr. Robinson's shield has a rampant lion; in the "Idylls" we find the matter thus:—

> "And when the shield was brought, and Gawain saw
> Sir Launcelot's azure lions, crowned with gold,
> Ramp in the field."

So much for the rampant lions.

All this, we know is not exactly photographic; but it bears pertinently upon photographic criticism and upon the historic correctness of a photograph, and we feel it important that photographic criticism should not lose all value by indulging in baseless or ill-informed strictures. Errors of judgment all are liable to, but it is important to avoid errors of fact. If Mr. Robinson ever carry out his original idea, we shall doubtless have a better representation of "Elaine the fair, Elaine the loveable," and although we shall have the shield with his device of the ramping lions, it will bear indisputable traces of the stern blows which awoke the sympathy of the "Lily Maid of Astolat."

Mr. Mayall contributes some *genre* studies, which will, however, bear out his reputation for being unequal. Some of these are very charming pictures, and deserve a much better light than that in which they are hung "The Great Light shines through the Smallest Window" is a very beautiful picture; the scene is an humble cottage in which a little child reads the Book which contains the words of hope and peace to man; to which an aged peasant listens with evident attention. The subject, the composition, and the photography, are alike good. "A real Ten-pounder" is another good picture, an illustration of an election *jeu de mots*, the ten-pounder not merely representing a ten-pound householder, but a ten-pound note, which the "hon. member for Tipem" has slipped into Hodge's hand whilst asking his "vote and interest." The story is cleverly told, the photography is good, and the picture is interesting to many, as containing an admirable portrait of Mr. Mayall himself, and one of Alfred Crowquill, as the "honourable member." There are some other pictures of the same class, and one entitled, if we remember rightly, "One more Unfortunate," which is a sad travestie on Solomon's "Drowned, drowned," exhibited at the Academy two or three years ago.

Mr. Charles Critchett exhibits a couple of studies, "The Nun," and "The Dairy Maid," which have considerable merit. Messrs. Ross and Thompson have several frames of very fine studies, in which the feeling and arrangement generally are very excellent; but there is an unfortunate heaviness and blackness, which sadly mars the effect in other respects so good. Heath and Beau exhibit a few pretty vignetted heads possessing much character and archness. There are a few other similar contributions which do not arrest our attention by any especial characteristics.

## PHOTOGRAPHIC CHEMICALS.

The first thing that must strike the visitor upon entering the department of the International Exhibition devoted to chemicals, is the very great advance which has been made in this branch of science during the last ten years. As compared with the Exhibition of 1851, the display is far in advance of anything there shown, whilst the beauty of the individual specimens is also very superior. We have already alluded to the fine specimens of rock salt, which form a trophy just at the entrance to the chemical annexe. This is exhibited as the support and centre ornament of a fine collection of the different varieties of salt met with in commerce. Here this very necessary photographic chemical may be seen in all varieties of form and purity, whilst the damp position in which the whole is exposed, shows the difference between the various qualities, and warns the photographer not to use any but the best variety for his purpose: all the specimens in this case, except those which are very pure, rapidly running to liquid.

Passing on from this trophy, which is included in Class I., as a mineral product, we enter the domain of chemistry proper. Among the first cases of photographic interest which here meet the eye is one shown by Messrs. Johnson and Sons, of Basinghall Street, No. 541. This firm exhibits a large dish filled with massive crystals of nitrate of silver, which, although they have been exposed to the full action of light and air, almost since the opening of the building, scarcely seem affected at all in colour. They have also a good assortment of nitrate of silver prepared with especial reference to photographic requirements. Little cakes of fused nitrate, not, however, of a very brilliant white colour, weighing exactly one ounce, being done up in pill boxes. We do not like the plan of keeping this salt in contact with organic matter. It may not be rendered any worse for the association, but photographic chemicals, nitrate of silver especially, should be, like Cæsar's wife, not only pure, but above suspicion. A far better plan of storing this salt is also to be seen in this case: little tubes of yellow glass having 180 grains, the quantity required for a quarter-size nitrate bath, hermetically sealed up in them. This has many advantages for the tourist and amateur photographer, as it not only saves the trouble of weighing out, but prevents any danger of contamination from dirty scales. For larger quantities of nitrate, Messrs. Johnson and Sons have yellow glass bottles. A few other silver salts are also exhibited in small bottles, such as chloride of silver, cyanide of silver, oxide of silver, as well as the precipitated metal. The chemist and photographer will each appreciate the beautifully crystallised chloride of gold, which is also seen in this case. The crystals are large, and very dry; the same may also be said of the chloride of platinum, each of which salts are shown, sealed up in glass tubes for photographic purposes, and containing definite weights of chloride with the equivalent also given in pure metal. We notice also some delicate-looking test papers, both litmus and turmeric, in books, some white-looking lumps of kaolin, and some good crystals of nitrate of uranium. They likewise exhibit pure silver wire, and also some soft iron wire, coated with gold, for dentists' use. We think the photographic instrument maker could make use of this wire very advantageously for the corners of frames, in the dark slide, and for dippers and other purposes, where silver is now used. We do not know its price, but for equal strength it would certainly be cheaper than silver wire, whilst the metal, gold, would be even better than silver for regular contact with the silver bath. There are also an instructive collection of mineral ores with the pure metals extracted from them, and also some large show crystals for druggists' windows.

Not far from the above case may be seen a nice collection (No. 588) of colours, red, green, blue, and yellow; carmine, vermillion prepared in the wet way (of a very beautiful colour), dye extracts and aniline mauve; all of which are of interest to the artist. The same firm, Messrs. Roberts, Dale, and Co., Manchester, exhibit hyposulphite of soda in large crystals, and considerable apparent purity, as well as caustic soda, tannic acid, and oxalic acid. These specimens of soda are, however, eclipsed by the magnificent blocks of alkali sent by the Jarrow Chemical Company (540); their mass of carbonate of soda is amongst the finest in the building, whilst their caustic soda is almost equally good.

(*To be continued.*)

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Potassium salts* (continued).—The sulphate of potash has already been described. The bi-sulphate may, however, be mentioned briefly, as possessing some valuable properties, which render it a useful adjunct to the ordinary materials of a laboratory. It is formed on the large scale in the preparation of nitric acid from nitrate of potash. When this acid is liberated from nitre by distillation with oil of vitriol, a residue is left behind in the retort, which, according to the quantity of oil of vitriol used, consists either of sulphate of potash $KO.SO_3$, or bi-sulphate of potash $KO.SO_3.HO.SO_3$. At first sight it would appear the most economical plan to add just sufficient sulphuric acid to liberate the nitric acid from the nitre, thus

$$KO.NO_5 + HO.SO_3 = KO.SO_3 + HO.NO_5.$$

It is, however, found that there are disadvantages attached to this plan. The operation is obliged to be performed in glass retorts, and, consequently, economy must be directed towards the retort, as well as to the oil of vitriol. The residue of sulphate of potash forms a solid hard cake, not readily soluble in water, and, consequently, offering considerable resistance to any attempts which are made to remove it from the retort. In four cases out of five the glass is cracked during the operation. It has been found, however, that if a double quantity of sulphuric acid be employed thus—

$$KO.NO_5 + 2HO.SO_3 = KO.SO_3.HO.SO_3 + HO.NO_5$$

the residue in the retort consists of bi-sulphate of potash, which can be removed without difficulty with warm water. Oil of vitriol is very cheap, and the value of the extra equivalent is trifling in comparison with the saving effected in the value of the glass retorts. After the bi-sulphate has been entirely dissolved out, the solution is to be evaporated. The bi-sulphate may also be obtained by dissolving 87·2 parts (1 atom) of sulphate of potash in forty-nine parts (1 atom) of oil of vitriol; the hot solution, especially if a little water be present, yields crystals of the bi-salt immediately on cooling, and the remaining quantity of the salt can be procured by evaporating and heating the supernatant liquid to dull redness. The bi-sulphate crystallizes in the anhydrous state in fine needles, melting at a temperature a little below redness. It is also obtained in the hydrated state when crystallized from an aqueous solution, forming oblique prismatic crystals; they fuse at a trifling lower temperature than the anhydrous salt. Bi-sulphate of potash dissolves in about half its weight of boiling water; the solution solidifies to a mass of needles on cooling. When dissolved in a larger quantity of hot water and allowed to crystallize, decomposition takes place to some extent; neutral sulphate of potash crystallizing out on cooling, leaving free acid in the solution. It seems as if an excess of water overcomes by its affinity for sulphuric acid that of the sulphate of potash for the same. When the powdered salt is diffused through a considerable quantity of cold water, the whole of the free acid may be removed, leaving neutral sulphate of potash behind. The equivalent of hydrated acid present in this salt, acts in many instances as if it existed in the free state, and on this account is of great use in the laboratory, being a convenient form of applying this energetic body at a high temperature, as for instance, in fusing and decomposing refractory minerals, cleansing platinum crucibles, &c.

*Iodate of Potash.*—This salt being formed whenever iodine and potash come together, and being liable to be present in many photographic compounds, a short account of its properties may prove interesting. It may be prepared by dissolving iodine in caustic potash, until a permanent brown colour is just produced. Six atoms of caustic potash, and six atoms of iodine, forming one atom of iodate of potash and five of iodide of potassium, thus—

$$6KO + 6I = KO.IO_5 + 5KI.$$

The liquid is to be evaporated to dryness, and the residue exhausted with alcohol sp. gr. 0·81. The iodide of potassium dissolves, leaving the iodate undissolved. Upon solution in water and recrystallization the iodate may be obtained pure. It forms small white cubical crystals which are anhydrous, and are unaltered in a dry atmosphere. At a low red heat it melts and evolves 22·59 per cent. of oxygen gas, being converted into iodide of potassium. The residue, however, is generally alkaline, owing to the escape of iodine along with the oxygen. Sulphuretted hydrogen also converts the aqueous solution of this salt into iodide of potassium with deposition of sulphur. This method, however, does not yield it sufficiently pure for photographic purposes, as it is almost impossible to get rid of the sulphur compounds formed at the same time. When heated with hydrochloric acid, chlorine, and afterwards iodine, are evolved, and if sufficient of the acid is employed, chloride of potassium alone is left; an intermediate compound of ter-chloride of iodine with chloride of potassium being however produced. Iodate of potash dissolves in thirteen parts of cold water, and more readily in a solution of iodide of potassium. Its presence in commercial iodide of potassium may be easily detected by adding a little sulphuric acid to the solution. In either salt separately this acid produces no marked reaction, as the liberated hydriodic and iodic acids are colourless; when, however, they both are liberated together in a solution, the oxygen of the iodic acid unites with the hydrogen of the hydriodic acid forming water and liberating iodine, which communicates a reddish brown colour to the liquid.

*Bromate of potash.*—The same remarks which we have made above respecting iodate of potash, apply equally well to bromate of potash. It is formed by saturating a moderately concentrated solution of potash with bromine. The greater part of the bromate of potash crystallizes out immediately, and the rest may be obtained by evaporation, whilst nearly all the bromide of potassium remains in solution; it may be purified by recrystallization. Bromate of potash forms crystals belonging to the regular system. At a red heat it evolves ten per cent. of oxygen gas, leaving a residue of bromide of potassium. It is decomposed by acids in a very similar manner to chlorate of potash.

*Fluoride of potassium.*—The best method of obtaining this salt consists in mixing hydro-fluoric acid with carbonate of potash, leaving the acid in slight excess; the liquid must be evaporated to dryness in a silver or platinum vessel, and heated strongly to expel the excess of acid, it must then be dissolved in water, and crystallized by evaporation at a gentle heat in a platinum or silver dish. Fluoride of potassium crystallizes in long radiating crystals which deliquesce rapidly in the air, are very soluble in water, but insoluble in alcohol; they contain 39·44 per cent of water. This must be borne in mind when weighing out crystals for photographic purposes.

*Oxalate of potash.*—This salt is frequently used in photography, both by itself and as a source of oxalic acid. It is obtained either from vegetable juices, such as sorrel, &c., in which it exists in the form of binoxalate, or by the direct union of oxalate acid with potash. In the ordinary state in which they are obtained in commerce they contain two atoms of waters. Upon being heated the whole of the water goes off, and after being heated to redness the salt leaves a residue of carbonate of potash; the crystals dissolve in three parts of cold water. The commercial salt is usually very pure, it is not likely to contain any impurities which are not removed by recrystallization.

*Binoxalate of potash* is produced by dividing an aqueous solution of oxalic acid into two equal parts; exactly neutralizing one of them with carbonate of potash, and adding the remaining oxalic acid to it, the salt crystallizes out upon evaporation; it can be purified by solution in water and recrystallization. In this form the salt contains two atoms of water, and crystallizes in the oblique prismatic system, it is permanent in the air, and has a sour, rather bitter taste; it dissolves sparingly in cold water, and in fourteen parts of boiling water. Boiling alcohol likewise dissolves a small quantity of it. It is to the presence of this salt in the juice of sorrel and various species of oxalis and rumex that the pleasant acidity of their juices is owing.

*Quadroxalate of potash* is formed by dividing an aqueous solution of oxalic acid into four parts, neutralizing one of them with carbonate of potash, and adding the other three parts to it. It separates in the form of very acid needles. often of great size, which require about twenty parts of cold water for their solution. The compound known among druggists as salts of lemon, and largely employed for removing iron moulds and other stains from linen, generally consists of this salt.

## WET OR DRY COLLODION.*

BY M. L'ABBE DESPRATS.

*On the part electricity plays in photographic manipulation.*—We have now arrived at the developing solution, at that stage of our operations which is at the same time so interesting and so mysterious. The sensitive film, acted upon by light, upon its removal from the camera, contains a latent picture, which we proceed to render visible. What is the action of light upon the sensitive film? what is its nature? And as this action is real, although invisible, what are the means of completing it, and of rendering its effects apparent to the eye? Hitherto, a decided reply has not been given to the first question; as to the second, it is, if not perfectly, at least very nearly resolved. However, as these two questions have an evident connection, we may say that the solution of the latter will be really perfect only on the day when the first has become fully elucidated. We have certainly no pretension to raise the thick veil beneath which the luminous operation takes place; but there is, it seems to us, no doubt that electricity plays a very important part in this case. In admitting that, in photogenic phenomena, electricity concurs with light, it will, it is true, always be very difficult to establish its particular action, but when it has been proved that this action exists we should take account of it, and seek the means, either of regulating its effects, or of rendering it more efficacious. It is this consideration which has determined us to give a summary of the experiments we have made in this direction.

It may be admitted, as a general law in physics, that every change, in the state of a body, is accompanied by a rupture of the equilibrium of their electric condition. Combinations, simple or complex, are the most powerful sources of electricity, but they are not the only ones, the passing of solid bodies to the liquid state, from the liquid to the gaseous, and reciprocally, also furnish signs more or less appreciable of electricity. In the various circumstances where electricity acts by shocks, science furnishes the means of measuring the fire in a very vigorous manner, in others on the contrary, when, for example, the electric action is slow, it is not possible to employ the same means of appreciation. Nevertheless when, after the lapse of a time more or less considerable, entirely new compounds have succeeded those under consideration, analogy compels us to admit that they are the effects of a similar cause, the action of which, always fruitful, is slow only from the fact of the circumstances under which it is forced to act. Reflecting ever so little upon the whole of the different manipulations which concur to the formation of a photographic picture, we perceive that they all have the effect of producing new combinations of known elements. We see, also, that these combinations, which, for the moment, seem perfectly definite, are, nevertheless, unstable; from this we are led to conclude that if as first there is electricity by shocks, there is also a slow action which reacts upon the result produced by the first. This second action, silent and persistent, may sometimes be very favourable, but more frequently it betrays itself by effects the more disastrous, inasmuch as the electro-motive force causes are very often concealed and inappreciable. In our opinion it

* Continued from Page 66.

is to this second mode of electric action that we must attribute the alteration, which ultimately manifests itself in the photographic preparation of proofs either negatives or positives.

As may be seen, the question that now occupies us is full of interest, unfortunately, it is also full of mysteries. We repeat we have not the slightest pretension to explain them; but persuaded that the path of experiment is that which must be preferred in advancing a science or an art, we proceed to indicate some of those which have more especially led to the subject before us. These experiments, or other similar ones, are not new, they have been repeated by many physicists and chemists; only as our mode of experimentation is very simple and very easily performed, we proceed briefly to explain it.

The multiplicator we employ, although but slightly sensitive, is nevertheless sufficiently so to appreciate the electric forces to which it is submitted—it is Mellone's thermo-electric multiplicator with astatic needles. Each end of the conducting wire of pure copper is terminated by a platinum wire six inches long armed at its free extremity with a plate of platinum one to one and a half inches square. If the copper wire terminates with these two plates there is a risk of developing by the mere warmth of the hand, a thermo-electric current sufficient to modify the results, but with a length of six inches of the platinum wire this inconvenience is no longer to be feared, and, on the other hand, the platinum plates being unoxidizable, there is no other electricity except that developed by the combination of the bodies placed in contact.

We first proceed to determine the direction of the current; this is ascertained by a plate of zinc being put in contact with one of the plates of platinum and separated from the other by some folds of blotting paper moistened with water acidulated with a few drops of sulphuric acid. When the circuit is complete, we shall perceive the system of needles, at first established parallel to the conducting wire, place itself at right angles with it, and always in the same direction every time the circuit is broken or renewed. The better to fix it in the mind, we call the current thus given by the zinc *positive;* and *negative* that of which the direction is opposite.

We now proceed to experiment, electrically, with some of the ordinary and familiar combinations in photography. The platinum plates being superimposed, but separated by pieces of moistened bibulous paper of nearly twice their size, no electricity is developed, the needles remain fixed. Upon pouring on to the paper some drops of a solution of iodide of potassium, still no effect; but if, upon the paper being moistened with iodide, we let fall some drops of a solution of nitrate of silver, the needles are instantly diverted more than ninety degrees from their fixed position, and the direction proclaims a *negative* current. By causing the paper to imbibe first, nitrate of silver, and in the second place, pouring upon it iodide of potassium, a current takes place as energetic as the first, but in an opposite direction to the first, that is, *positive*; double decomposition being accomplished, that is to say, after the complete formation of iodide of silver all electric action ceases, and a stable equilibrium, for the minute at least, is definitely established. The results are identical if we operate in the same manner with hydrochlorate of ammonia and nitrate of silver; identical also with this latter salt and hydriodate of iron, except this difference, however, that in this last double decomposition the electric currents developed are much more energetic. The addition of iodide of iron to collodion with the view of obtaining greater sensitiveness is disapproved by some photographers; for our own part, we have proved that the addition of this preparation to albumen is evidently accelerating. May we not be permitted to suppose that there is a certain correlation between these two different phenomena, on the one hand, disengagement of more intense electricity, on the other, exaltation of photogenic sensitiveness.

We cannot decide upon this point, but it seems to us at least worthy of examination; and then the case we have instanced is not the only one. There is at least one of a very similar kind. Pursuing our researches with the aid of the multiplicator, it has been easy for us to compare the electric action of pyrogallic acid and sulphate of iron upon nitrate of silver. We know that by means of the second reducing agent, the duration of the luminous action is generally diminished, in a word, it is a greater accelerator than pyrogallic acid. So we find that it is from its reaction upon nitrate of silver that the most energetic current results. With pyrogallic acid we obtained scarcely 45 degrees of deviation, while with sulphate of iron, the needle, suddenly diverted from its position, makes almost the entire circuit of the scale. We repeat, a correlation so manifest between two such different classes of phenomena, seems to us worthy of attention, and further researches in this direction would perhaps not be without profit for the progress of art.

In the preceding experiments, as well as in a host of others analogous, the effects obtained are due to instantaneous electricity, or that acting by shocks. These effects, always realizable at the pleasure of the observer, are, as may be perceived, of ready appreciation and measure. But it is not the same with the effects caused by a slow electricity. Too often the elements submitted to its action are inappreciable; moreover, if, during the intervals of electric action, these elements vary with respect to number and quality, combinations which may be clearly defined for a moment may be destroyed and give place, later, to new combinations.

We can easily sound the latent elements upon which a force is exercised, as little understood as electricity still is, being made evident, effects will result which it will be as difficult to foresee as to prevent. We stated at the commencement, that we were induced to think that the instability of photogenic preparation is due to this slow action of electricity, either electricity acts upon the elements peculiar to these preparations, or they are associated with others which carry them with them; therefore, an absolute fixity of photographic portraits will probably continue for a long time problematical. Still, in the absence of clearly defined facts, a kind of intuition, which may sometimes follow an attentive observation, may prove of great assistance; it is thus, that positive paper which but lately changed in a very short time, may now be maintained in all their integrity, since we have learned or divined that it was sufficient to preserve them from the action of moist air. It was very difficult to judge *à priori* of the efficacy of these means, but now that this efficacy is no longer doubtful, it is, if not certain, at least very probable, that in positive paper exposed to moist air, there is a decomposition of water by the nitrate of silver, and, consequently, electric action. We quote only this single example offered to us by the change and preservation of positive paper, and it is sufficient, it seems to us, to prove that in referring these effects of change to an electric cause, we put forth a view which is not entirely void of probability.

We limit ourselves, therefore, to these general considerations. The subject before us would furnish a crowd of others, interesting, without doubt, but, unfortunately, more or less vague, and not yet capable of furnishing us with rigorous conclusions. There is one, however, which has been our starting-point in this study, but which we do not mention in this place, reserving it for the occasion when we speak of the sulphate of iron developing solution.

(*To be continued.*)

## PROGRESS OF PHOTOGRAPHY IN AMERICA.

At the annual meeting of the Photographic Society, in America, the president, Professor Draper, gave an interesting address recalling and reviewing the photographic events of the year. We commend the idea to presidents of photographic societies in this country. We make some condensed extracts which will interest our readers. After some general observations on the national troubles and their influence on the art, he proceeds :—

"From these general remarks I may pass to a summary of some of the special topics that have occupied our attention, referring to them in a chronological order.

"Professor Seely presented us with some new views of toning, printing and fixing, in which he drew in a clear manner the limits of use of the nitrate of silver, the chloride of gold, and the hyposulphite of soda. From his observations he concludes that we should first remove all the free nitrate from a print by washing in clean water, at the end changing to a weak bath of chloride of sodium ; second, that for toning, the print should be immersed in a weak bath of chloride of gold, of one or two grains to the ounce of water ; third, that it should be rinsed in water to remove any free chloride of gold ; fourth, fixed in a bath of pure hyposulphite of soda, and, finally, washed in clean water. He offered evidence from his own experiments that by following this process we may secure photographs of almost any desirable tone, and what is of the greatest importance, photographs which are permanent. The process is also obviously economical. In these views and conclusions, Mr. Kuhns, who has had so large an experience in the printing of photographs, agrees.

In connection with this method of obtaining unfading photographs, Mr. Johnson has offered some illustration of the permanency of daguerreotypes, about one thousand of which, made previously to the introduction of the gilding process of Fizeau, are in his possession. Of these a majority are in perfect preservation. Where change has occurred it appears as a film of deposited matter, which commonly commences to form at the mat. It has been observed that ungilded Daguerreotypes fade sooner if kept in a warm place, this being perhaps due to the vaporization of the mercury of the amalgam constituting the lights.

"Mr. Charles Fontayne exhibited his machine for the rapid printing of photographs, by which it is possible to produce twelve thousand prints in one hour.

Mr. Snelling read to the society a communication on that important subject, to which Professor Seely had already drawn its attention—the fading of photographic prints; differing from him in some of his views. He thinks, that in the durability of our pictures, instead of advancing we have been retrograding, and enforces the opinion by an exhibition of proofs collected within the last ten years. It is his conclusion that failures arise from many causes, such as bad paper, impure chemicals, fixing and toning in the same room in which other operations are carried on, toning in the light, the use of water impure or insufficient in quantity, the heat and gas from stoves, the operations of mounting and printing, soaking the paper too long in the salted solution, toning bath, or washing trough : and too long or too short a time being given to the final washing. Among minor causes, not without interest, of the deterioration of retouched prints, he points out tobacco, the artist moistening his brush with saliva while at work. On making a direct experiment, retouching with India ink or water colours contaminated with saliva impregnated with tobacco smoke, decomposition at those points set in, and gradually spread, while other portions not so treated remained unchanged. He says he has toned and fixed separately, and has used the toning and fixing solutions together, but upon the whole cannot give decisive preference to either method, so far as permanency is concerned. He prefers printing in diffused light to printing in direct sunlight, since proofs so printed tone better, keep better, and are in every respect finer. The longer the printing the more solid and brilliant the picture. Sunlight pictures are the first to fade.

"Mr. Tillman read a paper on the optical phenomena of the recent great eclipse, remarking that the French astronomical expedition to Spain, under the charge of Leverrier, accomplished more during the three minutes and fourteen seconds of total obscuration of the sun, than has ever before been done during a similar phenomenon.

"The attention of the Society has also been directed to the application of photography to military purposes, more particularly to balloon photography, in reconnoitering encampments, hills, bridges, roads, &c. The President of the Society was directed to communicate with the Secretary of War in reference to this subject, and offer the Government its services.

"Mr. Tillman read a paper on the Analogy of Light and Sound, with a view of representing a new method for the arrangement of musical intervals, and imparting a clearer view of the relative position of colours. He showed that for all practical purposes a right angled triangle, whose sides are as 3, 4, and 5, will show the relations of the intervals of the minor common chord, and of a triad of colours, in which the indigo or darkest ray is substituted for the blue ; this relative arrangement producing up through the eye the same depressing effect that reaches up through the ear by the use of the minor mode.

"In reference to Balsamo's phosphorous process, it appears that for a long time that substance has attracted the attention of scientific men, experiments having been made upon it more than fifteen years ago in the university of this city. Photographs of the solar spectrum were obtained on pure phosphorus by the president of the society, so perfect as to show the fixed lines beautifully. For this purpose, the phosphorus was enclosed in a thin sheet between two plates of glass.

"Dr. J. M. Saunders communicated to the society what he considered to be a great improvement in collodion, especially that for ambrotypes. It consists in the addition of a drachm of water to each pint of collodion.

"Professor Seely made a verbal communication to the society on the Chemical History of Gun Cotton, and Professor Joy explained some of the recent discoveries by the use of the Spectroscope, leading to the detection of two new alkaloid metals, rubidium and cæsium ; these remarks being elicited by the exhibition of an instrument constructed according to modifications suggested by Dr. Gibbs, and in part carried into effect by Mr. Fitz.

"Another new spectroscope of German construction was exhibited to the society by Professor Joy, together with drawings of the spectra produced by various bodies. It is a modification of the spectroscope originally invented by Frauenhofer, and employed by the president of the society many years ago, at the time when he first discovered that the spectrum of incandescent solids, such as platinum, contains no fixed lines, and that the spectra of other bodies vary with their temperature, as is shown by combustions in air compared with those in oxygen gas. These results were published in the *Philosophical Magazine* for May, 1847, and February, 1848, but appear to have been overlooked by those European experimenters who have been paying attention to this subject.

"Mr. Johnson exhibited to the society a camera made by himself and Mr. Wolcott, and some specimens procured by it in 1843. The lens is a plano-convex of short focus, and is intended to make a picture on the interior of a concave plate to be used on the magic lantern. It appears that evidence is in existence that Messrs. Wolcott and Johnson had at that time nearly succeeded in perfecting the albumen process.

"Mr. Tillman read a paper on the Causes of Actinism, his object being to determine how the undulations of ethereal waves, having no distinguishing characteristics but a relative decreasing length, and an accelerated tranverse motion, can produce instantaneous and peculiar effects, when brought in contact with sensitive compounds used by the photographer. Adopting the atomic theory of Ampere, he showed how a series of wave forces generated by the sun, when acting upon such sensitive matters, may so modify the forces of cohesion and chemical affinity as to produce all the phenomena under consideration. The diverse effect of undulations of the same medium may be thus briefly stated :—the longer ethereal waves have the power of giving vibratory motion to a whole molecular chain, the shorter waves the power of moving each particular link of that chain. The longer penetrate and disturb the whole substance, thus evolving heat; the shorter act superficially, influencing the minutest component part of the surface, thus generating actinism.

(*To be continued.*)

## PREPARATION OF PHOTOGRAPHIC COLLODION.

A Lecture before the Antwerp Scientific Association.

BY M. CLEMENT OMMEGANCK.

The ordinary formulæ may be generalized by the following quantities—

| | | |
|---|---|---|
| Ether (sp. gr. 0·72) ... ... | 66 | parts |
| Alcohol (sp. gr. 0·81) ... ... | 33 | " |
| Iodide ... ... ... ... | 1 | " |
| Bromide ... ... ... | 0·25 | " |
| Pyroxyline ... ... ... | 1· | " |

If we make use of a weaker ether or alcohol, and one consequently containing more water, the collodion will be fibrous in texture in consequence of its containing too much water.

Of the 33 parts in the formula it will even be advantageous to take one-third of absolute alcohol. When operating at a high temperature, it is advantageous, and even, perhaps, indispensable, to modify the formula, and take equal portions of ether, and absolute alcohol (sp. gr. 794).

Most formulæ take little account of the greater or lesser fluidity which the quality of the pyroxyline communicates to the collodion, or of the influence which the iodides introduced may exercise upon this fluidity. Now, for a portrait of large dimensions we require a thicker collodion than for a smaller one, the delicacy of detail being in exact ratio with the fluidity, this delicacy, indispensable in the latter, will give to the former an unfavourable degree of transparency and hardness.

Very frequently the difficulty in obtaining the wished-for opacity in negatives depends upon the too great fluidity of the collodion. Without wishing to proscribe other formulæ, I give those which have given me the best results. For all kinds of negatives obtained by short exposure, a collodion consisting of, in 1000 parts:—

| | |
|---|---|
| Ether ... ... ... ... ... | 667 |
| Alcohol ... ... ... ... ... | 333 |
| Iodide of ammonium ... ... ... | 6 |
| Iodide of cadmium ... ... ... | 6 |
| Bromide of cadmium ... ... ... | 3 |
| Pyroxyline ... ... ... ... | 12 |

This collodion is sure to be thick enough: if too thick, however, it can be rendered more fluid by the addition of a suitable quantity of ether, or of absolute alcohol: if the quantity of this addition exceeds one-tenth of the original volume, it will be desirable to dissolve in the ether or alcohol added beyond this tenth, the quantity of iodide and bromide corresponding to the formula; that is, 1 grain of iodide and ¼ grain of bromide to 100 grains of liquid. We should never alter a collodion by adding iodides not already contained in it, nor mix collodions differing in composition; the results given by these capricious mixtures are almost always unsatisfactory.

*Formula for Landscapes, Views, and Direct and Transparent Positives, with Wet or Dry Collodion.*

The following formula has proved the most satisfactory:—

| | | |
|---|---|---|
| Ether... ... ... ... ... | 667 | parts |
| Alcohol ... ... ... ... | 333 | " |
| Iodide of zinc ... ... ... | 6 | " |
| Iodide of cadmium ... ... ... | 6 | " |
| Bromide of cadmium ... ... | 3 | " |
| Pyroxyline ... ... ... ... | 12 | " |

All the general remarks made respecting the first formula are also applicable to this. With one, as with the other, we commence with weighing the salts, and put them into a bottle of the proper capacity, then add the alcohol, and dissolve the salt by shaking it; then add the ether, and mix: lastly, introduce the pyroxyline, small quantities at a time, and shake the solution until the cotton is dissolved.

These collodions will be fit for use in from eight to fifteen days.

The first will keep good a very long time; the second is much less stable, but presents a superiority in the representation of foliage, the green colour of which is always rendered black in the image; it gives much delicacy of detail, and an incomparable purity in delineation. For direct positives we have found no collodion equal to it.

The first requires an exposure of only six seconds in summer, and twelve in winter, for a portrait of small dimensions, *carte de visite* for example; and an exposure of fifteen seconds in summer, or of twenty-five in winter for a whole plate negative, in an operating room suitably lighted with a good objective, and employing an iron developing solution. The time of exposure under very favourable circumstances may be diminished one half, and even be made instantaneous.

Collodions and processes which necessitate longer exposure are little to be recommended, because with most persons immobility is difficult, and even impossible to persons not accustomed to *pose*, when the exposure exceeds twenty seconds.

The use of iodide of potassium in lieu of iodide of ammonium may present certain special advantages, but it gives a less permanent collodion; the potassium possessing a more energetic decomposing action upon the pyroxyline.

The exclusive employment of the salts of cadmium rarely affords sufficient sensitiveness, at least when the collodion is not old, and then, as may be proved by analysis, it contains a good proportion of iodide of ammonium. For if it be treated with a little caustic potash, shortly after it has been prepared, it exhales a feeble ammoniacal odour, while after the lapse of six or eight months, the introduction of some small pieces of caustic potash, produces a very strong ammoniacal odour, as if it it had been prepared with ammoniacal salt at first; it is, therefore, simpler to introduce it at the beginning.

At the time it is prepared the collodion usually assumes a red colour, but in the course of ten or twelve days it becomes almost colourless; if, however, it becomes quite white, it is advisable to bring it to a straw colour, by the addition of an alcoholic solution of iodine, and renew this addition until the straw colour becomes permanent.

The employment of a thick, non-iodized collodion, to be subsequently iodized by means of alcohol holding iodides and bromides in solution, seems to use a useless augmentation of bottles, and frequently gives rise to error in proportions. As by mixing an alcoholic iodide solution with a plain limpid collodion, we obtain a preparation fit for immediate use, we are led to suppose it is advantageous; but there is an inconvenience in this respect, we are always tempted to employ a too recent collodion, and liable to uncertain results.

# Proceedings of Societies.

## South London Photographic Society.

The annual meeting was held at the City of London College, on Thursday evening, June 12th. The Rev. F. F. Statham, M.A., F.G.S. in the chair.

The minutes of a previous meeting having been read and confirmed,

The Secretary then read the report of the committee (see p. 285 in our last). He also read a letter from Mr. Borchert.

resigning his position in the committee from pressure of private duties, and expressing his deep interest in the continued success of the society, and his gratification at the complete success of the society's exhibition at the Crystal Palace.

Mr. Howard, the Treasurer, then read his report. He had the pleasure of congratulating the society on the fact, that for the first time since their existence he held a balance in their favour. Last year, it would be remembered, the year's accounts concluded with a balance of debt to the amount of £3 16s. That amount was nearly cleared off by the volunteer contributions of some gentlemen at the annual meeting. This year, however, he held a balance of £9 16s. 11d. in favour of the society. This arose partly from an increase of income derived from additional members, and partly from decreased expenses in not sending a journal to members. He thought, however, it would be admitted, that the society had more than compensated members for the loss of the journal, in securing them a half-year's season ticket for the Crystal Palace. The balance-sheet had been examined by the auditors and found correct, and now nothing more remained for him but to congratulate the gentleman who had consented to undertake the duty of treasurer, on the fact, that he would commence office under such satisfactory circumstances, with a balance in hand.

The Chairman, in putting the admirably drawn-up report, and the satisfactory balance-sheet, for the approval of the society, felt that it must be to every one a source of deep regret that they should have to consider the possibility of the captain and the chief mate, who had been mainly instrumental in bringing about a result so gratifying, now leaving the ship. It was a source of great satisfaction that the especial end the society had aimed at had been largely attained. The promotion of photography, in its relation to art, had been an especial object of the society; and the many valuable papers which had been read on the subject, must have effected much good. He did not wish to bring a blush to the face of their excellent Secretary by praising him, but in expressing what he felt must be the sincere regret of every member at the resignation of Mr. Wall, he must remind them how much of the success was due to him: he had been present at every meeting, prepared the minutes of all the proceedings, and during the intervals had exerted himself in securing papers for the meetings which were to follow. In addition to this he had written many excellent papers, and had contributed largely to the interest of their discussions by his share in them. He feared that it would be difficult to unite all these qualities again in one individual, and without derogating from the capabilities or willingness of a possible successor, he doubted if they should find a gentleman so well suited to the duties, and he would suggest that Mr. Wall be invited to retain the office, and that an Assistant-Secretary be appointed to share his labours. Mr. Howard had also helped to form and sustain the society by similar exertions. He, however, felt that his numerous engagements were incompatible with his continuance in office, the members must indulge the hope that they would find an efficient successor. He (the President) might be allowed to say for himself that he should like also to have withdrawn his name, since he felt that gentlemen might be found better acquainted with the science, for the advancement of which the society was founded, than himself; moreover, his duties in the large parish of which he had the spiritual charge prevented him from giving that attention to the subject which he desired. If, however, the members thought that the little attention he could bestow, and the exercise of common sense, as distinct from practical knowledge of the subject, would be useful to them, his services were at the disposal of the society. If they could appoint a gentleman who would be of more practical value to the society, he would be very happy to withdraw altogether, or he would feel pleasure, if they so willed it, in retiring to the position of a vice-president, if, in that position, he could be of service to them.

Mr. T. Clark Westfield had pleasure in proposing a vote of thanks to the president, treasurer, and secretary.

Mr. Wharton Simpson, in rising to second a vote of thanks, echoed the chairman's regrets as to the loss of the secretary and treasurer. In regard to the suggestion of the chairman in relation to providing an assistant secretary, said that he had endeavoured to induce Mr. Wall to accede to a similar arrangement, and was now prepared to announce that a member of the society would be happy to enter upon his vociate as secretary, by undertaking the position of assistant secretary for one year, performing the duties under Mr. Wall's direction. He would now put the vote of thanks to the meeting.

The vote of thanks was carried by acclamation.

The Chairman, in acknowledging it on his own part, again regretted that his duties did not permit him to give more time. He should have stained his fingers with the nitrate of silver long ago if he could have commanded leisure.

Mr. Wall explained that he would be placing himself in an unfair position if he undertook either the honour or responsibilities of secretary, and did not actually perform the duties. His own imperative engagements did not permit him any longer to perform the duties satisfactorily, and although during the three years he had held the office he did not think he had neglected them. He would now take the opportunity of apologizing to some gentlemen whose letters he had recently not answered, when they did not absolutely need a reply. There might be a few such, whose letters in his press of duties had been laid aside.

Mr. Howard felt that it was desirable that a change in the active officers should occasionally be made, and allow younger members to take part.

After some further conversation, the following officers were elected for the ensuing year:

*President.*—Rev. F. F. Statham, M.A., F.G.S.

*Vice-Presidents.*—Mr. Sebastian Davis, Mr. G. Wharton Simpson, and Mr. Alfred H. Wall.

*Committee.*—Messrs. Ackland, Blanchard, Foxlee, Harmer, Howard, Leake, Martin, and Newcombe.

*Treasurer.*—Mr. Noel E. Fitch.

*Secretary.*—Mr. Alfred Harman, 3, Albert Cottages, Hill-street, Peckham.

Mr. Martin proposed, and Mr. Simpson seconded, that the Committee meetings should take place on the same evenings as the monthly meetings of the Society, one hour before the commencement of the usual proceedings.

Some discussion arose in which Mr. Wall urged the importance of holding the Committee meetings at least a week before the regular meeting, in order to provide for papers, discussions, &c. Mr. Martin's proposition was finally adopted.

Mr. Wall proposed a vote of thanks to the vice-presidents, to whose active interests in the society much of its success was due, and especially did the Exhibition, now so successfully opened in the Crystal Palace, owe much to their labours.

Mr. Simpson, in responding, took occasion to propose a vote of thanks to Mr. H. P. Robinson, for the extreme liberality of his dealings with the society in the matter of the presentation prints. When asked if he could supply the beautiful photograph, "Early Spring," he at once acceded, leaving the terms of remuneration entirely in the hands of the society.

Mr. Wall seconded the motion, which was carried unanimously.

Mr. Larchin suggested that as the society had a balance in hand, some substantial recognition of the services of retiring officers should be made.

Mr. Simpson suggested that such a step was scarcely within the powers of the society, but might easily be carried out by a subscription amongst members in their individual capacity.

Mr. Wall called the attention of the members to the interesting out-door meetings of former seasons. After considerable conversation, it was resolved that during the coming summer the meetings take place on the first and third Saturday in every month, at from one to half past one o'clock, as might suit trains at the following places;—

1. Jack Straw's Castle, Hampstead Heath, to be reached by omnibus or rail.
2. Richmond Station, by rail from Waterloo Station.
3. Charlton, by North Kent line from London Bridge.
4. Beckenham Station, by Mid-Kent line from London Bridge.
5. The Eagle, Snaresbrook, from Shoreditch Station.
6. Barnet, by omnibus, or by Great Northern Railway.

Mr. Martin proposed a general meeting of the members at the Crystal Palace on the last Saturday in September. After some conversation it was agreed that the committee would meet at 433, Strand, on the third Friday in September, to arrange for such a meeting at the Crystal Palace.

It was announced that the address of two or three members was unknown, and that their Crystal Palace tickets awaited their application.

The proceedings then terminated.

## Talk in the Studio.

The Works of Sir Christopher Wren.—Mr. J. J. Cole has produced, or is producing, a series of cabinet photographs which will be highly prized by all admirers of good architecture, consisting of the Churches of Sir Christopher Wren. The specimens we have received are excellent photographs, and possess the additional advantage of having been taken from the best available points of view, the positions being selected with the technical judgment of an architect and man of cultivated taste. The negatives are taken on tannin plates, and are admirable examples of the softness which may be obtained by that process carefully managed, even with the difficulties of a London atmosphere and light. Of those which please us best, we may mention St. Paul's, from Ludgate Hill, and St. Mary-le-Bow; both pictures are admirable examples of the grace which characterises Sir Christopher Wren's architecture, and as pictures they are not spoiled by white paper skies; one possesses an atmospheric grey tint, and the other, although partially stopped out, is most skilfully managed, the line of the horizon being broken with clouds in such a manner as to preserve breadth. The series is published by Messrs. Griffiths and Farren.

Philosophical Instruments in the Exhibition.—The philosophical instrument division has for so many persons a special interest, that we may claim the indulgence of our general readers while we endeavour to do justice to the collection of objects comprised in class 13, and mostly displayed in the gallery of the North Court. First among the exhibitors in this scientific department we are inclined to place Mr. Ross, if only because he, with perhaps the single addition of Mr. Dallmeyer, can challenge comparison with the great Voigtlander himself for photographic and other lenses. The case furnished by Mr. Ross contains several microscopes of the newest and best construction. Some of them are binocular, and give a stereoscopic relief to the object, an effect both useful and pleasing. We observe a little photographic picture, which might be passed over as a common-place production obtruded in a show of philosophical works. On looking closer at this photograph, we perceive a pencil note in the margin, which informs us that the view was taken with one of Sutton's panoramic lenses; and truly the picture is almost panoramic, being clearly defined to its utmost extremities, and in admirably true focus, with an angle of 100 degrees. Such a thing we never saw before, and we believe it to be perfectly unique in the history of photography. Messrs. Smith and Beck exhibit what they appropriately call a museum microscope, which shows 500 objects in succession, and which includes an ingenious contrivance, too complex to describe here, for varying the powers. Messrs. Powell and Lealand, in a small case, submit for critical judgment a few binocular and other microscopes, of really first-rate workmanship. The show of Mr. Dallmeyer, as might be expected, is a varied and very excellent one, being specially strong in microscopes and telescopes. They also display two or three photographic views, taken with very large angles, and with a plain lens. It may be noted, in passing, that Mr. Dallmeyer is the exhibitor of the astronomical telescope in the nave. Messrs. Negretti and Zambra, opticians and meteorologists, have a great number of original objects. Their sensitive thermometers—the first ever constructed—were designed for service in the late balloon ascents for scientific investigations on the laws of atmospheric temperature. They have a gridiron form of vessel for the mercury, instead of the ordinary bulb, and they therefore expose a much greater surface to be acted upon in the same space of time. The instruments in the same case comprise pocket barometers smaller than a watch; and, so far as we were able to discover, the only actual novelty in field-glasses, the lenses being made of rock crystal. Before leaving the British display of Class 13, in which we have sought only to bring forward the names of real producers, and not mere dealers, we cannot omit drawing attention to the excellent show of philosophical instruments, and especially photographic apparatus, furnished by Messrs. Murray and Heath. A principal object in their collection is a new reflecting stereoscope, in which Professor Helmholtz's principle of telestereoscope is applied with marvellous effect.—*Telegraph.*

## To Correspondents.

Old Subscriber.—Some experiments we have made with the ammonia-nitrate bath, or rather the solution of oxide of silver in nitrate of ammonia, as described in the American journals, and transferred to our columns, have been very successful; and we have heard also some good accounts from others who have used it. 2. The camera should not be tilted in taking card negatives: neither is it necessary to have a raised dais or platform for the model. In standing figures the lens should be placed opposite the chest: when lenses of short focus are used, some operators prefer a camera with a swing back, in order to bring the feet into better focus. 3. We have not had any experience with the new card lenses of the makers you name.

Enlarged Negatives.—Mr. Warner asks us to inform a "constant subscriber," who has applied to him to enlarge a negative, that it is impossible to enlarge the figures without also enlarging the plate. Surely such information ought to be unnecessary; but Mr. Warner has nevertheless been asked to do it. "Constant Subscriber" must have failed to express his wants properly; the slightest thought must have convinced him that if a group of small figures fill a small plate, the same figures will require, when enlarged, a proportionately larger plate.

J. W. T.—The print enclosed is a very bad example of mealiness; not the "measles." Read the various articles which have appeared in our pages on the subject. See that your silver bath is not very acid, and change your sample of paper. The chief fault is probably there.

C. B.—An old positive silver bath evaporated down to the proper strength will rarely give a good printing bath, and we regard it as bad economy to use it for this purpose. If it can no longer be used for its original purpose, precipitate the silver as chloride, and reduce it in the ordinary way. It will certainly contain iodide of silver, which is not desirable in a printing bath; it will also probably contain free nitric acid, which is in any quantity inimical, both to sensitiveness and rapid toning. The paper enclosed, so far as we can judge from appearances, is very good. The prints are certainly under-toned. The negative also is faulty, and without a good and moderately vigorous negative good tones cannot be obtained. Excess of carbonate of soda in your toning solution will cause it to tone tardily.

Demens qui Nimbos.—The streaks to which you refer can only arise from the condition of your bath or collodion, and not from anything in the subjects to be depicted. Probably using an old collodion, which is most suitable for photographic clouds, will remove the difficulty. If the bath be the cause, it may arise from deficiency of acid, or from accumulation of ether and alcohol; or possibly from scum or floating particles on the surface. The lens you are using is one of the best possible for the purpose. See Mr. Wilson's pictures in the International Exhibition.

W. B—r.—The defects of your prints are due to imperfect fixing, and not to anything in the toning. The hypo is too weak, or is exhausted, or the prints have not remained in long enough. Hyposulphite of silver is formed, but not dissolved, and in the course of washing becomes decomposed, presenting the mottled yellow, dirty appearance which the prints exhibit. We have not time to write private letters in answer to such questions, but have pleasure in answering them in this column.

Lens.—The object of immersing the plates in a bath of distilled water, with a little acetic acid added, as described by Mr. England, is simply, we apprehend, to serve the purpose of acid in the bath. Persons using a bath nearly neutral, in good condition for wet plates, are thus saved the necessity of making a fresh bath for tannin plates. That was the object for which we used it, and we presume was the object also for which Mr. England recommended it.

Rolandi.—Gum is not good for mounting photographs, freshly made; starch paste is the simplest and best material for general use. Good glue may also be used. If the slightest trace of hypo were left in the print, alum might be injurious, but not otherwise. Some have recommended its use in the final washing, but we think it is best avoided.

A. B.—Hints on albumenizing paper are scattered broadcast through our pages. We may refer you to p. 14, No. 28, vol. ii.; p. 179, No. 67, vol. iii.; p. 245, No. 107, vol. iv.; p. 260, No. 104, vol. iv., and many places in vols. v. and vi. The chief points to be cared for are good paper to begin with, fresh eggs, thoroughly beaten, about 15 grains of salt to the ounce, floating the paper a short time, manipulating carefully, and performing the operation in a very warm room, say a temperature of about 80° Fah. It is an operation requiring experience to succeed in. Our time is too fully occupied to admit of our writing private letters on such subjects.

J. Tully.—So far as we can judge, your proposed alteration will be an improvement. Your present room would be better if a large portion of the top light over and immediately in front of the sitter were cut off. We could judge better by seeing some of the results. Good lighting is unquestionably an important auxiliary to good pictures; but more important still is adapting the general treatment to the character of the lighting.

A New Subscriber.—It is somewhat difficult from your general description to point out the source of failure. The use of some samples of old collodion will cause insensitiveness, but it ought not to cause fog, which your description of a universal drab deposit without any trace of an image indicates. This may proceed from many causes; light getting to the plate whilst it is in the bath would unquestionably produce fog. The nitrate bath should be kept in the dark, but if it be in good condition, a stray glimpse of light occasionally would not hurt it; if it be in bad condition, and producing fog without other cause, rendering it neutral, and then exposing for a few hours to the sun will probably improve it. The use of a paraffin lamp will be decidedly injurious, because if unscreened the light will be too brilliant, and will cause fog; and because the exhalations are likely to have a detrimental influence on the sensitive film, and will probably thus cause fog. The test papers sent would indicate that both baths are sufficiently acid. We do not know anything of the cases you name.

M. A.—Neither of the markings which trouble you have any connection with the lenses used; but are manifestly due to chemical or manipulative causes. The dark veil at the top of the plate is most probably caused by the film having dried somewhat at that part before immersion, which would cause insensitiveness in that part. Its regular form is somewhat against that supposition, but it is the most probable conjecture we can offer. Such a mark might occur with a new bath, from the iodide being partially re-dissolved by the bath. But for the stain the picture has many excellent qualities. The straight lines in the other picture are so faint and indefinite, that it is difficult to trace their cause; but they are certainly not due to the lens. They might be caused by the developer not covering perfect at one sweep, or by irregularity in the thickness of the film, or by the plate not being quite clean. We have tried the plate-holder, but not to any extent. In our limited time for work in the dark room, we find time is economized by using the fingers only, and we have acquired the habit of doing so without difficulty or much soiling of the fingers.

Several correspondents in our next,

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 199.—June 27, 1862.

## BROMIDES IN COLLODION.

As discussion progresses, it becomes more and more apparent that the influence of bromides in collodion remains but imperfectly understood. Our own conviction, held for many years, as we have repeatedly remarked, is, that in proper proportions, they are in all ordinary cases an improvement, and in most cases accelerators, and no argument and experiment we have hitherto met with has disturbed that conviction. Mr. Dawson, of King's College, has recently addressed a communication to our Liverpool contemporary on the subject, in which, admitting their value under some circumstances, he nevertheless urges that under some circumstances they are injurious. Without entering at large into the general subject, we will just make one or two remarks, before reproducing Mr. Dawson's communication on the subject. We would, in the first place, call attention to Mr. Heisch's interesting paper in our last, on the importance of the proper condition for rendering experiments in this direction fairly comparable. We next have to suggest, briefly, for the consideration of experimentalists, a possible reason for the alleged retardation of bromides in the presence of a pyrogallic acid developer. The allegation is, that the addition of a bromide to collodion, in any proportion, small or great, actually retards the production of an image, and renders necessary a longer exposure than when an iodide only is used; and it is often stated that exposure, which would suffice to give with the latter a passable picture, would, if a bromide were present, yield results thin, feeble, and entirely worthless. We believe this is true, but that it is, nevertheless, rather a question of intensity than of sensitiveness. An under exposed, simply iodized plate has generally excess of density, but lack of detail; the same exposure, if bromide were present, would probably yield more half-tone, but less density. The under exposed iodized plate might be made to print and produce one of the hard black and white pictures which have done so much to ruin the artistic reputation of photography, and impress art critics with the impression that it could not render soft reflected lights and tender half-shadows. The bromo-iodized plate, under the same circumstances, would probably have yielded nothing at all, and would at least have prevented the operator from producing an imperfect picture. Again, we have no hesitation in admitting that, as a general rule, bromides make development more tardy. The image of an iodized plate, whether with iron or pyrogallic acid development, generally springs much more rapidly into existence, and much more readily fogs under prolonged development, than that of a bromo-iodized plate. Those who have been chiefly accustomed to the use of an iodized collodion are, therefore, very liable to be deceived as to the amount of development necessary and permissible with the bromo-iodized collodion, and failing to give the proper amount of development, they are apt to imagine a plate under-exposed, and charge the collodion with slowness, simply because it was really under developed. Without entering further into the subject here, we may just enumerate those advantages arising from the use of bromides, which have received universal acknowledgement, not only from those who advocate their use, but from those who regard them as in some respects injurious and retarding.

In the Daguerreotype process, bromine was an unquestioned accelerator, besides giving roundness, delicacy, and harmony to the pictures. It was the addition of bromine, or, as it was technically termed, "a quick," or "quick stuff," which rendered portraiture possible by the Daguerreotype process.

In the waxed paper process it is an unquestioned accelerator.

In the calotype, and all paper development processes, it is an unquestioned accelerator. By its aid only could the magnetic and meteoric registrations be preserved at the Royal Observatory at Greenwich and elsewhere, where the slightest perturbation is rendered by means of the momentary photogenic action of a gas jet, upon bromo-iodized paper. In solar camera printing, its accelerating principle is described by those who use it as enormous.

In the dry collodion processes its accelerating influence is, we believe, unquestioned by any one.

In the wet collodion process its accelerating and beneficial influence in the presence of an iron developer is generally admitted. We submit, then, that with so much admitted on all hands, it becomes necessary to pause before allowing that under its own best conditions and fair experiment it is ever absolutely a retarder.

We shall now quote Mr. Dawson:—

"The question of bromides in collodion has again, I see, become the subject of strong contention in some of your contemporary journals. About five years ago, when the pyrogallic acid developer for negatives was almost exclusively employed I, in conjunction with a friend well versed in photographic chemistry, went through a series of experiments for the purpose of settling the point at issue. We worked independently of each other with different chemicals, and only compared notes at the end of the series. Our conclusions were pretty nearly alike in all points; but in this opinion we were perfectly agreed, viz., that the use of a bromide, combined with an iodide, had a retarding instead of an accelerating effect, and tended strongly to the production of feeble negatives. It should be borne in mind that we worked only with pyrogallic acid and the potassium and ammonium salts. This conclusion, forced on us by the facts, seemed the more surprising, inasmuch as a previous series of experiments in connexion with the waxed-paper process showed that the addition of bromide, in the proportion of one to two of iodide, reduced the time of exposure by nearly one half; while farther addition began again to exercise a retarding and fogging effect. We made some attempts to reach the cause of this curious anomaly, but failed in our endeavour.

"Having had occasion during the early part of the present spring to repeat my experiments, considerably modified, and on a more extensive scale, both with iron and pyrogallic developers, and with the iodides and bromides of different metals, I still remain of opinion that with a pyrogallic developer the presence of a bromide in the collodion is a positive injury, and remarkably so when conjoined with the iodide of potassium or ammonium. With the iodide of cadmium the effect is slightly different. For instance, supposing we have dissolved a sufficient quantity of pyroxyline, free from all trace of acid, in pure fresh-washed ether, and the proper proportion of alcohol, specific gravity ·805, and iodized with cadmium, we shall find great difficulty, even in a slightly acid bath, of obtaining anything better than a faint, blurred, foggy negative, until the collodion has been kept for several weeks. The addition of one grain of any bromide to each ounce of the collodion at once corrects the fault; and, although it does not seem to me to increase the sensibility, it undoubtedly gives greater clearness. But pyrogallic acid as a preliminary developer is fast giving place to iron, and here it is that the advantage of bromides is very conspicuous. My experience will not warrant me in saying that their presence increases the sensibility of collodion or the opposite; but they do give a clearness and incipient vigour to the image, which is easily raised to a fine gradation of tone by subsequent redevelopment with pyrogallic acid and silver.

"The value of the bromides in the dry processes is undoubted, both in increasing the sensibility and clearness of the negative. They may be used, I dare say, in something like the same proportion I have found the best for the waxed paper, viz., one of bromide to two of iodide. I do not pretend to explain this seeming anomaly. The fact is nevertheless certain, and deserves a more careful and methodical investigation than it has hitherto received."

As regards the rapidity with which bromide of silver is formed in the collodion film when immersed in the nitrate bath, Mr. Dawson agrees with our recent remarks in answer to Mr. Sutton. He says:—

"Mr. Sutton, while discussing this subject, has said:—

"'The film of bromide of silver is very slowly formed in the nitrate bath, requiring, sometimes, as much as a couple of hours to convert the whole of the bromide of cadmium into bromide of silver. But the film of iodide of silver is fully formed after the plate has been immersed a few minutes in the bath. If, then, a plate is removed from the bath after it has only remained on it a few minutes, some undecomposed bromide of cadmium will remain on the film, and this will, no doubt, render it less sensitive. But we are now speaking of a pure neutral nitrate bath. Suppose the bath or the film to contain traces of a strong acid, such as nitric or oxalic, it is then easy to see that this will attack the cadmium and liberate the bromine, allowing it at once and promptly to combine with the silver, and form bromide of silver in the film. The proof of this is, that if you add nitric acid to a solution of bromine of cadmium you at once liberate bromine and form nitrate of cadmium in the solution. It appears, therefore, that a strong acid in the film (produced by free iodine or oxalic acid in the collodion or nitric acid in the bath) assists the rapid formation of the bromide of silver, and thus renders the bromo-iodized collodion more sensitive.'

"This is very ingenious and plausible; but let us examine the theory a little more closely. Is it true that the bromide of silver is less rapidly formed than the iodide? The change, indeed, is, in both cases, effected immediately a sufficiency of the nitrate has come in contact with the other salt, and the presence of no acid will hasten or retard the decomposition. Although a bromized film will not assume the creamy appearance of an iodized film, it does not follow that the whole of the bromide has not been converted into bromide of silver, since there is no more difficulty in the nitrate permeating the film and decomposing the bromide than the iodide. All photographers must have observed that some specimens of collodion fully iodized will, even after a lengthened immersion, give a pale opalescent film, while others containing less iodine will show greater density and creaminess. I believe the nature of the collodion itself has more to do with this than the quantity of iodide or bromide which it may contain.

"Again: let us suppose the collodion contains free acid. Surely the effect of this would be to decompose the bromide and iodide—not during the few minutes immersion in the bath, but previous to the coating of the plate, whilst the collodion was reposing for weeks or months, as the case might be, in its bottle. When decomposition of this sort takes place, and it can only occur under the conditions mentioned, it will make itself very manifest in the high colour of the collodion; and every one knows that this state of things is anything but conducive to sensibility. In short, an acid, whether in the bath or in the collodion, cannot in any way consistent with chemical laws, assist in the formation of bromide of silver. The great affinity of bromine for silver renders their combination complete the instant they come in contact; and it is only the nitric acid thus set free that will combine with the base of the other metal, both being in the nascent state. Should any free nitric acid have been in the bath before the plate was immersed it will remain there in the same quantity as before. The same is true of oxalic or any other acid. Neither oxalate of cadmium nor ammonia (or whatever the base of the bromide is) will be formed during the immersion of the plate, whether the acid exists in a free state in the collodion or in the bath. In the former case the oxalate is already formed before the plate is coated, and in the latter there is no tendency to its formation. If, therefore, it be true, as Mr. Sutton asserts, that the formation of a bromised film is hastened by presence of free acid, we must look for the explanation in a different direction to that which he has indicated, and probably we shall find it depends more on mechanical than chemical action."

Regarding the influence of bromides on dry plates, we call attention to an article by Mr. Sutton in another page.

## TABLE OF THE BEST KNOWN ORGANIC SALTS OF SILVER, THE PROPERTIES OF WHICH HAVE ANY INTEREST IN PHOTOGRAPHY.

BY DR. VAN MONCKHOVEN.

| Names of the Substances. | Chief Properties and Observations. |
|---|---|
| Croconate | Insoluble. ? |
| Xanthamylate | " Is blackened by light. |
| Cetyl di sulpho carbonate | " " " |
| Phenyl carbamate | " ? |
| Nitrate of silver and of glycocolle | ? ? |
| | Soluble in water. Very sensitive to light. |
| Glycollate | ? ? |
| Homolactate | Soluble. ? |
| Formiate | Not very soluble, is easily reduced. Not very sensitive to light. |
| Onalate | Insoluble. |
| Amyl onalate | Crystallizes, is soluble. Sensitive to light. |
| Onamate | Not very soluble. Very sensitive to light. |
| Phenyloxamate | Soluble, crystallizes. |
| Cobalti-cyanure | Insoluble. Not affected by light. |
| Cyanate | " |
| Cyanurates | There are two. One of them becomes violet at 300°,* but is scarcely sensitive; the other has given magnificent positive impressions. |
| Nitrate of silver and of urée | Soluble. |
| Sulpho-cyanure | " |
| Selenio-cyanure | Insoluble. Very sensitive to light. |
| Nitrate of silver and of melamine | Soluble. |
| Sulpho-mellonate | Insoluble. Not affected by light. |
| Mellonure | " |
| Cyamelurate | " |
| Uroxanate | " |
| Urate | " |
| Cyanurenate | " |
| Alloxanate | " |
| Purpurate | " |
| Mesoxalate | " |
| Oxalurate | " This salt is not very sensitive, as it is not colured deeply in half an hour. |
| Inosate | " Same remark. |
| Methylsulfite | Not very changeable by light. |
| Chloro methylsulfite | Extremely sensitive to light. |
| Bichloro ditto. | " " |
| Trichloro ditto. | Very sensitive to light when wet, less so when dry. |
| Cacodylate | ? ? |
| Aldetrydate | A curious substance, sometimes under certain conditions it is extremely sensitive, sometimes not. Soluble in collodion and gives a good film, but under these conditions it is totally insensitive to light. |
| Alaninate | Soluble, crystallizes. Sensitive to light. |
| Lactate | " " " |
| Acetate | Not very soluble. Not very sensitive. |
| Clor. acetate | Very sensitive. Combines some curious properties to which we will recur. |
| Trichlor-acetate | Very sensitive to light. |
| Sulpho-glycerate | Very soluble. |
| Acrylate | Not very soluble in cold water. Is blackened slowly by light, but rapidly at 100°. |

* Centigrade.

| Names of the Substances. | Chief Properties and Observations. |
|---|---|
| Malate | Has given superb positive impressions. |
| Maleate | Crystallizes, is soluble. |
| Tumarate | Insoluble. |
| Tartrate | ,, Blackens in the light, but slowly. |
| Para-tartrate | ,, |
| Ethyl tartrate | Soluble, crystallizes. |
| Pyro-tartrate | Insoluble. Is blackened quickly by light. |
| Pyruvate | Crystalline. Slowly turns brown in the light. |
| Citrate | Insoluble, is reduced by hydrogen at 100° into a violet citrate of the suboxide of silver. |
| Phenylcitramate | Same properties. |
| Aconitate | Insoluble. |
| Itaconate | ,, |
| Citraconate | Crystallizes in fine crystals. |
| Mesaconate | Not very soluble. |
| Bromo-triconate | ,, |
| Phenyl itacomate | Dissolves in boiling water, taking a violet tinge. |
| Moreate | Insoluble. |
| Saccharate | ,, Scarcely sensitive to light. |
| Pyromucate | The solution turns brown on evaporation. |
| Ethyl mecconate | Remains a long time in the sun without turning black. |
| Ethyl sulphite | Soluble in alcohol. |
| Ethyl sulphate | ,, ,, and in water. |
| Ethyl phosphate | The crystals are but little soluble. |
| Propionate | Not very soluble. Is changed slowly by light. |
| Angelate | Soluble in boiling water. |
| Succinate | Is reduced to a sub-salt by hydrogen at 100°. |
| Chloro-succinate | Not very soluble. Sensitive when hot, not very sensitive when cold. |
| Sulpho-mannitate | Very soluble, and very stable. |
| Butyrate | Not very soluble or sensitive. |
| Bichloro-butyrate | ,, ,, but sensitive. |
| Quadrichloro.-butyrate | ,, ,, ,, |
| Valerate | Is blackened quickly by light. |
| Trichloro.-valerate; Quadrichloro.-valerate | Salts soluble in nitric acid; under the action of light the solution deposits violet chloride of silver, a circumstance which is of the highest importance in the study of the theory of the formation of the positive image, and to which we shall recur. |
| Nitro-valerate | Not very soluble. |
| Amyl sulphite; Amyl sulphate | Salts both soluble in water and in alcohol. |
| Caproate | Not very sensitive to light. |
| Tuberate | Insoluble. |
| Sebacate | ,, |
| Rutate | ,, Is rapidly blackened by light, but not while dry. |
| Laurate | ,, Not changed by light when it is well washed. |
| Cocinate | Soluble in ether. |
| Myristate | Crystallizes in ammonia. |
| Margarate | Insoluble. Not very sensitive. |
| Atearate | ,, ,, ,, |
| Anamirtate | Is coloured by light. |
| Erucate | Very sensitive to light. |
| Trichloro.-phenate | Pale yellow, precipitates. |
| Binitro phenate | Soluble in alcohol. |
| Picrate | Very soluble in water. Yellow. |
| Picramate | Insoluble. A fine red. Not very changeable by light. |
| Chrysanisate | ,, ,, Yellow. |
| Oxybicrate | Soluble. |
| Phenylsulphite | ,, and crystallizable. |
| Quinate | Very sensitive to light. |
| Formo-benzoilate | White. Insoluble. Is gradually blackened by light. |

| Names of the Substances. | Chief Properties and Observations. |
|---|---|
| Benzoate | White. |
| Nitro-benzoate | Not very soluble. |
| Sulpho.-benzoate | Very soluble. |
| Hippurate | A white precipitate. Not very soluble. |
| Nitro-hippurate | It is rapidly acted on by light when moist. |
| Benzo-glycollate | Is quickly acted on by light. |
| Salicylure | Yellow precipitate, which is easily reduced. |
| Chloro-cinnamate | Acted on by light. |
| Sulpho.-naphtalate | Soluble in water (water 100, sulpho. naph. 10.) |
| Isatate | Soluble in water. Yellow. |
| Cuminate | White precipitate, is blackened rapidly by light. |
| Resinate | ,, ,, ,, |
| | Soluble in spirits of turpentine. |
| Camphorate | Precipitate, coloured by light. |
| Cholate | ,, ,, ,, |
| Cholalate | ,, ,, ,, Soluble in alcohol. |
| Litho-fellate | ,, Very sensitive to light. |
| Euxanthate | ,, Yellow. Sensitive to light. |
| Mellate | Gives a sub-salt with hydrogen. |
| Pyro mellate | White. Not altered by light. |
| Gallo-tannate | Red brown. |

## Scientific Gossip.

Manufacture of Chloride of Ammonium—Chemical Transformations—Potabilization of Sea-water by means of the Electric Current—Application of Hyposulphite of Soda in Preserving Meat—Spectral Examination of Coloured Glass.

Dr. Playfair, in one of his recent lectures at the Royal Institution, gave a most admirable history of chloride of ammonium. This salt is so largely used by photographers that we are tempted to give a *resumé* of the principal points touched upon in the Doctor's lecture. Taking the name in the first instance, this salt carries us back to some of the earliest historical ages, the word ammonia being derived from one of the titles given to Jupiter, "Jupiter Ammon," near whose temple in Upper Egypt ammonia was for many generations manufactured from the refuse of camels, which was collected and distilled, when it gave off ammonia or some of its salts. Hence its name. It is now prepared almost exclusively from gas-water, a badly-smelling, black liquid from the gas-works. The uses of ammonia and its salts were familiar in this country, and their applications to manufactures were known long before this source was discovered for it. When a ton of Newcastle coal is distilled, ten gallons of a watery solution comes over from it, containing sulphide of ammonium and carbonate of ammonia. Now, sulphuretted hydrogen and carbonic acid are both volatile gases, it is, therefore, only necessary to add a strong acid to obtain whatever salt we please from these compounds of ammonia. Chloride of ammonium, known in commerce as muriate of ammonia, or sal-ammoniac, is manufactured on the large scale in this way:—The gas liquor is run into a deep cistern, which is connected with a chimney, and there is poured into it muriatic acid. This expels the sulphuretted hydrogen and the carbonic acid, and forms a solution of sal-ammoniac. The sulphuretted hydrogen, which, as most of our readers know, is a very bad smelling gas, like rotten eggs, is passed up the chimney, and removed from the locality of the works to be given to people living at a distance. Sal-ammoniac solution, obtained in this way, is very impure, and has to be sublimed in order to be obtained in that state in which it is usually seen in commerce. When the crystals are perfectly dry it is removed to a still, formed of an iron pot surrounded with a leaden dome; a fire being placed below it, the sal-ammoniac vapourises from its impurities, and condenses at the top as a crystalline solid. About 4,000 tons of sal-ammoniac are made annually in this country from gas-water. It is extensively employed in making the more common salts of ammonia. Another method of making it is by taking the gas-water, and instead of saturating it with strong acids, like muriatic acid, to distil it with lime. The gaseous ammonia goes over and very readily condenses in water or acids, when it forms various salts. This process is much the best, as the badly smelling sulphuretted hydrogen gas is retained by the lime. There is also another way of manufacturing this sal-ammoniac by acting upon sulphate of ammonia with common salt. Sulphate of ammonia is another salt very largely manufactured from gas-water, by adding oil of vitriol to the ammonia of the gas liquid. Carbonate of ammonia is made from this sulphate by distilling it with chalk. A double decomposition takes place, the sulphuric acid going to the lime, and the carbonic acid to the ammonia, forming carbonate of ammonia. The mixture is placed into retorts and distilled, the carbonate of ammonia being volatile, sublimes, and is condensed in chambers. The *liquor ammoniæ*, or hartshorn of pharmacy, is made by distilling sulphate or chloride of ammonium with caustic lime, this keeps back the acid, and the free ammonia comes over. Besides its uses in photography it is largely employed in medicine, and also in ladies scent bottles, some aromatic substance being generally mixed with it. What a wonderful transformation is thus effected by the application of chemical agency: the refuse of camels, the offal of the streets, and the fœtid water of the gas-works have become so transformed under its influence that the most fastidious ladies preserve them in their scent-bottles as a cherished luxury.

A most ingenious application of electricity for the purification of water has recently been made known by Dr. Phipson. We do not suppose that this process will be much employed by our readers, but still it is possible to conceive that cases might arise in which such a method of getting rid of the impurities in water might be of great value. The doctor says, that reflecting upon the powerful decomposing chemical force with which we are furnished by the voltaic pile, it occurred to him that we might be able to render sea-water potable by decomposing and extracting its salt by means of a moderately powerful battery. The experiments were made at Ostend a few years ago. The apparatus consisted of three vessels containing sea-water, the centre one contained the water to be operated upon, the two others communicated with the two poles of the battery. The three vessels were connected by two bent ∩ tubes filled with sea water. As the only battery procurable at Ostend was rather weak, the current was passed through the water for about fourteen hours, after which one of the outside vessels had become acid and the other alkaline. The sea-water was then filtered through charcoal, and was nearly drinkable. It would have been, doubtless, quite potable, had the battery employed been more powerful, but with the one in use it was found difficult to extract the last portions of salt, and the water, after subsequent trials, still presented a slightly brackish taste. Dr. Phipson has not since had an opportunity of repeating this experiment, but from the results obtained it is quite possible that sea-water might be rendered potable by means of the electric current.

This reminds us of Sir Humphrey Davy's memorable experiments upon the production of fixed alkali by the electrolysis of water. Upon electrolysing the purest water that could be procured, placing it in two cups connected together by threads of amianthus, it was always found that the water in the negative cup gained the power of giving a slight blue tint to litmus paper—the water in the positive tube rendering it red. This had been noticed by many English and foreign chemists, and some of them had expressed the opinion that there was a veritable production of acid and alkali by the electricity. After a great number of experiments, conducted with the most minute precautions, Sir Humphrey Davy read a paper before the Royal Society, in November, 1806, in which he proved that the acid and alkaline bodies were derived from a minute trace of soluble salts, which had been dissolved by the water from the glass, &c., in which it was distilled, and which the electricity had decomposed in the manner mentioned above by Dr. Phipson.

An ingenious application of hyposulphite of soda, not however for fixing and preserving positives from change, but for fixing and preserving provisions from change, may be seen in the International Exhibition, in the Food Department, exhibited by Mr. M'Call. In preserving cooked meats, he adopts the old plan of expelling air by boiling, but he adds an ingenious contrivance of his own. All who have been condemned to live on preserved meats are well aware that a little decomposition almost always takes place in them, and few who eat them escape without some ill effects. Probably the air is never completely replaced by steam in the boiling, or some air may make its way again into the cases before they are soldered, down, so Mr. M'Call has a plan by which he expects to effect the absorption of any oxygen remaining in the case. In the top of his cans is a small capsule, in which he places a button of fused hyposulphite of soda, which, by a little contrivance, is exposed when the can is soldered and becoming dissolved, is expected, by the decomposition familiar to chemists, to absorb any oxygen left in the vessel. Whether it really does so, we will not undertake to say; but at all events the case of beef open on the table is quite free from taint, and looks remarkably good.

A specimen of orange glass has been forwarded to us by "Photos" for examination in the spectroscope, It is flashed on one side of a very good deep orange colour, and when examined in a good light is seen to cut off all the chemically actine rays. The spectrum is entirely intercepted down to the middle of the green, showing that light filtered through this glass would be quite harmless in a photographer s working laboratory.

## The International Exhibition.

### PHOTOGRAPHIC CHEMICALS.*

Those chemicals which are of more especial interest to photographers are so scattered about the building that it is impossible to observe any particular order in the notes which we have made of them. The catalogues also are here of no use, as under the term "chemicals" everything rejoicing in that name, and a few which have not the remotest claim to it, are classified. We will, therefore, proceed with some of the cases in the eastern annexe, taking them in somewhat the order of their position.

The well-known firm of Hopkin and Williams (530) exhibit several of the scientific preparations for which they are famous. A mass of iodide of cadmium, which is shown in this case, is the finest specimen we have ever seen. It has that peculiar neutral-tint appearance which is so characteristic of this salt, owing, doubtless, to the remarkable pearly lustre of the crystals. We also notice here some remarkably white cyanide of potassium in fused lumps, representing the commercial article usually sold under this name, and also a beautifully crystallized specimen of the pure compound. It has exactly the appearance of coarse table salt. It is very white and nicely crystallized, and as far as can be judged from appearance, quite pure. They also exhibit some very white and well-crystallized pyrogallic acid: the largest, if not the finest, specimen of this salt which we have yet noticed in the building is, however, exhibited by E. Schering, of Berlin (Prussia, Class XIV, No. 1433), about which we shall have more to say presently. Messrs. Hopkin and Williams also exhibit a case of chemicals in the photo-

* Continued from p. 294.

graphic department, a notice of which we must defer till a future occasion.

Messrs. Huskisson and Sons (536) exhibit a beautiful series of iodides. bromides, &c. One remarkable point about their case is the attention they seem to have paid to the crystallographic characteristics of the various salts exhibited. We may notice especially some large jars of iodide and bromide of potassium, the crystals of the former salt being in some cases nearly an inch and a half cube. They also exhibit some pure neutral iodide of potassium for photographic purposes, as well as iodides of ammonium, calcium, magnesium, silver, mercury, lead, iron, zinc, antimony, arsenic, phosphorus, and sulphur. Their iodide of arsenic is a magnificent preparation; it is exhibited in a large hemispherical bowl with a flat glass cover. The sides are lined with a fine mass of brilliant red crystals, resembling a beautiful collection of miniature ferns or sea-weeds, and totally unlike the ordinary run of chemical crystals. The companion dish of iodide of mercury is also exceedingly fine; but the third of iodine will be looked upon with especial interest. There are many exhibitors of iodine in this department, but few, if any, show a specimen equal to this.

J. Ward and Co.'s case (619) will be regarded by the scientific photographer with some interest, illustrating as it does the utilisation of kelp, the technical name of the ash obtained by the incineration of sea-weeds; it is valuable from the potash salts and iodine which it contains. We have here exhibited a beautiful specimen of crystallized iodine, and several samples of iodide of potassium extracted from this source.

W. Bailey and Son, Wolverhampton (465), also exhibit some good chemicals, nearly every article used in photography being manufactured by this house. They prepare an impervious varnish for the preservation of paper photographs, and specially adapted for taking colour, which is said to render the touch equal to working on ivory: and also an encaustic paste, which produces an equal and homogeneous surface on the picture that neither damp nor water will effect, making the colour transparent like glazing in oil. The value of this is most apparent when uncoloured photographs are stippled with sepia or the like, which on albumenized paper injures the surface and spoils the effect. The paste is to be gently rubbed all over the picture with the finger, and after remaining there for ten minutes, rubbed off again, when the photograph will be found to have acquired great brilliancy and clearness of detail.

## AWARDS OF JURORS.

The following official circular, relative to the declaration of the awards of the juries, has been issued by order of the Commissioners:—

1. The declaration of the awards of the juries at a State ceremony on Friday, 11th July, 1862, at one o'clock, will be made by an International representative body of Royal and distinguished personages, specially named by the various nations which have taken part in the Exhibition.

2. The Queen has named his Royal Highness the Duke of Cambridge, K.G., as her Majesty's representative to receive and distribute the awards to the exhibitors of the United Kingdom and its colonies and dependencies. The special representatives of foreign countries will receive and distribute the awards to foreign exhibitors.

3. The various ceremonies will take place in the Exhibition Buildings and in the Horticultural Gardens, which will be treated as part of the Exhibition for that day.

4. The special representatives will be received by her Majesty's Commissioners on the upper terrace of the Horticultural Gardens, if the weather be favourable; if unfavourable, in the Conservatory; and the International juries will then deliver their awards to the special representatives.

5. The special representatives after receiving the awards will pass in procession along the arcades to the Exhibition Buildings, and at various stations will deliver the awards to the chairmen of the British Class Committees, to the Colonial Commissioners, and to the Foreign Commissioners in or near those parts of the buildings where the principal objects of each class or country are placed.

6. Upon the arrivals of the special representatives at the different stations for distributing the awards, the national airs of the respective nations will be played by military bands, British and foreign. After the distribution, &c., the procession will assemble again on the upper terrace, when "God save the Queen" will be performed by all the military bands.

7. The public will be admitted between the hours of 10 and 12.30 by season tickets or by special tickets to be purchased before the 8th July at 5s. each. On and after that day the price will be 7s. 6d. each. Tickets will be ready for issue on the 30th June.

8. Exhibitors who may not have season tickets may obtain a free ticket of admission upon personal application at the offices in the Exhibition Road, on or before the 8th July.

## DECOMPOSITION IN COLLODION.

BY M. AUG. TESTELIN.*

In studying the decomposition of collodion, we began by examining the reciprocal action which each of the constituent elements of this product exercises upon the others, and we also, though very incompletely, indicated the reactions and the principal products resulting from them. We now proceed to the examination of the changes in property which the collodion undergoes.

Collodion, properly so called, that is to say, the simple solution of pyroxyline in ether and alcohol, has never presented to us a very striking example of spontaneous decomposition. Still, however, we believe that this collodion will ultimately become decomposed when it is not protected from the influence of light.

But when the pyroxyline is not chemically pure, and retains traces of the salts which have served in its preparation, or of the hyponitric acid which, in some extremely rare cases, is left behind, then the collodion is always decomposed in the course of a very limited space of time. For nitric acid very readily decomposes ether, even without combining with it: this reaction gives rise to a great number of products, the nature of which varies according to the degree of concentration of the acid, and the temperature at which these reactions are manifested. When the acid is very diluted, or the temperature is very low, there are formed simply nitric ether and aldehyde; but if the acid be concentrated, there are formed beside, oxalic acid, carbonic acid, acetic acid, formic acid, and formic and acetic ether.

These several products are very injurious to the photographic preparation, because they always acidify it in the course of a short space of time, and because some of them, as acetic ether for example, cause the pyroxyline to undergo a molecular modification which renders it unfit for photographic purposes; the film given by a collodion thus modified is of a dull white colour, and non-adherent to the glass.

The gun-cottons of commerce always retain a greater or lesser quantity of free acid. To prove this fact, it is sufficient to put a specimen of 10 or 20 drachms into a glass-stoppered bottle; upon opening the bottle at the expiration of a few days, a very strong odour of hyponitric acid escapes, which will be found fixed between the capillary fibres of the cotton, and which repeated washings fail to remove.

Now, at the moment when the cotton becomes dissolved in any liquid, these capillary spaces are distended, and even become dissolved, upon disengaging the acids they contain; from which necessarily follows a partial decomposition of the solvent, when the latter is susceptible of being destroyed by oxygenizing bodies as energetic as hyponitric acid.

The solution of pyroxyline in ether is then a prime cause of acidification, for beside the substances whose formation we have indicated, the compound ethers also produced at

* Continued from p. 222.

the same time, becoming acidified, are soon decomposed. The result is, that at the time of preparing the collodion the iodides are attacked, the iodine is liberated and colours the liquid, while the equivalent quantity of the bases of the latter combine with the formic, acetic, oxalic, and other acids.

But while these combinations are slowly effected, the iodine which at first colours the solution, acts upon the formyle and the oxide of ethyl, producing organic iodides (compound ethers), which are nearly colourless.

These facts clearly explain to us the spontaneous changes in colour that collodion generally undergoes, and even while admitting that the pyroxyline exercises no influence in causing the primary acidification of the collodion, and consequently, the decomposition of the salts it contains, we have seen that this condition is established, even by the effect of the solution of the iodides solely.

Colourless collodions possess an alkaline reaction in proportion as the absence of colour is more complete. This alkalinity is principally due to the presence of free metallic oxides, the formation of which is probably favoured by the affinity of the iodine for hydrogenized substances, with which it produces organic iodides, while the major part of the base set at liberty combines with the formic, acetic, and oxalic acids.

We do not yet clearly understand in what manner the reactions are effected, so that there can remain a quantity, whatever it may be, of free metallic oxide in the liquid; for while the elimination of the iodine of the iodides is produced by the acids, it must make quantities exactly equivalent to those of the metal which was as first united, and which the acids have removed.

It must then be admitted that the iodine is not expelled from its first combination, but that it forms, with the compounds of ethyl and of formyle, new bodies, probably more stable under these circumstances, and thus abandoning the metal, which then oxidizes, and uniting in part to the acids which the liquid may contain, which will naturally be only in equivalent relation.

Proceeding now to the change of properties in collodion, we commence by remarking, that immediately after its preparation, it usually furnishes two distinct results. For one proof obtained with this product, under given circumstances, developes only feebly under the action of the reducing agent, the shadows presenting no detail, while the lights are strongly marked; and if, to avoid this effect, we prolong the exposure to light, the details come out well in the portions feebly lighted, but they present no harmonious relation with the shadows in the negative. In the other case, the image is sometimes formed very rapidly, sometimes with excessive slowness, and is always extremely feeble and superficial; every part comes equally grey, even those which have not been submitted to the influence of light, and the negative acquires no greater intensity by the ordinary means of intensifying.

The first of these two results proceeds, not from the free iodine which may be disengaged, but from the presence of the acids we have shown to be formed in this case, and the neutralization of which cannot be effected at the time of preparing the collodion, for it often requires many days to complete these transformations.

The second result can manifest itself in so short a time only when alkaline substances are employed, but we may always remark during the bleaching of the collodion, either that it takes place spontaneously, or is determined by some cause or other.

When the collodion is completely bleached, it is neutral or alkaline; "then it will be remarked that it becomes more fluid, that the film it forms is thinner, generally iridescent after dessication, more permeable in those parts which correspond to the shadows of the model, and the silver is reduced with a metallic aspect upon the glass plate; the slightest defect in cleaning, therefore, becomes a spot."*

The fluidity bleached collodion acquires arises from the neutralization of the acid substances which are developed, and which possess the faculty of thickening the collodion by acting upon the pyroxyline in the same manner as the mineral acids do.

When the collodion bleaches spontaneously, some alkaline matters are formed, as has been shown, and this reaction is always accompanied by oxidation of the ether, which gives rise to compounds of aldehyde: now these compounds enjoy the peculiar property of reducing the salts of silver with that brilliant metallic aspect remarked upon plates prepared with old collodion.

As a concluding remark upon the spontaneous changes of colour in iodized collodion, we have shown that when this product, colourless at first, or bleached ultimately in the dark, acquires a red hue more or less deep, this effect is due to the decomposition of the organic oxides, the principal of which is the periodide of formyle, which is decomposed with great facility under the influence of diffused light, although feeble. *(To be continued.)*

* Barreswil et Davanne.—*Chimie Photographique*, p. 117.

## BROMIDES IN DRY PLATES.*

THE further we go on in experimenting on the action of a bromide in collodion, the more interesting and instructive our experiments become. In the rapid dry processes a bromide seems destined to play an important part, and we will now discuss this branch of the subject.

On examining, by daylight, the colours of different sensitive films of iodide, or bromo-iodide of silver, they will be found to vary greatly—some being of a whitish-yellow, and others of a deep greenish-yellow tint. Films of the latter colour appear to be the most sensitive in the dry processes, and it therefore becomes important to ascertain upon what the colour of the film depends, and to know how to produce a film of a pale or deep colour at will. For this purpose it is necessary first to examine separately the films of iodide and bromide of silver—and afterwards to examine them in a state of mixture or combination.

Let us first confine our attention to the iodide of silver alone.

If you add iodine to plain collodion, and then coat a plate with it and immerse it in the nitrate bath, an intensely yellow film is very quickly formed; and you may make this as creamy as you choose, by adding a sufficient quantity of iodine to the collodion. This, however, gives a very insensitive film in the wet process, chiefly on account of the large quantity of nitric acid which is set free in the film. But if, instead of adding iodine to the collodion, you add iodide of cadmium or potassium, the colour of the film becomes much whiter. Again, if you add a few drops of a solution of nitrate of silver to a solution of iodide of potassium you produce a white turbidity in the liquid, and the iodide of silver thus formed is not entirely precipitated, but remains suspended. If, however, you add a few drops of a solution of iodide of potassium to a solution of nitrate of silver, the iodide of silver formed is at once thrown down in flakes, and is of a much deeper yellow colour.

Our readers are of course aware that iodide of silver is entirely soluble in a strong solution of iodide of potassium; but when that solution is not strong enough entirely to dissolve the iodide of silver it seems to form with it a sort of double iodide of silver and potassium, of a whitish colour. It will readily be believed that this complex salt is not, *cæteris paribus*, so sensitive as the pure, deep, yellow-coloured iodide of silver.

If we perform similar experiments with bromide of silver, we do not arrive at similar results. The bromide of silver obtained under any circumstances appears to have a whitish colour, and never a deep yellow. Whether the collodion contains bromine, or bromide of cadmium or ammonium, the film is still white, like a film of chloride of silver, and not yellow like iodide of silver; and it turns grey, and eventually dark blue, by exposure to light, so that you can, if you like, obtain vigorous sun prints upon bromide, in the

* From the *Photographic Notes*.

same way as upon chloride of silver, a property which iodide of silver does not possess.

The yellow colour of a sensitive film of bromo-iodide of silver depends therefore upon the iodide, and not upon the bromide of silver; and if you wish to make the film as deep a yellow colour as possible, you must add free iodine to the collodion, and not iodize it with iodide of cadmium or potassium.

Collodion iodized with iodine is of a very dark colour —as dark as port wine. It may contain at least 6 grs. of iodine to the ounce.

Collodion, sufficiently bromized with bromine, is about the colour of pale sherry.

These two collodions may be mixed, and the best proportions seem to be in the ratio of the atomic weights of iodine and bromine. The film is beautifully clear and even, and the collodion flows remarkably well upon the plate.

You cannot produce a film of pure bromo-iodide of silver in the manner described without setting free nitric acid; but the effects of this can be neutralized in the dry processes in the following way:—

In the first place, the excited film is well washed in distilled water, which removes a great deal of the nitric acid. The remainder may be neutralized by immersing the plate in water containing a trace of carbonate of soda; after which it should be thoroughly washed again. This soda bath has the double effect of neutralizing the nitric acid in the film, and of renovating the free nitrate which is entangled with it into insoluble carbonate of silver. After which a preservative of gum and honey may be applied for the purpose of giving density to the image; and it seems probable that the preservative may be used without the addition of any free nitrate; for we have lately prepared very sensitive plates containing the smallest imaginable trace of free nitrate. There must be either free nitrate or carbonate of silver present in the film, in order to confer sensitiveness upon the iodide of silver, and it may turn out that the substitution of carbonate for nitrate may be a grand improvement.

[It will be seen here that Mr. Sutton treads closely upon the heels of Mr. Bartholomew, whose process with gelatine and carbonate of soda appeared in our pages at the beginning of the year.—Ed.]

## PROGRESS OF PHOTOGRAPHY IN AMERICA.*

"Professor Seely communicated to the society his views respecting the Composition of the Photographic Image, the question being, as to whether the dark material is to be considered as metallic silver, an oxide, or a chloride. There are some experiments published in the *Philosophical Magazine* in May, 1858, which appear to have bearing on this subject, and show that the black substance arising from the decomposition of white chloride of silver by light is probably silver in an allotropic, or passive state.

"Professor Seely presented his views on the subject of the Strengthening of Negatives, comparing in this particular those that have been developed by sulphate of iron, and those by pyrogallic acid. The cleanliness, cheapness, rapidity, evenness, and delicacy of the former, has led in America to its universal use, although negatives made in that way commonly require to be strengthened for printing. In the discussion that ensued among the members of the society on the views of Prof. Seely, Dr. Henry Draper remarked that the protochloride of palladium, first discovered by him as a strengthener, would increase the density of an image sixteen times, without changing the thickness; the advantages it offers being quickness, purity, and evenness of action, all the parts being acted upon in their order of darkness, and no extraneous stains ever arising. Mr. Rutherford was of opinion that the aid of strengtheners is always at the expense of detail, and that it is better whenever possible to obtain negatives of the proper degree of intensity in the first instance. In this view the society seemed generally to concur.

"Mr. Rutherford communicated his recent experiments in Astronomical Photography. The chief difficulties he had encountered in obtaining impressions of the moon, were owing to the want of coincidence between the chemical and visual foci of his achromatic telescope. He had, therefore, caused to be constructed a Cassegrainean reflector, with a silvered glass mirror, after the manner of Steinheil, and had already obtained several lunar photographs by its use.

"Dr. Henry Draper has also been engaged for three years in the construction of mirrors for his large reflecting telescope, of sixteen inches aperture, and thirteen focal length. It was built expressly for celestial photography, and a description of it read before the British Association for the Advancement of Science, in 1860. At first he used the ordinary metallic speculum, but soon gave it up for silvered glass. He has now three large mirrors. They were silvered from the ammonia nitrate by oil of cloves, and reflect very much more light than the best achromatic of equal diameter can transmit. He has with this instrument taken many lunar and solar photographs. He finds that the silver keeps its polish very much better than would have been expected. His telescope is of the Newtonian form.

"Mr. Johnson exhibited an instrument for the purpose of illustrating on the large scale the complex curves executed by the vibrations of an elastic tube, made to revolve by suitable mechanism. Through the tube a current of gas was pesmitted to pass, and lighted at the end. The flame made visible all over the room the symmetrical figures of the vibratary tube, and by the changes of its colour from yellow to green and blue, illustrated the principle that as the energy of combustion increases, the refrangibility of the emitted light increases. At the points where the flame came momentarily to rest, the tint it emitted was yellow, but when at its maximum of motion the tint was violet, this being in accordance with the principle which connects rapidity of chemical action with rapidity of molecular vibration. Mr. Johnson likewise exhibited a number of daguerreotypes, etched by sulphuric acid about twenty years ago. Some of them were very beautiful. They were accompanied by prints made from them with a copper-plate press.

"Such is a statement of our transactions since the last annual meeting. We may, therefore, congratulate ourselves that we have not been altogether idle. The progress of science in modern times is, however, so rapid, that where even great things have been accomplished, still greater things are expected. The history of that special branch of knowledge which it is our business to cultivate, offers us many interesting and instructive lessons. It took more than thirteen hundred years to correct the great fundamental error of optics. The Alexandrian scientific men, to whom we are only beginning to concede the merit they may justly claim, treated of optics on the principle—not that rays proceed from objects to the eye, as is known to us, but that issuing from the eye they impress on each object, and make us sensible of its presence and qualities in a manner somewhat analogous to touch. Euclid, the celebrated geometer, composed his treatise on optics on that fallacious conception. The occasion does not permit me to relate how this singular error became mixed up with some of the most important theological doctrines. It maintained its ground until more than a thousand years after Christ, when it was overthrown by a Mohammedan writer, Alhazen, the author of many other physical discoveries, which, considering the age in which he lived, might almost be spoken of as supernatural. Thus he showed that whenever a ray of light falls perpendicularly on the atmosphere, it pursues its path downward to the earth in a straight line, but that in every other position it moves in a curve that is concave to the earth, compelled to do so by the increasing density and refractory action of the air. He demonstrated that as the consequence of this, we live in a world that is full of illusion; that the

* Concluded from p. 298.

stars are not in the places in which we think we see them, and that—incredicle to be said—we perceive the sun and moon long before they have actually risen, and long after they have actually set. Upon these principles he gives the explanation of the twilight received by us as true, though modern times have disingenuously misappropriated the merit to themselves. With singular sagacity he demonstrated from the facts before him that the earth's atmosphere must be about fifty miles high.

"I have said, and said truly, that, considering the age in which these discoveries were made, they were almost supernatural. At that time in all Europe there was not a single man who could comprehend what the great Mohammedan philosopher was writing about. Through ignorance, justice to his merit could not be done to him in his own day, through jealousy it has been denied to him in ours.

"What a contrast between the slow development of optical truths in the old times, and their rapid development in ours. But more than this. We work at our ease, and without fear. It was not always so. When Antonio de Dominis first essayed to give a physical explanation of the rainbow, on the principle that it is caused by the reflections and refractions of light, by drops of water falling at a certain angle before the eye, he was brought into collision with the popular idea that it was the weapon which the Almighty had rested against the cloud. For this, and similar offences, de Dominis drew upon himself the hand of authority; and though a sudden death snatched him from his persecutors, with an exquisite refinement of vengeance they dug his body out of the grave, that the earth might not be polluted thereby, and burning it in the fire, cast his ashes to thewinds, to prevent as far as it might be possible for human agency to do, his participation in the resurrection to the lifeto come.

"But truth will force its way at last in spite of opposition. The physical theory of the rainbow, as depending on the reflection and refraction of light, was independently developed by Descartes, though he was at one moment on the point of burning all his manuscripts on this and other physical topics, for fear of impending punishment. It was at last under happier auspices, completed as we now find it by Newton, as a consequence of his great discovery of the different refrangibility of the rays of light.

"And it is under such happier auspices that we also live. We may occupy ouselves in full liberty with problems in science ,and operations in art. The origin and rapid advancement in photography is an illustration of this. But privileges imply duties. If our predecessors under disadvantages so great accomplished so much, what ought we not to do who have not a single obstacle in our path."

## A NEW RAPID DRY PROCESS.

The *American Journal* says:—We have received the following from Mr. J. M. Masterton, of Bronxville. New York:—

"Enclosed please find a print which I promised to send you; the negative was taken on a tannin plate prepared as usual with iodide of potassium and bromide of cadmium. When exposed it was about four weeks old, the exposure was about thirty-five seconds, and developed with *cold* spring water, as usual, except the citric acid solution, which was made one hundred and sixty grains to the ounce of water, with very little silver (probably about six drops of a twenty-grain solution doing the development), and used freely; the exposure was given intending to use hot water, but afterwards concluding to try an experiment, I used the strong citric acid, and I think got as good an effect as if I had used *hot* water. I leave you to judge of the merits of the picture, hoping that others may try the use of strong citric acid, and report the effect."

The editor adds:—The print received is evidently from a negative fully exposed, without a trace of fogging, full of detail, and at the same time of proper density. The view is of a shady locality in Greenwood. Mr. Masterton's modification of the tannin process is exceedingly simple, and if his experience is confirmed by others, the strong acid developer must at once come into general use.

[The idea of using excess of a very powerful retarding agent as an accelerator is certainly as droll as it is novel. We fear the problem of an instantaneous dry process will not be solved by using excess of citric acid.—Ed.]

## DISORDERED BATH.

A correspondent in western New York thus describes his troubles:—

"I am meeting with a difficulty in my negatives which is new to me, and am not able to define the cause or apply the remedy. The difficulty is this: the negative, after being developed with the usual iron developer, is filled with holes part way through the film; not like pinholes, as there are some of those, but look somewhat as if the negative had been covered with sand, or something of a light character, and had left the marks in the film, making numerous holes or indentations in the film, but the holes are not quite through.

"If you can give me the cause and remedy through your Journal, or any other way you see fit, I shall be much obliged."

We print the above chiefly on account of the very plain description of a difficulty which every one of long experience must meet and understand. Many of our readers will recognise an old acquaintance in the sandy film, and need not be told the remedy. For our correspondent. and perhaps many others, we repeat the explanation which has been given in former numbers of this Journal.

The trouble in question generally appears only after a bath has been a long time in use, and is most noticed in baths which are very strong in silver; also it is apt to show itself at a late hour of a day when the bath has been much used. If a plate which on development would become sandy be washed with water immediately it comes out of the bath, the developed picture will not be sandy. If a sandy film be examined with a microscope, crystals will be seen in various places, particularly if the washing has not been so violent as to dislodge them.

These crystals forming on and in the film by roughening it are the immediate cause of the sandy appearance. The crystals are supposed to be iodide of silver, with which the bath is super-saturated.

The simple and practical remedy is to add five or ten per cent. of fresh solution which contains no iodide.—*American Journal.*

## CLEANING THE GLASS.

This is one of the most important operations in practical photography, it being very essential to have a plate thoroughly cleaned before attempting to produce a negative upon it. Various modes are practised, but it is only necessary to point out those which are considered the best. First, immerse the glass in a dilute solution of nitric or sulphuric acid, one part to eight or ten of water, and after remaining in a little time, take it out and rinse thoroughly with water. Rear the plate upon the corner and let it drain, or wipe dry with a clean towel.

Next, fasten the plate in a vice constructed for the purpose, apply a few drops of alcohol from a bottle with a perforated cork, and rub thoroughly with a piece of cotton flannel, with a circular motion, till the alcohol has evaporated. The glass may be first scoured with a mixture of alcohol and fine rotten-stone. and finished with two or three drops of alcohol, polished off with a clean piece of flannel. The glass is known to be clean when the breath will lie evenly upon it without streaks or marks of rubbing.

Considerable time may be saved in cleaning glasses by coating them with albumen diluted with an equal quantity of water, and placing them in a grooved plate-box, to exclude them from dust while they are drying. They need but little rubbing off before they are coated, and the albumen film makes a fine clean surface to receive the collodion.—*Humphrey's Journal.*

## TABLE OF PROPORTIONS AND DISTANCES ON BOTH SIDES OF LENSES FROM THE POINT WHICH IS THE ZERO OF MEASUREMENT.

BY M. CLAUDET, F.R.S.*

| A. | B. | A. | B. |
|---|---|---|---|
| 100· | 1· | 20· | 5· |
| 90·90 | 1·10 | 19·60 | 5·10 |
| 82·83 | 1·20 | 19·23 | 5·20 |
| 76·92 | 1·30 | 18·86 | 5·30 |
| 71·40 | 1·40 | 18·51 | 5.40 |
| 66·66 | 1·50 | 18·18 | 5·50 |
| 62·50 | 1·60 | 17·85 | 5·60 |
| 58·82 | 1·70 | 17·52 | 5·70 |
| 55·55 | 1·80 | 17·24 | 5·80 |
| 52·63 | 1·90 | 16·96 | 5·90 |
| 50· | 2· | 16·66 | 6· |
| 47·61 | 2.10 | 16·39 | 6·10 |
| 45·45 | 2·20 | 16·13 | 6·20 |
| 43·47 | 2·30 | 15·87 | 6·30 |
| 41·66 | 2·40 | 15·62 | 6·40 |
| 40· | 2·50 | 15·38 | 6·50 |
| 38·46 | 2·60 | 15·15 | 6·60 |
| 37·03 | 2·70 | 14·92 | 6·70 |
| 35·71 | 2·80 | 14·70 | 6·80 |
| 34·44 | 2·90 | 14·49 | 6·90 |
| 33·33 | 3· | 14·28 | 7· |
| 32·26 | 3·10 | 14·08 | 7·10 |
| 31·25 | 3·20 | 13·88 | 7·20 |
| 30·30 | 3·30 | 13·69 | 7·30 |
| 29·41 | 3·40 | 13·51 | 7·40 |
| 28·57 | 3·50 | 13·33 | 7·50 |
| 27·77 | 3·60 | 13·15 | 7·60 |
| 27·02 | 3·70 | 12·98 | 7·70 |
| 26·31 | 3·80 | 12·82 | 7·80 |
| 25·64 | 3·90 | 12·65 | 7·90 |
| 25· | 4· | 12·50 | 8· |
| 24·39 | 4·10 | 12·34 | 8·10 |
| 23·80 | 4·20 | 12·19 | 8·20 |
| 23·25 | 4·30 | 12·04 | 8·30 |
| 22·72 | 4·40 | 11·90 | 8·40 |
| 22·22 | 4·50 | 11·76 | 8·50 |
| 21·74 | 4·60 | 11·62 | 8·60 |
| 21·27 | 4·70 | 11·49 | 8·70 |
| 20·83 | 4·80 | 11·36 | 8·80 |
| 20·40 | 4·90 | 11·23 | 8·90 |
| 11·11 | 9· | 9·09 | 11 |
| 10·98 | 9·10 | 8·28 | 12 |
| 10·87 | 9·20 | 7·69 | 13 |
| 10·75 | 9·30 | 7·14 | 14 |
| 10·63 | 9·40 | 6·66 | 15 |
| 10·52 | 9 50 | 6·25 | 16 |
| 10·41 | 9·60 | 5·88 | 17 |
| 10·31 | 9·70 | 5·55 | 18 |
| 10·20 | 9·80 | 5·26 | 19 |
| 10·10 | 9·90 | 5· | 20 |
| | | 3·33 | 30 |
| 10· | 10· | 2·50 | 40 |
| | | 2· | 50 |
| | | 1·66 | 60 |
| | | 1·42 | 70 |
| | | 1·25 | 80 |
| | | 1·11 | 90 |
| | | 1· | 100 |

The quantities A and B are the factors of the same product, which is always 100; and one being given, the other may be found by dividing 100 by the quantity known.

If we take the column A for the distance of the negative, the column B will indicate the proportion of enlargement and the distance of the image. If we take the column B for the distance of the negative, the column A will indicate the reduction and the distance of the image.

* See M. Claudet's "Rule for Finding Distances," p. 282, No. 198.

## COLLODION FOR NEGATIVES.

The conditions of a good negative collodion are: 1. That it must possess the properties of intensity to a considerable degree. 2. That it must possess good flowing qualities in order to obtain an even and structureless film. 3. That it must have body to give a negative of sufficient density.

To secure these qualities it is necessary to use the purest chemicals that can be obtained. The pyroxyline or soluble cotton has more to do with the excellence of collodion than any other ingredient, and great care must be used in testing and selecting an article which will best answer. A good article of soluble cotton is harsher to the touch and shorter in the fibre than ordinary cotton. If it is very short and powdery it may have considerable solubility, but it is apt to give a film full of opaque spots, and is unsuitable for collodion. If it does not differ much in texture from ordinary cotton, it is not sufficiently soluble, and should also be rejected. The criterion of good pyroxyline is, that it should possess the maximum of solubility, and at the same time give a transparent film when poured upon glass and allowed to dry.

If an article can be found which will dissolve in the proportion of eight grains to the ounce in the mixture of ether and alcohol, and give a perfect homogeneous and transparent film, it may generally be relied upon as a good article for negative collodion. No sample should be used which makes a film too thick after dissolving six grains to the ounce in the alcohol and ether.

Pyroxyline which exhibits a glutinous appearance in dissolving, will flow in a slimy manner on the plate, and is not fit for use. The best cotton will fall slowly to the bottom in the alcohol and ether, and will dissolve with liberation of beautiful air-bubbles, with little or no appearance of glutinosity. It should leave no flocculent matter, and deposit but a very slight sediment on standing. It is necessary to observe also that the soluble cotton should be quite free from acid when it is used. Pyroxyline, when it is kept for some time in close stoppered bottles, partially decomposes, forming oxalic acid. It may, moreover, be found in an acid condition from imperfect washing in the process of manufacture, so that the acids used are not thoroughly cleansed from it.—*Humphrey's Journal.*

# Correspondence.

## A HINT TO PHOTOGRAPHIC TOURISTS.

Dear Sir.—Having recently paid a visit to the Isle of Man, it has struck me as a very singular thing, that photographic tourists seem to ignore the existence of a place possessing so much interest and beauty.

In passing through the streets of London, no one can fail to observe that the views from the Isle of Wight, Jersey, Guernsey, and many places of much less interest, are abundant, while views of that fine old historical relic, Peel Castle, or the beautiful picturesque town of Douglas, are nowhere to be seen.

That it does not arise from paucity of subject I can myself testify, for in my humble opinion the Isle of Man affords more variation and boldness of scenery than the Isle of wight, and almost every nook and corner of the latter place are familiar to all the little shoeblacks of the Strand. Peel Castle is quite as interesting as Tintern Abbey, but, as I before observed, that is not to be obtained, while to get a *fresh* view of Tintern Abby is almost impossible; unless some enterprising photographer where to engage the services of Mr. Coxwell, and even then I should doubt its originality.

Again, I might compare Douglas and Ryde, but, Mr. Editor, I will leave your much more able pen to assign a reason and suggest a remedy for this, contenting myself with the remark, that in no place will photographic tourists find more hospitality and kind assistance than in that much neglected, but beautiful spot, the Isle of Man.—Dear sir, truly yours, Leo Daft.

2, *Queen Square, Westminster. S.W.*, 16*th. June.*

## BROMO-IODIZED COLLODION AND IRON DEVELOPMENT.

Dear Sir.—I cannot understand how Mr. Sutton could have fallen into such an error with regard to iodides and bromides in collodion, it seems contrary to the experience of every photographer of my aquaintance.

I think Mr. Sutton does not use chemicals more pure than I do myself, so *that* cannot account for it.

The nitrate of silver which is recrystallized, I obtain from R. W. Thomas of Pall Mall, which I am perfectly sure cannot be surpassed in quality, and the collodion I make myself from the purest materials I can purchase, and with all this, my experience is totally at variance with that of Mr. Sutton.

A few days ago I was engaged in copying some pictures, and while counting the time for exposure, a person spoke to me, which distracted me for a few seconds from what I was doing, and by that means caused the exposure to be prolonged to nearly double the required time. Wishing to save the negative if possible (for I knew if I developed it with my usual developer, which is iron, it would be much over exposed) I proceeded to develop it with pyrogallic acid mixed in the usual way, thinking by that means the resulting negative would be perfectly good. But what was my surprise to find that it was not more than half exposed enough. I think this will prove that bromo-iodized collodion and iron development is far superior where rapidity of action is required.

I feel assured the cause of so much controversy of opinion is, that with bromo-iodized collodion some persons use pyro as a developer, and some use iron, without doubt when pyro is used as a developer a plain iodized collodion is best, and *vice versa*, therefore an advocate for pyrogallic used a plain iodized collodion as being best suited for his purpose, he is recommended to try iron and does so, but does not trouble to obtain any suitable collodion for it, the result is, he produces negatives wanting in detail, which entirely disgusts him with the *iron age*, and makes him a still greater advocate for his old friend pyro.—I am, sir, yours very respectfully. Alfred Harman.

*Peckham, June* 13*th.*

## ON ENLARGING NEGATIVES.

Sir,—My name having been somewhat prominently brought before the public in connection with the above, I feel myself called upon to come forward and state my experience upon the subject which is occupying the attention of so many gentlemen, both amateur and professional, at the present time.

Nearly two years since, I had constructed for me a deal box, in which I fitted a single lens by Valentin, 3 inches in diameter, 10 inches focal length, which afforded me very tolerable results, and also gave me many hints for future guidance. I continued my experiments therewith for some months, until I considered that I had perfected myself sufficiently to ask the public to support me professionally. Feeling justified in making a beginning, in the early part of last year, I instructed Mr. Ross to prepare me a camera for the purpose, to be furnished with the lens best suited to my requirements, viz., his No. 2 carte de visite lens. On its delivery in September last, I made some experiments which were tolerably successful; and in October I applied for space in the International Exhibition. At the latter end of January in this year, I received intimation that 30 square feet had been allotted to me in the "Garret" now devoted to the purpose, where toys and dolls, dressed and undressed, black and white—miniature impositions upon "the human face divine"—reign supreme, referring one back to the nursery days. I was then very seriously ill, and forbidden to work by my medical man. However, on the 14th February I set to work, and by the 12th of March (notwithstanding the dull damp weather which prevailed at that time), with the light from a western sky, I had taken four dozen positives, and converted them into four dozen enlarged negatives; out of these I selected three dozen for the Exhibition, which were printed, mounted, framed, and sent in before 31st March, wholly untouched (not even rolled, as the boards are nearly three feet square), as a sample of enlargement from negatives 3¼ by 2¾ to a whole plate, and 10 by 8 inches. The negatives from which enlarged copies were made, were all taken by myself, some as far back as four years ago. They were also taken with all kinds of lenses, upon which I should like to say a word or two. I speak now of the small negatives which were taken with ¼-plate lenses—by Lerebour (compound); Secretan (compound); Valentin (compound); by Andrew Ross (single 4½ stereos); and by Thomas Ross (compound stereos).

The collodion was a mixture of Bolton's and Ponting's. The first for half-tone, the latter for density.

The developers were various; but I found this fact, that those which were developed with iron, as far as skies went (see view of Goodrich Court), never gave so clear, so pure, so thoroughly good a result, as those developed with pyro and citric acids. In architecture, I found the iron gave very good results, but the old 3-gr. pyro and acetic acid better (see picture, the Blind Harper, St. Michael's Doorway, Teignmouth; Doorway at Bishop Teignton). It must be recollected that I am speaking of negatives, as if taken expressly for enlargement.

Of all the lenses mentioned above in the taking of these small negatives, I must give the preference to the compound by Lerebour (the first I ever bought, and which I hope never to part with) and the single 4½ stereos. by Andrew Ross. With both these lenses, especially the latter, I have taken instantaneous pictures of all kinds (see pictures of "Oscar," "Clouds," "Bringing Home the Faggots") dogs, sheep, cattle, horses, clouds, &c., &c., all of which were developed with citro-pyro developer.

Church architecture has special charms for me, above ordinary views, perhaps because I am a freemason, perhaps also because my bent in early life was to be an architect and civil engineer, although I was wedded to the law for some years. Be that as it may, I have turned my attention now for some time past to the taking of the interiors of cathedrals. They, of all pictures, are the most difficult, but I think them (and I am happy to say the public think so too) the most beautiful. The difficulties in taking them lie in many little things, which are to be overcome only by practice; of these I may speak some other time.

I have digressed thus much from the main question, because it is to this class of negative that enlarging will specially apply. Either the portrait negatives, of which the portrait is the one principal feature in the picture, or the architectural, that covers the whole plate evenly and sharp, are the ones for enlargement. In this I may be mistaken—I hope I am—but my present experience is as I have stated.

And now to speak of the camera and lenses used for the purpose.

Whether Mr. Vernon Heath's principle or M. Claudet's (solar camera) be the best, remains to be shown; but taking our English climate into consideration, its want of sun, and its many drawbacks in the shape of damp, I certainly must lean towards my countryman's view of the matter, and I think many will bear me out in my opinion. At the same time, with all courtesy and deference to M. Claudet, to whom I am, personally, a total stranger, I am rather sanguine of success in the long run.

I therefore suppose I am working with Mr. Vernon Heath's apparatus, taking such for my foundation, and applying my own experience to the matter, I must say that the 4½ lens of Ross, which I have, gives, up to 8½×6½, very fair and satisfactory results.

Not having had an opportunity of trying any other lens, I cannot say more, but even up to that size, to get depth and perfect sharpness over every part of the picture, a very much smaller stop must be used than that usually sent out with the lens. I use one an eighth of an inch, and expose in full sunshine seven minutes.

Having been frequently applied to since March to enlarge cartes de visite heads to life size, I set about thinking whether the lens (4½ focal length) I was then working with would answer my purpose; upon instituting experiments thereon, I found it did so, but in order to secure definition I lost much light. I therefore applied to Mr. Ross for assistance, but without avail; I next got a triplet from Mr. Dallmeyer, still the same fault, although considerably modified. At last I went back to the old original lens of all, and succeeded. I am therefore making arrangements to enlarge cartes de visite pictures to 15 × 12 *so that every portion of the picture shall be equally sharp*, full of half tone, and the general effect satisfactory. Your advertising columns will inform the public when I am in this position.

Many of your readers have by this time seen, from the reports of the various journals, the doings of the Photographic Society at its last meeting. M. Claudet *did* certainly show us that the solar camera could distort a head larger than life; but he failed to convince many others besides myself that his image was equally sharp all over the focussing screen. And, supposing that in the place of a paper positive, as the final results of the operations of the solar camera, a negative by a second operation is produced, what proportion of sharpness, let me ask you, Mr. Editor, would this bear to the original negative, when in the enlarged positive the PRESENT results are so dreadfully indistinct?

I am prepared to construct an apparatus, without much extra expense, that shall enlarge to the same extent as the solar camera, *and yet give perfect and equal definition all over the plate*. Whether the demands of the public may justify me in carrying out these ideas is another matter; it is for them to decide—for me to follow.

But I have not yet done with the matter. I believe it will be found that to enlarge a small picture *well*, up to 10 × 8 and over, long-focus lenses of large diameters will ultimately carry the day, as the rays of light, having to travel further, lose much of their intensity after having passed through a short-focus lens of small aperture, and in consequence the exposure is considerably lengthened; while on the other hand, if a long-focus lens of large aperture were used, the rays, although having to travel the same distance in proportion, are strengthened, or made equivalent to that distance, by the larger refracting surfaces derived from the greater diameters of the lenses.

Of the many lenses offered to the photographers of the present day, there is none that gives better results than the orthographic; it may be used in a confined space, and it may be tilted, and it gives good definition with the whole aperture, especially in interiors, and, were it not for its unfortunately giving pictures of a pincushion formation, it would be a very valuable lens. Whether the triplet of which I have spoken does otherwise, I am not prepared to say, but this I may state, that it will take a landscape 10 × 8 without distortion and without using by any means the smallest diaphragm. It will also take a head life-size (see enclosed) *direct* in the camera. It will copy without reduction of subject, and will give both texture and water-marks without any diaphragm at all in letter paper.

In conclusion, I would add, that as I am guided by the wants and wishes of the public, that if Mr. Ross, Mr. Dallmeyer, or Mr. Anybody-else, will make a lens that will offer greater advantages than those of the present two celebrated English makers, I for one will be happy to be a purchaser, and will strive to make the lens committed to my care tell its fullest capabilities to "a discerning public."

Apologizing for the space I have occupied, I am, dear sir, yours truly, W. H. WARNER,

*Ross.*

## Photographic Notes and Queries.

### MR. SUTTON'S QUICK DRY PROCESS.

SIR—I have been trying Mr. Sutton's rapid Taupenot process, but found no increase of sensibility. Would you be kind enough to inform me if I have made any error in the manipulation? I used Keene's dry process collodion, sensitized in a 40-grain bath faintly acid, washed thoroughly, poured over the albumen solution, drained, and then dried before a bright fire, making the plate quite hot; when cool, I immersed it for half a minute in a 20-grain bath, and finally washed in a 10-grain bath, both acidified with 1 drop of acetic to the ounce, but *without* any iodide of potass, like the first bath. After all this trouble the plates were not to be compared to the honey and tannin I made according to the formula given by you in No. 192, either in sensibility, smoothness of the film, or keeping qualities. It may be my inexperience, but I shall be sorry if I have made two extra baths of no use to me.—Yours very truly,

BLUNDERBUS.

[We have not experimented ourselves with Mr. Sutton's quick process. We know him to be, however, a very careful experimentalist, and a thoroughly good, practical photographer, and he has, doubtless, produced the results he describes. Probably your bath may require a little more acid. To give the process the utmost fair play, it would be well to try some of his collodion with it. In our own hands the honey and tannin has proved the best dry process we have tried. We are glad to hear your favourable account of it.—ED.]

### RAPID DRY PLATES.

SIR,—In a late number of your very valuable journal I observed some enquiries from Mr. Taylor and yourself regarding Mr. Louis Floyd's instantaneous dry plates. That gentleman having accepted an appointment in Russia, I do not know whether or not I might be justified in imparting his *modus operandi* through your columns, he having given me his formula some time since; but from a variety of circumstances I have not yet been able to try it. I have put myself in communication with him, and should he give his permission I will send you the details as soon as I have tried the system. I think it will be no breach of confidence to state that it is a slight modification of the Hill Norris formula, and totally distinct from Mr. Sutton's method. The instantaneous effects are caused by moistening the plates previous to exposure with a solution, but they require to be developed within twelve hours after, otherwise stains result.—Yours, &c., THOMAS D. BELL.

*Windermere, Monday, June 22, 1862.*

## Miscellaneous.

A NEW CEMENT OF VARIED USE.—New uses have been suggested for a combination of pitch and gutta-percha, as to which we some years since gave instructions for the prevention of damp in walls. Professor Edmund Davy has read a paper to the Royal Dublin Society on the subject. He obtains the cement much as we suggested, by melting together in an iron vessel two parts by weight of common pitch with one part of gutta-percha. It forms a homogeneous fluid, which is much more manageable for many useful purposes than gutta-percha alone, and which after being poured into cold water, may be easily wiped dry and kept for use. The cement adheres with the greatest tenacity to wood, stones, glass, porcelain, ivory, leather, parchment, paper, hair, feathers, silk, woollen, cotton, linen fabrics, &c. It is well adapted for glazing windows, and as a cement for aquariums.—*Builder.*

## Talk in the Studio.

Photographic Exhibition.—An exposition of works of fine art is about to be opened at Spa, and wo notice with pleasuro that under the directors recognize photographs as coming distinctly that designation. Tho Secretary writes to our contemporary, the *Bulletin Belge de la Photographie*, inviting contributions from photographers, and stating the regulations which will govern tho exhibition, ono of which is somewhat unusual, namely, that roproductions of engravings, statues, &c., will not be admitted.

Mr. Mudd, whose name our readers have known as one of our first landscape photographers, perhaps *the* first dry plato photographer, has yielded to tho pressuro in the shape of demauds made upou him for portraits, and has resolved to devote a portion of his timo to portraiture, as well as landscape. We shall be sorry if tho latter is at all sacrificed to the former.

Application of Photozincography.—It is stated that a proposition is under consideration for sending a photographer to Simancas, in Spain, to copy some of the dispatches in cipher deposited in the royal archives there, and which are supposed to relate to important events somo time before and after the reign of Elizabeth.

Honey and Tannin.—A correspondent who has been successful says:—"I think Mr. England deserves the thanks of all dry-plato photographers for his modification of tho taunin process; any one with ordinary care must succeed."

New Copyright Bill.—This Bill still remains beforo the Select Committee of tho House of Lords. A petition has been presented by Lord Overstono from certain goldsmiths, silversmiths, and porcelain dealers, that their works, comprising art designs, might be included in tho protection of the Bill.

Tax Upon Photographers.—A new tax Bill, under consideration in the United States, imposes an annual tax upon certain trades and professions. Photographers are charged with a tax of two pounds a year.

Fulminating Silver.—If you pass a current of coal gas through a neutral solution of nitrato of silver, you obtain a crystalline precipitate, which when dry explodes under the action of heat, or the blow of a hammer, like fulminating silver.

Gun Cotton.—Every tissue from vegetablo origin, like cotton, linen, &c., can be transformed into gun cotton. To distinguish gun cotton prepared with nitric and sulphuric acids, from the oue prepared with nitrate of potash and sulphuric acid, dip them into a mixturo of 100 parts ether and 25 parts alcohol, the first will not dissolve, while the lattor dissolves entirely.

## To Correspondents.

Punjabee.—Vulcanized india-rubber would exercise an injurious effect on coming in contact with the nitrate bath, on account of the sulphur it contains. Boiling the India-rubber in a strong solution of potash is said to remove all sulphur from the surface. It is a better plan, however, to cover the vulcanized surfaee with a thin piece of gutta-percha, about the thickness of paper, or with vegetable parchment; this will not interfere with the elasticity or perfect pressure of the india-rubber on the water-tight lid. 2. Where acetic acid has been added to a bath it is difficult to eliminate it. You will find some information on the subject in one or two recent communications in our pages. You may neutralize either with oxide of silver, or with bicarbonate of soda before sunning your bath. We have given from time to time all the information of a practical character which has been published on the panoramic lens. It has not come much into general use, but there is no especial reason beyond its novelty, and involving the necessity of a complete equipment of baths, slides, printing frames, &c., to prevent it. See a recent paper by Mr. Dawson on its practical working.

Interior.—A variety of plans have been proposed for preserving the plate from drying during very long exposures. Such as adding some neutral deliquescent salt, like nitrate of magnesia, to the silver bath, covering the plate with some preservative, sueh as oxymel, honey, glycerine, or glycerine and honey, laying a sheet of wet blotting paper at the back of the plate, &c. The method we have generally used ourselves coasists in using a porous collodion, which does not dry so rapidly as a horny one, and when we have in hot weather observed partial dryness, we have washed the film with a little distilled water, aud then added this water to the developer. This in our hands has always succeeded, and given entire immunity from stains. It is sometimes recommended to redip the plate in the nitrate bath under such circumstances, and there are occasions when this caa be done with advantage, but if there be the slightest tendency in that direction it causes fog. It is important ia long exposures to let the plate rest on a piece of blotting-paper at each corner.

Derby.—Benzole or chloroform will remove crystal varnish from a negative. 2. You may probably obtain a bellows body of aay of the practical camera makers: the cost we cannot tell you. 3. The front lens of a portrait combination, having a focus of 10 inches will, if properly stopped down, probably cover about 7 in. by 5 in. 4. Marine glue is said to be made of shellac and India-rubber; but its exact composition is a trade secret. We are glad to hear of your success with honey and tannin.

Cornish Chough.—You have no reason whatever to be dissatisfied with your results, they are both very fine photographs of trying subjects. The smaller one is especially pretty and satisfactory.

W. J. C.—The charge is a foolish and improbable one, inasmuch as nothing could possibly be gained by abstracting or changing some of the glasses. It is certainly quite possible to remove part of the combination and substitute other glasses, inasmuch as all the lenses of a given size are similar, and, we believe, in the common French lenses, are put together without much selection, large quantities being ground to the same curves, and subsequently fitted without very specific attention. It is not probable that the respective lenses of such a combination will be marked so as to admit of identification. If the lens really be in any way out of order, it is possibly from the lenses being put in the wrong position, or not placed quite true iu their proper position. Your only mode of setting yourself right is to show the absurdity and uselessness of such an exchange as you are supposed to have made.

Cassandra.—The silver from old hypo baths should be precipitated with liver of sulphur, and nitrate of potash may be used as a flux in reducing the sulphide to metallie silver. See page 50, vol. v. of the Photographic News. The spot on the enclosed picture appears to be caused by a drop or splash of some chemical on the print, probably an acid, but we cannot tell what. We shall have pleasure in receiving your method of manipulating.

W. X. G.—Excess of acid in a gold toning bath made by any formula should be neutralized with a little bi-carbonate of soda.

J. Dyson.—The best varnish we know for coloured glass positives is Newman's Colouring Varnish, or the Alabastrine Varnish sold by Squire. The colour will always be a little lowered by varnishing; but may be easily retouched.

J. F.—The keeping properties of dry plates after exposure and before development is a subject about which some doubt and difference of opinion exists. We have heard of tannin plates keeping perfectly, but then we have heard of some that have not kept. The use of honey and tannin is so recent that we have little information of the keeping properties of the plates, but we have heard some complaints that they do not keep so well as tannin alone. We believe the safest process for keeping is the collodio-albumen, especially if the plates after sensitizing aad washing, receive a final coat of gallic acid, as suggested some years ago by Major Russell. 2. You are under a misapprehension as to the mode of using a portrait lens for landseape purposes. The allusions you have seen refer to the removal of the back lens entirely, and then reversing the position of the front lens. If your portrait combination is not arranged properly for using in this manner, your best plan is just to stop it down and use it as it is.

R. G.—The prints are on the whole very good, and the negatives free from over exposure. The conditions of lighting might have been a little better, aud a little more brilliancy, perhaps, might have been secured by management in developing and intensifying. The question of intensifying before or after development much depends upon the character of the original image; more softness is generally obtained by intensifying before fixing, more brilliancy by intensifying afterwards. Some operators do both: there is no reason, when the negative which has been intensified appears to lack vigour after fixing, why it should not be intensified again. By the application first of a solution of iodine, aud then applying pyro and silver, and if need be continuing this alternately, any amount of intensity can be gained. We shall be glad to see the 12 by 10 specimen covered with a lens of 11½ inches focus.

J. G. M.—It entirely depends upon the fittings of the combination, and if the front lens is intended to be used as a single lens, as to what steps you must take iu using it for landscapes. The usual method is to remove the back lens, and, having unscrewed the hood, turn round the tube and screw that part into the flange which was screwed iato the hood. That is one method, but different plans are used by different makers. It is necessary to be able to reverse the front lens, turning that side inwards which was out, and to be able to place a stop at the proper distance in front of it.

F. M.—Save all your clippings and waste prints, without fixing. Then at some convenient opportunity burn them and save the ashes. These may then be reduced with a flux, such as borax, nitrate of potash, &c., in the usual manner.

G.—In using any substitute for ground glass, in putting up transparencies, always place the prepared side next to the transparency; it will not then rub off. Of course wax, or starch, or any such preparation will readily scratch if exposed. The method of deadening glass with an acid about which you enquire will give a very fine dead surface, but is a little troublesome, and needs great care from persons unaccustomed to chemical manipulations. To deaden glass in this way the vapours of hydrofluoric acid may be used. The bottom of a leaden or gutta-percha vessel is covered with powdered fluor spar, over which sulphuric acid is poured, and gentle heat applied, which causes the generation of hydrofluoric acid fumes, above which the glass to be deadened is to be placed. Hydrofluoric acid is very corrosive, and should be used very carefully. The application of the acid itself would not produce deadness. 2. Photographs for exchange can be sent to the secretary of the Exchange Club at any time. The exchanges take place every month.

G. G.—The mark you describe is probably caused in the preparation of the plate by irregular draining or drying; but we cannot say with certainty. Where the unaltered iodide has not been entirely removed, the plate may be wetted again, and treated with hypo. If there be any crack in the film of course very great care will be required.

H. R.—You will find several descriptions of dark tents in our last volume. Perhaps Leake's tent is the simplest and cheapest. You will find a description on p. 381, vol. iv., Photographic News.

W. Morgan.—Use the alkaline gold toning bath, and abandon the mixture of gold and hypo. Try:—

| | |
|---|---|
| Chloride of gold ... ... ... ... ... ... | 1 grain |
| Acetate of soda ... ... ... ... ... ... | 30 grains |
| Distilled water . ... ... ... ... ... | 5 ounces. |

Mix one or two days before using. Tone in this until the print is a little deeper than required, then rinse and fix in a bath of fresh hypo, one ounce in five of water. See article on toning, &c., in the Photographic News Almanac for this year.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

VOL. VI. No. 200.—*July* 4, 1862.

## FADING OF POSITIVE PRINTS.

THE dampness of the walls at the International Exhibition, ruinous as it is to the beauty of many of the photographs, mortifying, as it must be, to many of their exhibitors, need not be regarded as an unmitigated evil, and may possibly become auxiliary to a valuable lesson. The fading of positive prints has, we are happy to believe, become during the last few years much less common; it has certainly excited less attention and discussion, has been less prominently before the eyes of the photographic world than a few years ago. We believe there is no question as to the fact that since the introduction of the alkaline or neutral gold toning system, fading has been much less common than it used to be.

The damp walls of the Photographic Department of the building at South Kensington bring before us, however, in a startling manner, the fact that permanence is not the invariable rule even in the productions of first-rate photographers. Every visit convinces us more painfully of this fact. We see the productions of men standing high both in the professional and amateur ranks, showing the incipient or the advanced stages of decay in the yellow "cheesy" colour of the lights. That at least fair and ordinary care in carrying out of their respective processes has been used, may fairly be assumed in regard to the works of such men as Mudd, Robinson, Wardley, Watkins, Verschoyle, Colonel Stuart Wortley, Lord Caithness, and others of high reputation. The question then arises, if the process were properly worked, and ordinary care taken, which process was used? Are these, or any of them, the result of the old hypo toning system, or are they the produce of gold toning? Were they fixed in fresh hypo, or old hypo? What method of washing was used, or what means were taken to secure efficiency? Were any tests ever used, and what were they?

It is quite possible that these prints, or many of them, might have remained for years without exhibiting the same signs of decay which are now most evident; the damp of the walls is something worse than would be readily believed; the card-board at the back of mounts, we are told, is in some instances absolutely in the condition of pulp. What gaseous exhalations may be emitted by the bricks and mortar, and plaster, we cannot pretend to say, but it is by no means improbable that these may be injurious. Notwithstanding all this, however, some of the prints placed in the same condition show no sign of decomposition whatever, but retain their primitive purity. It becomes interesting to know, also, under what treatment these were produced. Some of the best of them, we know, have been toned in an alkaline gold solution, fixed in fresh hypo, and very carefully washed. The question arises, have any of those which are permanent been produced under the old system, and if so, with what precautions?

That prints toned in the old hypo and gold toning bath were not unfrequently permanent, cannot be denied. We have prints produced nine or ten years ago which are yet unchanged. Most old photographers can offer similar evidence. We recently inspected a frame of specimens shown by Mr. T. R. Williams, at the first exhibition of the Photographic Society, some nine years ago, which were intended to illustrate the effect of leaving the print in the old bath of hypo and gold for different periods. The first specimen was immersed for five minutes, the second for ten minutes, the third for fifteen minutes, and so on, increasing the time five minutes with each example. The number of prints was about two dozen, so that the last print would be immersed for two hours. These prints were washed with the ordinary care, customary to a careful operator, and although nine years have elapsed since they were produced, the majority of them are at the present moment entirely unchanged. The last few prints showed unmistakeable evidence of the action of sulphur at the time, and it is difficult to say, therefore, whether they have gone further or not. All the earlier prints are, however, good in tone, and at present quite permanent. The system was, however, there can be no question, an uncertain one; and we by no means recommend a return to it. Notwithstanding the result of the specimens in question, Mr. Williams has long since abandoned the old bath for the more certain, philosophical, and trustworthy, alkaline gold toning solution, and fresh hypo fixing solution.

We do not intend here to enter into the question as to the causes which may have been in operation, to induce the fading of the prints now in the Exhibition, but rather to call attention to the subject, and the important considerations involved. No subject of greater importance to photography and photographers can be conceived. The permanence of its productions is unquestionably the consideration of all others, upon which the value of the art most depends. It is very desirable then, as this mortifying reminder of the instability of photographic prints, under certain conditions, has been thrust upon our attention, that some valuable use should be made of it. It may be regarded as a test upon a grand scale, and under the most trying conditions, of the value of various printing processes, or modes of working them. We would strongly urge upon those gentlemen whose pictures have become yellow, or are otherwise decomposed, to place upon record the details of their printing operations; so that the cause of decay may, if possible, be detected and published. The proximate cause is, doubtless, the damp to which they have been subjected, but we want to trace the ultimate cause in the method employed, which left in them the elements of decomposition. Accounts of the method of producing those which, subjected to the damp, have entirely withstood its influence are also desirable. We shall have pleasure in receiving and publishing communications on either subject. Or, we would suggest that no more interesting and important topic could engage the attention of the first meeting of the Photographic Society after the summer recess, and that if the gentlemen concerned furnish the necessary information, a discussion might ensue which would possess more interest and importance than any which has for a long time been held.

## CIRCULAR PANORAMIC PICTURES.

As our readers are aware, we have always felt considerable interest in the panoramic lens and in any development of its powers, as, indeed, of any lens which, by including a wide angle of view, has contributed to the pictorial advantage of photographers. We extract the following article from a recent number of the *Photographic Notes*, rather as an illustration of the ingenious method by which difficulties may be met, than from any strong conviction that it will come into practice. Our friend, Sutton, some time ago complained of our referring to him as an enthusiast, and emphatically proclaimed the matter-of-fact caution which governed his ideas. We think that those who read the following article will scarcely wonder at our reference to his enthusiasm. Let us not be misunderstood, however, or thought for one moment to use the term with any intention of disparagement. Without enthusiasm there would be little progress. Every great inventor, every courageous innovator, has been an enthusiast, and without the steadfast faith which laughs at impossibilities, and the large hope which has taken no heed of present difficulty, but seen only in the future good, almost all the great triumphs of art science, and civilization would have been lost to the world. Mr. Sutton says :—

"It has been the reproach of panoramic photography that you cannot include the 90° of subject in height, and all other directions, as in width; that is to say that you cannot take a picture upon the segment of a sphere subtending an angle of 90° at the centre. The difficulty of doing this does not, however, depend upon any infirmity of the panoramic lens, but is entirely a difficulty of manipulation, in the case of taking the negative, and of afterwards printing from it. The panoramic lens will as easily and as perfectly cover a field of 90° every way upon a spherical segment, as of 90° in width and 50 in height upon a cylindrical segment. With a modification in the diaphragm, which can easily be made, the panoramic lens will do all that is required in height as well as breadth, and it only remains to master the difficulties of taking negatives upon the inside of a bowl, and of printing from such negatives. It is important to consider in what these difficulties really consist, and how they may be successfully overcome, because if they *can* be overcome, the photographic artist will have a new world open to him, and the means of leaving far behind all that has been previously done in landscape photography.

"We do not anticipate that there would be any great difficulty in getting glass bowls, made of suitable radius, upon which to take the negatives. Glass spheres could be blown to the proper radius, and segments of the right size cut from them, avoiding as much as possible any blemishes in the glass. Neither do we suppose that such glasses would be very expensive, or difficult to pack in boxes. Let us imagine all this done, and that a suitable camera has been made, with a slide to hold such glasses. The next thing will be to coat the glass with collodion. This is not, by any means, the difficult job we fancied some time ago. We have been trying lately to coat the insides of various vessels of a spherical form, such as glass scale pans, saucers, saucepan lids, &c., and there does not really appear to be any more difficulty than in coating the cylindrical glasses which are now used with the panoramic camera. Assuming then that the glass can be coated with collodion, you would proceed in the following way to excite and develop :—You would use a common wire dipper, put the flat side of the glass against it, and dip it into a vertical nitrate bath in the usual way, then remove it into a second bath containing distilled water, and cast off the free nitrate; and lastly, pour the tannin solution into it, let it flow all round, and set the glass up to dry. The development would be equally easy. You would wash the glass by pouring water into it, then put it upon a holder, which would be a simple wire hoop fixed into a handle, and pour in weak developer at first, and keep it moving over all parts of the glass until the image was visible in all its details, then intensify by adding more silver. To fix with hypo and wash would be easy enough, and then the varnish could be applied in the same way as the collodion. The varnishing would be rather nervous work at first, for fear of forming lines and ridges on the film, but after a little practice this difficulty would probably be overcome.

Assuming then all to have gone right so far, and that we have obtained an excellent tannin negative upon the interior of a glass bowl or spherical shell, subtending 90° at the centre of the lens, and including 90° of subject in all directions, we have next to consider how to print from such a negative.

"We will not now stop to consider how a *transparent* positive could be printed, because that would involve some peculiar difficulties, and it is a mode of printing which has not yet become so popular as it deserves. We will confine our attention for the present to the question of printing an ordinary positive, to be looked *at* and not *through*, and to be mounted upon a card, or exhibited in any other convenient way.

"Our readers will perceive at once the impossibility of printing upon *paper* by contact with such a negative as we describe. If you attempt to apply a piece of paper, however thin, to the inside of a spherical bowl, it becomes puckered in all directions. Paper is, therefore, out of the question for this purpose, but, happily, we have in certain fine elastic textile fabrics a suitable material. For instance, if you lay a white silk handkerchief upon a globe, you can get close contact over a large extent of surface, without a crease or pucker. A sheet of paper is composed of fibres felted together, and closely interlacing in all possible ways and directions, but a woven fabric is composed of threads which cross each other at right angles, and leave spaces between, which can be made to assume all sorts of shapes according as the material is stretched in different ways; and thus it is that such a fabric can be made to fit against a spherical surface without creases, and to be as closely in contact with it as a sheet of paper againt a plate of glass. Fine white silk, or fine jaccinet muslin or linen, would be suitable for printing upon from spherical negatives, and report says that there are now on view in the International Exhibition some very beautiful photographs upon silk.

Having now in imagination made a stride over the practical difficulties of this subject, and taken a beautiful positive print upon silk from a panoramic negative including 90° of subject in all directions, let us next discuss the optical qualities of such a picture—the nature of its perspective—how it ought to be mounted, and so forth.

"If we agree to treat such a print solely as an artistic study, and without any reference to absolute truth of perspective, or freedom from distortion, we should simply mount it upon a flat card, and in the printing should vignette out all the details which were superfluous, or injurious to the subject. Thus the round picture would be cut down to an irregular outline by any of the common modes of vignetting, and only such parts left as were required to make a pleasing composition. In a view of this kind, when flattened out, the vertical lines of a building near the margin would be curved, and in order to straighten them, the silk might be stretched a little at the corners. When a first print had been treated in this way and properly mounted, a flat negative might be copied from it, and from that any number of prints could be taken in the usual way. If our readers will open an illustrated book of travels, they will find numerous examples of views of places which could not have been taken by a common camera, or even by a panoramic camera for cylindrical glasses, but which would afford fitting subjects for the wide-embracing spherical negative, and the mode of printing and treatment which we have described. Anyone with a knowledge of landscape drawing, and a taste for that branch of art, will understand the class of subject to which we allude, and perceive that it includes the majority of good views.

"But if we desire in a photographic view something more than an artistic study, and that it should satisfy the conditions of true perspective, then it would be absolutely necessary to mount the print upon the convex side of a glass similar to that upon which the negative was taken, and view it through the glass, the eye being placed at the centre of the sphere. Prints mounted in this way in a circular frame would be very pretty, and the perspective would then be rigorously correct.

"With respect to focus, that would be perfection in every part of the picture, except where an object happened to be nearer to the spectator than ten or a dozen yards. This would rarely happen, except in the immediate foreground of views in which the camera was placed upon the level ground, and not upon a height. The focus of views taken from high ground would be absolute perfection in every part, and infinitely better than in a common photograph upon a flat plate, taken with common lenses.

"If our readers will think over what we have now suggested they may greatly assist us with hints as to the best kind of fabric to print upon; and if some of them would kindly experiment upon such fabrics, and inform us of their results, we should greatly value such assistance. The end to be accomplished is worth any amount of trouble, and that it lies within the reach of our present knowledge and means there can scarcely be a doubt. The other day a lady friend showed us a D'Oyley upon which a very pretty sketch had been made with a pen dipped in marking ink, and her enquiry, whether similar views could not be taken by photography, suggested the idea which has called forth this article. But before similar photographic views can be printed upon D'Oyley's, the negatives must include a much wider angle than the comman lenses give. It is not one photographic view in a thousand that can now be called a picture. At present they are mere bits of detail, and bear no resemblance to pictures such as artists love to take."

## AN EXPERIMENT UPON MOSER'S IMAGES.

BY M. D. VAN MONCKHOVEN.

Photographic images are, as it is well known, formed of pure silver, disseminated in a transparent film of pyroxyline, albumen, or other porous substances. We are reminded also of the celebrated discovery of the sculptor Rauch, who, having left an engraving in contact with a plate of glass, saw the image of his engraving reproduced upon it after the lapse of a certain time.

Many years since we observed an analagous fact. A glass which covered a photographic picture presented, after cleaning, the same image on its surface, when the breath was condensed upon it. And, moreover, the image was not easily effaced.

We have recently observed the same fact again. The glass which sustained the film is green: it is a glass having soda for a base, with a small quantity of lead. It had upon it a collodion portrait, taken in 1857, and since that date has been kept in a very dry and dimly-lighted room, with some fifty other glass plates.

Some weeks ago all these glasses were cleaned. Chance led me to discover that one, when breathed upon, displayed a very intense image. It might be called a Daguerreotype portrait. Viewed by reflected light, the image is a negative. It corresponds, therefore, exactly to that of the collodion film. Among all the glass plates this was tho only one that exhibited this phenomenon.

From information obtained from very reliable sources, this fact, I find, occurs frequently to professional photographers, who preserve their negatives. With respect to the theory of the Daguerreotype, it will be very useful to have their attention directed to this fact, in view of the curious experiments to which it gives rise.

The glass plate described was now coated with iodized collodion, sensitized in a bath of nitrate of silver, and placed in an ordinary camera pointed to the model. The negative obtained was double, the new image and a second, very weak; beneath it resembled the invisible image, imprinted upon the glass plate.

The experiment, repeated several days subsesequently, in the fear that we had to do with one of the phenomena of "stored-up light," described by M. Niepce de Saint Victor, still gave two images: that newly obtained, and a second, very weak one, beneath it, but still quite visible.

We were much occupied with this fact, when the idea occured to us of operating in the dark, without exposing the plate in the camera. This time, after fixing, we could discover only a scarcely perceptible image. It is well known that the polarization of light, resulting from reflection from the surface of metals, does not possess the same properties as that from non-metallic reflecting surfaces. We took advantage of this property to render the preceding image visible. To this end, it sufficed to examine with a Nicol's prism the film containing the image under the angle of incidence necessary to polarize the light, and to turn the prism so as to extinguish the light reflected by the glass. We succeeded better by blackening the back of the glass. The silver, constituting the image, did not participate in the properties of ordinary polarized light, the image, which has been visible only because we suspected its existence, became fully visible even to persons who previously could see nothing. This means of recognizing the silver, may prove very useful on account of its extreme sensibility, to ascertain, for instance, if the light in ordinary photographic processes, really decomposes the iodide of silver, or if it only communicates to it new physical properties.

Now what can be the mysterious cause of the impression of an image upon the surface of a glass plate and which afterwards gives to it the properties of reducing iodide of silver. There cannot be a doubt that this is not a phenomenon of the "storing up of light" for very glass plate covered for a certain time with a photographic image and exposed to light, should present analogous properties. If it is a molecular modification of the surface of the glass, under what conditions does it act? from whence comes its property of acting upon iodide of silver?

It is certainly only by collecting a great number of facts and discussing them, that we can arrive at a sound hypothesis upon this series of phenomena.

## The International Exhibition.

### PHOTOGRAPHIC CHEMICALS.

The large manufacturing chemists, as might be expected, make an excellent show in the Eastern Annexe, and nothing shows the importance of photography more than the prominence given to chemicals which are used exclusively, or nearly so, by the cultivators of this art. Some very fine samples of pyrogallic and gallic acids are exhibited by Messrs. May and Baker, who also show some large slabs of commercial cyanide of potassium, upwards of eighteen inches across and three thick. This, however, does not look very pure, but the same firm has a smaller sample of cyanide which is beautifully white; their speciality seems to be mercury and bismuth compounds, some magnificent crystals of calomel and corrosive sublimate being in the case. The former is, however, becoming very discoloured, probably by the light; this seems to point to some photographic qualities of this salt which are not generally known.

A beautiful series of acetates and some samples of acetic acid, are shown by the well known house of C. Foot and Co. They have also a large quantity of dried albumen, still retaining its solubility in water. The substance labelled "egg albumen," seems, from its colour and general appearance, as if it would prove of considerable value to photographers when eggs are scarce, but the article styled "blood albumen" is not sufficiently tempting, either from its appearance or origin, to justify us in recommending its employment for photographic purposes, although, from its low price, we have no doubt that it frequently enters into the composition of the extra-cheap albumenized paper. We also noticed in this case a bottle of formic acid, a body which has on several occasions been recommended for use in photography, and which, from its energetic reducing properties, cannot fail to be of considerable use when it is better known. Messrs. Foot and Co., we understand, are now enabled to supply this acid at a comparatively low price, and we would, therefore, at once suggest its employment in both positive and negative developing solutions, in which it might partially, if not entirely, replace acetic acid. Acetic acid is also shown by the large makers, Cox and Gould, who exhibit an interesting series, explaining the different stages of its manufacture, from the rough log of wood, and the crude pyroligneous acid, which is a product of its destructive distillation, up to the purified glacial acetic acid. Two remarkable looking objects in the same case would puzzle any photographic chemist to identify them; one is a lump of fused iodide of potassium, and the other a corresponding lump of fused bromide of potassium. The only substance to which we can compare them, is a piece of excessively fat meat, with streaks of lean showing themselves here and there. These are, of course, only shown to illustrate one stage in the manufacture of these salts, tho crystallized compounds being also exhibited in a very pure state.

Messrs. Davy, Macknurdo, and Co. show several preparations of photographic interest. One in particular we may specify. A largo bottle of dry and apparently pure chloride of gold in fine crystals. Near it is a corresponding bottle of chloride of platinum almost equally good. Their iodide of sodium, bromide of ammonium, and iodide and bromide of cadmium, may also be specially commended for their purity and definite crystalline appearance; the iodide of cadmium crystals are especially large. Amongst the other chemical compounds of scientific interest which this firm exhibits, we may mention valerianic acid, and some valerianates, not, however, so much for their photographic value, as in reference to the powerful and unpleasant odour of valerian which is so strongly noticed near the case.

The old-established firm of Howard and Sons devote a great portion of their space to compounds of quinine, and other alkaloids, for the manufacture of which they are so justly famous; they have, besides, some fine cadmium salts as well as iodide and bromide of potassium and Rochelle salt. This case also contains the largest crystals of nitrate of silver which we can remember ever having seen, some of the tables of this salt being upwards of three inches square.

The articles exhibited in Mr. Versmann's case—Wolfram ores and various metallic tungstates—are of considerable interest apart from the anti-inflammable property which they communicate to ladies dresses, inasmuch as they furnish two new and very beautiful colours, namely saffron bronze, and magenta bronze; the appearance of these, when the sun shines on them is beautiful in the extreme.

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## BRITISH PHOTOGRAPHIC DEPARTMENT.

Portraiture must ever be one of the most important departments of photography, nevertheless, we are disposed to believe, at the risk of being charged with photographic heresy by some, that as yet it has scarcely received full justice. We do not mean to say that there are not some pre-eminently able portraitists; but we think it would be very easy to prove, that portraiture has rarely been pursued with the loving enthusiasm by amateurs, which has been given to landscape and other branches of photography. Very few educated amateurs have given it any attention at all, whilst of the profsssional photographers who pursue photography as a business, how very few are by natural aptitude or education, fitted to excel in this most difficult branch of the art? To attain the highest excellence here, not only should the operator be perfectly familiar with all the principles of art which pertain to this department, and be at the same time a thoroughly accomplished photographer; but he should also possess that rapid, almost intuitive perception of character, which will enable him at once to perceive what style, position, lighting, and general arrangement, will be most conducive to perfect *vraisemblance*, and to satisfactory pictorial results, together with sufficient of the magnetic charm of manner, which places the sitter at once at ease, and induces the happiest expression during the sitting, for unless the idea of a dentistical operation, entertained by so many persons, can be dispelled, there can be no chance of a successful portrait.

Notwithstanding, however, that we believe it is possible to attain a higher standard in photographic portraiture generally, we are fully prepared to admit that there are many very fine examples of this branch of the art in the International Exhibition, both in the British and other departments. It is with the former, however, we are now concerned. Prominent here, as might be anticipated, are the various examples of card portraiture. The fashion which has prevailed for the last couple of years, for these small photographs, has done much, we believe, to improve the manipulative part of photographic portraiture. Not that bad photography is entirely uncommon in this department still; but the general quality of the results, or at least such as belong to the merely mechanical part of photography, are materially improved. Moderately good manipulation has become imperative where slovenliness might pass before. The time was, a very few years ago, when the cut-out backgrounds, which originated in France, and touched pictures, were common in portraiture, or when coloured pictures were largely in demand, very moderate and often very bad, results were deemed good enough for touchiug or colouring, and the obligatiou to produce clean even backgrounds; sharp, round, well defined images, was by no means imperative. The card mania has, however, changed all that; and the photographer who would maintain any reputation, *must* manipulate well, whether he be an artist or not. The public have begun to acquire discrimination enough to form some judgment as to the mechanical department; the artistic appreciation is, perhaps, yet to come, although even in this respect, it generally happens that the most artistic photographs please best.

By far the best card pictures, to our taste, here exhibited, are those of Mr. H. P. Robinson, of Leamington. The frame (703, in the photographic catalogue,) is a small one, containing only half-a-dozen pictures, but these are gems. Excellent in composition, easy and natural in pose and general arrangement, soft and delicate, yet, withal, rich and brilliant, they are altogether charming. Pictorial backgrounds, so commonly misused as to render them generally disgusting, are here employed with good taste and natural effect, especially in a standing group, and in the picture of a lady, sitting sketching. Perhaps, next in quality amongst card pictures are those of Mayland, of Cambridge. These are soft, vigorous, and round, generally quiet and well arranged, free from the meretricious and incongruous display of accessories, which is but too common in this class of portraits. Mr. Kilburn, or, rather, his successor, also displays some very good card portraits. Mr. King, of Bath, sends a very extensive collection of specimens, small and large, for which he is fortuuate in having obtained so much space. Of the large pictures, we have yet to speak; but his card pictures are, however, best, and these are very unequal, some being very good, some moderate, and many very poor indeed, both as photography and art, being hard and patchy, and crowded with "loud" accessories. Mr. Kiug has been fortunate in sitters, his specimens including the elite of the professional world in music, art, and letters, as well as stars of the drama and of the pulpit. It is always a source of regret when we see, from some of the specimens of an artist, that he can do good work, to find at the same time that from hurry, carelessness, or the lack of a sufficiently delicate appreciation. he sends forth, side by side with the good, other results which are entirely bad.

We find on looking over our notes in regard to card portraits, that a very large proportion of the contributions are marked as "middling." Many of these have excellent points, but are still in some respects wanting; and many of these, too, by artists of good position; amongst these we may mention such names as Mayer Brothers, Caldesi, and some others whose pictures are hard; Beard, Claudet, and others, who exhibit some very fine pictures, but some of which lack the perfectness of definition desirable in such pictures, or are cold and wanting in richness and vigour. Mr. Hering exhibits some very good card pictures, but immediately in contact with them is a large frame, containing some scores of heads, arranged so closely together in long uniform lines, row over row, as to have a most unsatisfactory and unpleasing effect, giving the appearance at first glance of an immense chess-board. The photography is probably good, but it is impossible to form a good opinion of it displayed in such a style. Messrs. Maull and Polyblank exhibit some very commonplace card pictures, and the London School of Photography some still worse. Descending still further, not by a mere stride, but by an immense leap, we come to a frame, or a series of frames by L. Birnstingl; as we stand before these, we pause and wonder, and as we remember that this department represents British photography, and that the world is invited to examine the display, we feel a hot flush, half of shame, and wholly of annoyance. These are portraits of the "Guarantors," the representative patrons of science and art in the country, and the portraiture is by the gentleman who obtained the contract for photography in connection with the Exhibition whilst the building was in progress; so that these pictures possess a quasi-official character, and might naturally be regarded as in some sort representing national character and national photography. We must confess we are truly sorry for it. The work is irredeemably bad in every sense. If we believe the photographers, and they *should be* good evidence, the men of science, art, letters, and wealth, who are prepared to sustain a possible loss in the erection of this monument of the world's progress, are a herd of the most vulgar, snobbish, and commonplace-looking personages, without one trace of the characteristics of English gentlemen. If the noble lords now considering the Bill for Artistic Copyright, who are impressed with the idea that all photographs are alike, and that it would be impossible to distinguish between the works of different artists, will glance at these frames, they will at least see what monstrosities can be perpetrated by the art when not in the hands of a skilled artist; but we fear a glance at such productions would be sufficient to exclude all chance of photography remaining in a Bill for the protection of fine art. Seriously, it is too bad that some discrimination or control as to the quality of the work was not exercised in the first photographic contract; it is too bad that the Guarantors should be gibbetted in such vile guise in what is to some extent their own building; but it is far worse that such pictures should occupy so much precious space, representing British photography.

In larger portraits, pre-eminent now as ever, stand the productions of Mr. T. R. Williams, who exhibits only vignette heads, thus avoiding the necessity for accessories of any kind. This style is, in our estimation, by far the most pleasing and successful style of photographic portraiture, especially for gentlemen: the interest is entirely concentrated on the most important part, the head. There are no awkward legs or arms to dispose into passable lines; and bring within the defining powers of the lens. All this is favourable to success; but there is about the portraits of Mr. Williams a perfectness and completeness which we have rarely, if ever, seen in any other photographs, whether vignetted or otherwise. It becomes an interesting question, to what this especial pre-eminence is due. Some persons who have examined these pictures have answered it readily, "Oh, it is simply due to skilful 'touching'! the pictures are elaborately worked up; here is a whole eyebrow put in, and there the hair is worked upon, etc." It were an easy thing to answer that we have never seen touched work that could compare in beauty with good untouched photography; but we can go further—and we do so because we always deprecate the idea that good work is due to any adventitious aid—we have before us at this moment unmounted duplicates of the photographs in question, and can vouch that they are entirely genuine, pure untouched photography. To what then is this superiority due? "How is it" we are frequently asked by some anxious student, "that I cannot produce such pictures? I have the best lenses, I use the best collodion, and have tried almost all the makers; I get the very best chemicals, but my pictures are not good. Is it the lighting or the lenses, the chemicals or the formula, the exposure or development, which makes the difference between my productions and those of first class photographers?" All these things unquestionably have their share in the result, but perhaps none in any pre-eminent degree. Good lenses, that is suitable lenses for the work, are undoubtedly necessary; for large heads, lenses with sufficient depth of focus to define all parts moderately well, without that cutting sharpness which makes the head appear as if chiselled out of marble. Judicious lighting has perhaps more to do with perfection of results than any other one thing; sufficient direct light to give vigorous and well marked contours, and sufficient diffused or reflected light, to give texture and modelling. It is a very easy thing to obtain texture which degenerates into wiry rugosity; but a careful selection of the lens, and management of the light is necessary to secure in large heads texture without coarseness. Good chemicals are necessary and easily obtained; good formulæ we constantly publish. Judicious manipulation must depend upon nice appreciation and carefully garnered experience; exposure and development must be in proper relation to each other, and to the condition of chemicals: harmonious relation of every part to every other part is the great secret: other things being equal skilful development is perhaps most important. But every step so depends upon the whole, that especial stress cannot be justly placed upon any single operation. We have digressed from criticism into questions of process, because we have often been asked lately, after describing various good pictures, to say something special about the method of producing them, and because Mr. Williams' pictures are unsurpassed in all that constitutes good photography: wondrous delicacy; perfect roundness and modelling; fleshy texture and transparency, without magnified wrinkles and freckles; great vigour and brilliancy; rich tone; exquisite definition, as well as good taste and fine feeling.

Next, to our taste, in portraiture, are the productions of Mr. Hennah, of Brighton, whose pictures always make us wish that such a thing as albumenized paper had no existence. Mr. Hennah is one of the few, if he be not the only one, who has not been seduced by the charms of surface possessed by albumenized paper. He adheres to plain paper and the ammonia-nitrate printing process. His contributions to the Exhibition are magnificent specimens of the tones obtainable by that process, and many of them, as specimens of portraiture, leave nothing to be desired. Some whole-plate portraits of children, one (420) especially, are perfect gems. John and Charles Watkins contribute largely to the examples of portraiture, and amongst the large number exhibited are many thoroughly excellent pictures, good in every respect; we regret, however, that there is some inequality, some of the pictures are considerably touched, and some yielding to the extreme test of the damp walls show signs of incipient decay, which circumstance makes the touching more apparent. We can conceive that some of these would not have been exhibited but for the interest attaching to the portraits, which comprise such names as Landseer, Millais, Faed, Hook, Webster, and others amongst painters; Dickens, Jerrold, and others, amongst men of letters, as well as many royal and noble personages. Mr. Herbert Watkins also exhibits some good portraits of celebrities, one frame of good photographs consisting only of various portraits of Ristori in different characters.

Mr. D. O. Hill contributes a large frame of pictures, which are subscribed as "Contributions towards the further development of fine art in photography." These pictures, partly because, we apprehend, of their stepping a little out of the conventional treatment of portraiture, and partly because of the somewhat ambitious description just quoted, have excited some animadversion. They are unquestionably pictures of unusual merit, and it should be remembered that the artist is a gentleman well qualified to aid the art progress of photography, being a painter of considerable reputation, and Secretary to the Scottish Royal Academy of Painting. He is, moreover, a staunch and old friend of photography, having in conjunction with Mr. Adamson, many years ago, executed some of the finest calotype portraits ever produced. These pictures may offend some by being large and bold, and in some instances, tending slightly towards coarseness in their massive vigour, but there is, nevertheless, an amount of true art and good photography, which must challenge admiration. There is a daring use of unusual accessories, which is in some cases very effective. A large group of "Dr. John Brown and his Cousin," which obtained a silver medal at the last exhibition of the Scotch Society, is a very fine photograph; massive, round, and well composed; a portrait of Dr. Brown alone is also very good. "Through the Trellis" is a very pleasing group, consisting of three girls, one of whom is seen through a wire trellis and the creeping foliage which surrounds it; the subject is a difficult one, but is well managed and effective. "Our Dear Old Nurse" is another very good picture. Some of the specimens, "The Story of the Bruce," for instance, would have been as well omitted from the frame; but, as a whole, we strongly commend the pictures to the attention of photographers.

M. Claudet exhibits a large number of very excellent examples of portraiture which have many pleasing qualities. M. Joubert exhibits some exceedingly artistic portraits. Mr. Hering contributes some good pictures, some of which, unfortunately, have been slightly touched in body colour, and show the action of the damp walls. The whole-plate portraits of Maull and Polyblank are in many respects good, and altogether much better than their card pictures. Mr. Charles Newcombe contributes some pleasing pictures. Ross and Thompson's portraits have many artistic qualities. Heath and Beau exhibit some characteristic heads. Mr. McAndrew has some fine bold round vigorous heads. McLean and Melhuish have some specimens, many of which display very excellent qualities.

Touched portraiture is, we are happy to say, only contributed by very few persons. Why it is contributed at all, or why admitted at all, after the announcement to the contrary, we cannot understand, unless it be that unscrupulous persons sent in such pictures to fill the space granted to them, and it was thought better to wink at the broken condition than leave bare walls. Certain it is that some are there. Mr. King, of Bath, sends a large number of these spoiled photographs very gaudily done, and some of which are showing yellow stains of decomposition already. Mr. Mayall sends some very carefully worked pictures in black and white, which are, to our taste, infinitely inferior to untouched prints from the same negatives, some of which we have now before us. Mr. Eastham, of Manchester, sends a large composition group, which is very good, but being touched has no business here. The same may be said of some positives by the tannin process upon enamel glass.

The examples of solar camera enlargement are not numerous in the British Department. M. Claudet contributes the largest number, and many of them are very fine indeed; but some of them are touched. Mr. Owen Angel, of Exeter, has sent some very good enlargements; but apparently as conscientious in his regard to the conditions issued, as others have been unscrupulous, he has not even touched out slight accidental spots. Messrs. Smyth and Blauchard exhibit some very fine enlargements (609), which are to our taste the finest in the department. On the same screen, as if hung as a foil to that just named, is a picture about half life-size, by Cramb, Brothers, of Glasgow. This is minutely described as being taken direct in the camera without enlargement. We can only regard it as having been sent as a specimen of what to avoid, as anything more hideous, clumsy, or inartistic we have rarely seen.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulterations, and Analysis.

*Potassium Salts* (continued).—*Acetate of potash*, and the corresponding soda compound, are of frequent use in the laboratory, photographic as well as chemical, to replace a strong acid such as nitric, sulphuric or hydrochloric by a weak organic acid. For instance, free nitric acid in the silver bath, the presence of which gives rise to well-known objectionable qualities may be replaced by acetic acid by the simple addition of one of these salts. We may as well briefly point out the *rationale* of this replacement. When a certain amount of acetate of potash is brought into contact with a liquid containing free nitric (or other mineral) acid, a decomposition takes place. The potash finds itself in the company of two acids which have a strong but unequal liking for it; and the attraction being reciprocated in the same degree, the potash combines with the acid for which it has the greater affinity. Nitric acid and potash having a far greater affinity one for the other than acetic acid and potash, unite and form a solution of nitrate of potash, leaving free acetic acid instead of free nitric acid in the liquid. Of late years the exact and sharp decomposition here described has been doubted by some writers, who consider that the solution, under the above circumstances, would contain a mixture of nitrate of potash, acetate of potash, nitric acid, and acetic acid. Whether this theory be correct or not, it would be very difficult, if not impossible, to say, but it is sufficient for our purpose to know that a liquid treated as above acts as if there were only free acetic acid present.

Acetate of potash may be readily prepared by neutralising carbonate of potash with acetic acid and evaporating. If the acetic acid and carbonate of potash are pure, the resulting acetate will be ready for use at once; as, however, the former generally contains traces of empyreumatic matter, this will have to be removed from the acetate in the following manner:—evaporate the mixture with continual addition of acetic acid, so that the potash may never be in excess from evaporation of the acid, as that would cause decomposition and introduce further impurities. The concentrated liquid is mixed with one-tenth of its weight of animal charcoal, then evaporated to dryness, and the mass heated until it fuses; the fused mass is then dissolved in water and the liquid filtered; a little carbonate of potash that may have been reproduced by the fusion is then neutralized with strong acetic acid, and the solution is to be evaporated to a syrup and allowed to crystallize. It may also be prepared by double decomposition between acetate of lead and sulphate, or carbonate of potash. We do not, however, recommend this, as the process in inexperienced hands, is liable to give an impure product. Acetate of potash in the dry state melts below a red heat, forming an oily liquid, which on cooling solidifies to a white, opaque, crystalline mass. The aqueous solution, when evaporated to dryness, with constant stirring, becomes covered with a white crust of anhydrous salt, until the whole liquid is converted into a dry powder. If the evaporation be stopped as soon as the crust begins to form, and the liquid then allowed to cool, large transparent prismatic crystals are formed which contain water of crystallization. The salt has a warm and pungent saline taste. When the anhydrous salt is heated above its fusing point it is decomposed, yielding acetic acid, and several other liquid and gaseous products, having a residue of carbonate of potash and charcoal. Acetate of potash deliquesces very rapidly in the air, and dissolves at the ordinary temperature in less than one-fourth of its weight of water. When it is dissolved in a considerable quantity of water, and allowed to remain for some time (as in the test bottles on the laboratory shelves), a decomposition takes place, carbonate of potash is formed, with production of fungi. Acetate of potash when dissolved to saturation in boiling water forms an oily liquid, boiling at 169° C., containing one part, by weight, of water to eight parts of salt. Acetate of potash also dissolves very readily in alcohol, requiring only three parts of the cold or two parts of hot liquid, from this solution carbonic acid precipitates carbonate of potash.

*Tartrate of potash.*—Before describing the neutral tartrate, we think it will be more convenient if we give a short account of the acid compounds, as it is from this that most of the potash of commerce is obtained. Bi-tartrate of potash is the salt commonly known as cream of tartar. The crude tartar or *argol* is partially purified by solution, filtration, and crystallization. The lime is then separated from it by treatment with dilute hydrochloric acid and washing. The salt then forms a white hard crystalline powder, having a slightly acid taste, and being permanent in the air. It is very slightly soluble in water, and is of no especial interest, except as a means of forming the

*Neutral tartrate of potash.*—This is formed by treating the bi-tartrate with water and carbonate of potash, until the acid reaction is neutralised. By slow evaporation the salt is obtained in transparent colourless prisims. These are permanent in the air, but very soluble in water. Tartrate of potash is of interest, as it offers a ready means of obtaining the corresponding silver salt by double decomposition. Tartrate of silver has not yet been much employed as a photographic agent, but it possesses many qualities which would render its further investigaton in this respect desirable.

*Citrate of potash.*—The silver salt of this acid has been used in photography with marked success, and on account of its potash salts, which is the one most usually employed in preparing, it will be of immediate as well as of future interest. Citrate of potash is formed by neutralising citric acid with carbonate of potash. Upon allowing the solution to evaporate spontaneously, the salt separates in the form of transparent colourless needles, united in stellate groups. The salt thus formed is tribasic, containing three equivalents of base to one of acid (citric acid being in this respect analogous to phosphoric acid, already described). The crystals have an alkaline taste, and are very deliquescent, dissolving readily in water. Citrate of potash is insoluble in alcohol. The monobasic citrate of potash (containing one part of acid to one part of base), is formed by exactly neutralising one part of the acid with carbonate of potash, and then adding another part of the acid. Upon allowing the solution to evaporate at a gentle heat, the salt is deposited in large transparent prisms, permanent in the air and having an agreeable sour taste. They contain four equivalents of water of crystallization which are entirely given off at the boiling point of water, leaving a gummy liquid, which on cooling solidifies completely into a radiated mass of needle-shaped crystals of the anhydrous salt, which are decomposed at 150°C. The salt dissolves slightly in boiling alcohol and crystallizes therefrom on cooling.

*Formiate of Potash.*—Now that formic acid and its salts are likely to be employed in photography, it is of some importance to the experimentalist to be enabled to know what are the characteristics of these bodies. The neutral formiate is formed by neutralizing the acid with pure carbonate of potash, and evaporating. It crystallizes in white transparent cubes, which are anhydrous. They taste bitter and caustic at first, and afterwards saline and cooling. They deliquesce in the air. An acid salt is also known, but it is even more deliquescent than the neutral salt. It is prepared by dissolving the latter in concentrated formic acid and evaporating. It is of no particular interest.

## SOUTH LONDON PHOTOGRAPHIC EXHIBITION.

WE proceed briefly to conclude our notice of the pictures exhibited at the Crystal Palace, by the South London Photographic Society, which, we believe, continue to excite a large share of attention amongst visitors. The specimens of coloured photographs are not numerous, the committee, as we understand, having rather repressed, than encouraged, contributions of that kind, as not of a strictly photographic character. There are a few very fine coloured pictures, however, one to which we may especially refer, is a portrait of a Spanish girl, by Macandrew, painted by M. Lafollie. This is an admirable specimen of oil painting upon the photograph; the colour is quiet and mellow, low in tone, but still rich and vigorous. The olive tint of the Spanish complexion is delicate and transparent. Altogether, the head is thoroughly well painted. Mr. Wall exhibits the only solar-camera picture contributed; this is a life-size head of a lady painted in oil, a plain print from the original quarter-plate negative placed beside it, shows how admirably the likeness is preserved. The painting is brilliant, but not crude or glaring, the flesh being rich and transparent. It is one of the best oil coloured solar-camera pictures we have seen. There are some other coloured pictures not needing especial notice.

Mr. Warner contributes some prints from enlarged negatives, some of which are very good indeed, and well worth the attention of photographers generally, who are interested in enlarging their negatives by a method within the reach of every one. Here are exhibited, side by side, prints from the original negatives, and prints from the enlarged negatives, affording full facilities for comparison.

Amongst some wet collodion specimens, which it seems arrived late, and hence were not placed in their regular order, are some very fine landscapes by A. K. Macdonald. All these are very good, and some very fine indeed. We may especially mention "Castle Acre, Norfolk," a fine old ruin, with overhead an angry-looking sky, giving a peculiarly picturesque effect to the photograph. "At Woolmer, Hants," is another very fine picture; as is also the "Wagoners' Walls, Hants." A photograph of the "Begonia Rex" is a good picture, and an effective example of a photographic difficulty overcome.

Mr. Gladwell sends specimens of a series of very large photographs, by continental artists, amongst whom are Alinari, Cuccioni, and others. The majority of these are magnificent photographs, and many of them of subjects new to the country, and are well worthy of careful examination.

We before omitted to notice, as by far the best card portraits in this Exhibition, three small frames sent by Mr. Hawke, whose pictures we have before noticed in these pages. Round, vigorous, and singularly brilliant, these qualities are obtained without any sacrifice of delicacy or softness. The tone is rich and warm, and the pictures are in every way satisfactory.

Mr. Skaife sends a neat glass case, containing a pistol camera, and a selection of the very charming little photographic gems, which he styles chromo-crystals, as well as some very respectable enlargements on paper, about quarter-size, produced from the miniature glass positives yielded by his waistcoat-pocket camera.

The only contribution in apparatus which has come under our notice is one of the excellent rolling presses of Bury Brothers, of Manchester.

Several other interesting contributions have, we understand, been promised, but have not, as yet, from some cause, made their appearance. Amongst those promised specimens, were a series of Mr. Breese's exquisite stereoscopic transparencies; we shall hope to see them in the Exhibition shortly.

The South London Society's first Exhibition is, as a whole, decidedly a success, with but very few drawbacks: the chief of these is, perhaps, the catalogue, which is scarcely so perfect or correct as might be desired, possibly, from being managed by a committee, instead of one responsible officer, in such matters the old adage relating to too many cooks often proving true. As a whole, however, we congratulate the society on the successful issue of the undertaking.

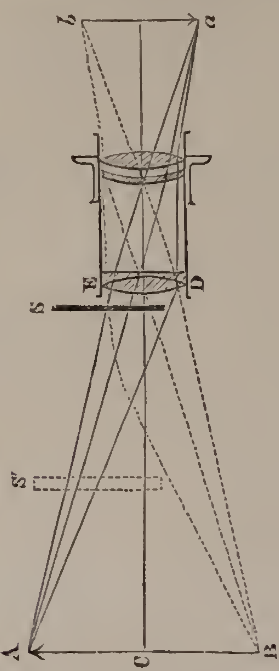
## NEW INSTANTANEOUS SHUTTER.

BY A. MANN, M.A.

So many contrivances have of late been brought before the public for regulating and reducing the time of exposure of the prepared plate in the camera, that, were it not for the great importance now attached to instantaneous photography, some apology might be deemed necessary for again calling attention to this subject. The difference between the so-called instantaneous pictures and those produced by a much longer exposure, both in commercial value and artistic merit, is now inducing the majority of photographers to turn their attention eagerly to this branch of the art, and the question so often asked is, not whether it be worth while to aim at instantaneous results, but how can they best be obtained. For this purpose, in addition to very sensitive chemical preparations, it is important to have a lens capable of being used with a large aperture, so as to admit a considerable amount of light into the camera in a very limited time. The quick-acting lenses, however, now manufactured by the first English opticians, seem admirably adapted to supply the wants of the photographer in this respect; but it occurred to the writer, some time since, that none of the arrangements used for affording the exposure rendered sufficiently available the advantages which these lenses possess. The most common method of giving what is termed an instantaneous exposure is, by removing a plate, or some opaque substance, from before the lens by lifting it up or drawing it to one side, and replacing it as quickly as possible. A little consideration will show that this does not afford the kind of exposure required for the purpose.

On referring to fig. 1, where A B represents an object in front of a double combination lens used with the full aperture, *a b* the image formed in the prepared plate, and S the

Fig. 1.



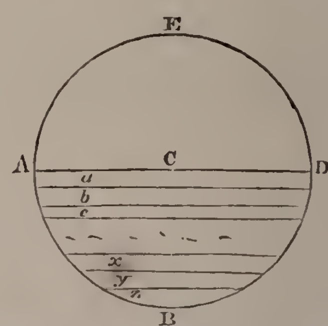
shutter placed just in front of the lens, it will be seen that as soon as the shutter begins to rise, and uncovers the edge of the lens, as represented in the figure at D, part of the rays forming the pencils emanating both from A and B, will enter the lens and be refracted to a focus at *a* and *b* respectively. The same will be the case with the pencils of rays emanating from all intermediate parts of A B; so that as soon as soon as the shutter begins to rise an image is formed over the entire plate, very feeble at first, and confused by the diffraction suffered by the rays in passing through the narrow opening, but gradually getting brighter until the lens is entirely uncovered, when the illumination reaches the maximum. This, however, is no sooner attained than the shutter must again begin to descend, gradually cutting off the light; and on its approaching the edge of the lens, again causing indistinctiness in the image by diffraction. In this way, instead of the requisite amount of light being admitted in the least possible time, a prolonged, partial exposure is obtained. But it is also well known that the effect of an exposure of this kind upon a sensitive plate is different from that produced by the same amount of light admitted in a much shorter time; in the latter case the tendency is to produce an intense and vigorous negative, but in the former a flat and feeble one, and want of intensity is one of the chief difficulties to be contended with in the prosecution of instantaneous photography. These causes, it is true, can only exert an influence for a very short time, but as that is all the time allowed for the formation of the latent image, it becomes a matter of considerable importance to attend to them, the more so as a plate adapted for this kind of work may be entirely spoiled by that which would produce no effect on a less sensitive one. If the shutter be removed to some distance apart of the lens, as indicated at S′, in the figure, it is evident that an excess of exposure may be given to the foreground of a landscape; but the same objection applies, as before, for rapid work, since the field of view will be longer in being entirely cleared. These remarks apply principally to the use of double combination lenses with the stop in a central position, such being now universally used for quick work.

With a view to the obviating of these disadvantages, the writer contrived the new shutter, the properties of which he is now about to describe. This consists essentially of two opaque plates, or membranes (both being used) provided with rectangular openings at a distance from each other equal to that between the lenses. These plates are so placed that each covers up one-half of the lens, and the exposure is afforded by their moving simultaneously in opposite directions in a plane at right angles to the axes of the lenses, which are thus uncovered from the centre outwards, and again covered up from the edges toward the centre by the plates still moving onward. In this way the principal part of the lens remains uncovered from first to last, thereby affording nearly the maximum illumination to the image during the whole time of exposure.

The difference between the amount of light admitted into the camera during an instantaneous exposure by this contrivance, and that admitted by the ordinary one, will become more apparent on comparing the amount which will pass through one-half of a lens when uncovered by a plate sliding from the centre towards the edge, and from the edge towards the centre respectively.

Let A, B, D, E, (fig. 2) represent a lens, and let the half A, B, D, C, be supposed to be divided into any number of parts of equal breadth, and let the areas of these be denoted by the letters $a, b, c, \ldots x, y, z$. These areas will evidently

Fig. 2.



decrease rapidly in size towards B. In the first case, then, when the plate is drawn from C to B, the largest areas, $a, b, c$ will remain entirely uncovered during the time occupied by the plate in passing over all the other areas; but the small areas, $x, y, z$, near the edge, will scarcely remain uncovered any length of time. On the other hand, when the plate moves from B to C, the small areas at the edge are first uncovered, and the largest and most important parts near the centre scarcely remain uncovered for any time at all. Now, as the amount of light admitted in any case must be proportional to the area of the lens exposed, and also to the time it remains exposed, it will be proportional to the product of these. If the respective amounts of light admitted into the camera in these two cases be calculated by the application of mathematical formulæ, they will be found to be very nearly in the proportion of 3 to 2; and since, even in the most perfect lenses, the margin is of less value than an equal area at the centre, we shall not be guilty of any exaggeration, at least in adhering to these numbers.

In uncovering the lens, A, B, D, E, by the new shutter above-described, one limb will descend from C to B during the time (supposing the exposure to be of the same duration in both cases) in which the single shutter rises from B to C, and the amount of light admitted by it in that time will be represented by 3, compared with that admitted by the single shutter as 2; but during the same time the other will have moved up to E, and admitted the same amount of light through the other half of the lens, so that by the time the single shutter will have uncovered one-half of the lens, the other will have uncovered the whole of it, and have admitted thrice as much light in that time. The lens will now remain entirely uncovered by this method during all the time the single shutter is moving from C to E and back, and will be covered up during the time occupied by its descent from C to B, three times as much light being again admitted in that time as with the single shutter. In this way three times as much light will be admitted into the camera during one-half of the time of exposure, and during the other half the lens remains entirely uncovered, while, with the ordinary shutter, the amount of the lens uncovered during that period varies between the half and the whole surface. Combining these two, and taking into account the close proximity of the new shutter to the lens, the respective amounts of light admitted in the two. cases during the exposure will be found to be about as two to one.

When a small central stop is used, it would be advantageous to have the arrangement placed in a central position also; but instantaneous pictures, however, are now being generally taken with nearly, or altogether, the full aperture of the lens. When the objects are situated at nearly equal distances from the lens this is easily effected by the ordinary portrait combination; but fine views are now being taken by Dallmayer's new triplet lenses, with the full aperture, where the definition is perfect, even from the extreme distance to within a few yards of the lens.

Before constructing this shutter, the writer had recourse to a contrivance placed inside the camera, immediately in front of the dark slide, which, by pulling a cord caused a longitudinal aperture to descend in front of the prepared plate, and permitted the maximum power of the lens to act upon the various parts of it in succession for a very short time. There are disadvantages, however, attending the use of this contrivance, which render it available for instantaneous pictures only, and but for a certain class even of them. Suppose, for instance, that this slit be an inch in depth and the plate four inches, then each portion of the plate will be uncovered only one-fourth of the whole time of exposure; and if a large moving object has to be photographed, so as to fill up a considerable portion of the picture, some of the parts will continue to move after others have been impressed, which must lead to distortions and indistinctness of the image. In such a case it will be seen that, by the shutter already described the same amount of exposure may be given in one-third the time, since all the parts of the image are formed simultaneously. The only circumstance in which this is suitable is for an instantaneous sunlight view, comprising a number of small or distant objects, and where a change in their relative position is of no importance.

The most important application, however, of quick photography is to subjects which are not necessarily in motion, but very apt to move, and where the exposure need not be altogether what is understood by the term instantaneous, but may last from one to two or three seconds. For this purpose the writer believes the new shutter will be found very well adapted, as it is concealed from view and entirely under the control of the operator, thus enabling him, by a gentle touch to uncover all the lenses simultaneously (if he uses more than one) at the proper moment, and devoting all his attention to the sitter, to cut off the light the instant any motion is perceptible, as a slight deficiency in the exposure may, to a certain extent, be compensated for in the developing. The shutter may be placed either inside the camera, behind the lenses, or outside, in front of them, in which position it is provided with folding hood, which projects, at pleasure, considerably in front, and acts as a shade. One part of the hood admits of being so used as to give an excess of exposure to the foreground, whenever that is desirable.

The exposure may be effected in several ways, according to the convenience of the operator. One is by gently pulling a string which uncovers the lenses, by causing the plates to glide in opposite directions, and the light may be shut off, by tightening the cord, to make them pass onwards, or by allowing them to return to their former position by a retrograde motion. When extreme rapidity is desired, the plates are first drawn into the proper position by tightening the cord, and are, at the proper time, let loose by twisting a small trigger with the finger, when they flash across the lens, and give the requisite amount of exposure. With this arrangement and sufficient sensitive preparation, especially with the dry process, the use of a stand might be dispensed with, and if a view meter were fixed on the top of the camera, the operator, as soon as a chance presented itself, might take aim and pull the trigger.

Some of the peculiarities of this form of shutter: these are, that it may be applied to cover any number of lenses—is perfectly under control—and affords a convenient mode of uncovering the lenses for ordinary work in the studio; it can be used without any danger of shaking the camera, which is not the case when any rigid body has to be taken hold of for raising the shutter; when used for instantaneous work, it will admit about double the amount of light into the camera that the ordinary form will at the same time, or give an equal exposure in about half the time; or, in other words, produce equal results in that time on preparations about half as sensitive as those required by the ordinary form. By producing a well illuminated image during nearly all the time of exposure, it will assist in counteracting the tendency to feebleness, characteristic of instantaneous negatives. In conclusion, it may not be out of place to mention that the instrument in its varied forms, is patented; but that its manufacture has been undertaken by Mr. Dallmeyer, who is now supplying the public with it, and if it be found to meet the wants for which it is intended, the writer will not consider his labours thrown away.

## THE URANIUM TONING BATH.

We have received the following from Mr. S. Fisher Corlies, of Philadelphia:—

"I have been so much pleased with the use of chloride of uranium in addition to the alkaline toning bath that I send you my formula:

"Make up the toning bath in the usual way, and after allowing it to stand for half an hour, add one drachm of solution of chloride of uranium (one grain to drachm) for every grain of chloride of gold in the bath, and proceed to tone. The prints are softer and of a beautiful colour, and will not change scarcely any in the hypo bath. I have not seen any formula given for its use, and as it is quite popular among operators here, it certainly deserves being generally known."

The reports we have received thus far on the use of *nitrate* of uranium are quite conflicting; we do not consider it fully settled that it is advantageous; we commend the subject to experimenters. Prove all; hold fast that which is good.

Our correspondent is a very high authority, and we do not think he can be deceived; therefore we are inclined to be of the opinion that the *chloride* of uranium is a good thing to put in the toning bath. We hope it will be tested. Many people think that the virtues of the use of this or that chemical in photographic processes, may be accurately determined in advance of trial, on already established principles. But they are in error. Photographic reactions are very subtle; the causes and conditions are too nice for our awkward scrutiny. Thus many questions discussed for years are still undecided, as, for example, the changes of the salts of silver under the action of light, the changes of collodion, etc. Who could tell in advance that iodide of potassium will make plain collodion thin, and iodide of nickel make it thick as jelly. The toning process is especially a knotty subject. Our science is truly lagging far behind our facts. Our progress in good degree is empirical. Yet what science we have we should use; a rush-light is better than a pitchy darkness; our science is more trustworthy than facts which rest on supposition or ignorant observation.

We know something concerning uranium salts which is pertinent to their photographic use. The proto salts are deoxidisers; the per salts are reduced to proto salts under the action of light. All the salts give precipitates with proper reagents, which are of various colours. Uranium salts in their properties are strikingly like the iron salts; what one does it may be expected the other will do. Iron photographs have been made of various colours, so ditto uranium photographs. Proto salts of iron develop collodion pictures; will not proto salts of uranium do the same thing?

Now as to the toning bath. Proto salts of uranium are deoxidising agents, *i.e.*, reducing agents. They should reduce the gold of the toning bath, perhaps make the toning more prompt and more beautiful, and—perhaps prove worthless. If uranium salts prove advantageous, try iron salts as a substitute, etc. What proto salt to use, and how much, must be found out by the practical men.

Thus we have reasoned before, with our little science, at the same time calling upon the careful, practical men with their facts to help us.

Mr Corlies' testimony in the case goes a great way with us; we think it will be confirmed by the experience of others.—*American Journal.*

## Proceedings of Societies.

### Photographic Society of Scotland.

The Sixth Annual General Meeting of this Society was held in the Society's Hall, 51, George Street, on Tuesday, 13th May, 1862, Mr. Walker in the chair.

Professor Macdonald read a paper on the subject of Stereoscopic or Straboscopic vision, in which he explained, assisted by diagrams, how this effect was produced. After referring to the paper of Dr. Carpenter, where it was clearly shown that Mr. Wheatstone had in 1833 constructed a reflecting telescope, and also a prismatic one, and thus was entitled to the credit of having invented the principle of the stereoscope in its modern form, he also referred to a conversation between Sir D. Brewster and an eminent teacher in St. Andrews between 1841 and 1843, where Sir D. Brewster showed the prismatic form was most probably that already proposed by Wheatstone.

Referring to the photographs of Chimenti's drawings, he contended that the slide was really as stereoscopic as the near similarity would admit.

In connexion with this subject, the Honorary Secretary read extracts from a communication addressed by Professor Tait to Sir David Brewster, in which he said that, putting the argument in its feeblest form, in asserting that it is at least 1,000 to 1 that the sketches were designedly drawn as views by separate eyes or a single eye displaced.

The Honorary Secretary then read the following Report by the Council:—

In accordance with the rules of the Society, the Council have to present their Report at the conclusion of the sixth year of its existence.

They regret that it is not in their power on this occasion, as has previously been the case, to offer their congratulations to the Members on the continued progress of the Society.

In common with many kindred institutions, and with the country at large, they have to lament the death of His late R. H. the late Prince Consort, the Patron of the Society. As is known to the Members, it was considered to be the duty of the Society to present an Address of Condolence to Her Majesty.

The Council regret also to have to report that the Monthly Meetings have not been so successful as might have been expected in a Society holding so high a position, and including among its Members so many ardent photographers. The Council are aware that an idea is generally prevalent, and has affected other photographic societies as well as this, that the object for which it was instituted has now, to a large extent, been fulfilled, and that the interest of the Meetings and the usefulness of the Society will be partially nugatory until some new and important discovery is made in one or other of the departments of the art. While admitting that such a discovery would give a great impulse to the art, and necessarily increase the attractiveness of their Meetings, the Council cannot avoid repeating an observation made by them on a previous occasion, that there is ample opportunity for maintaining the interest and success of the Monthly Meetings, in the free and unreserved communication by Members of the results of their investigation and experience in connection with known processes; and they would again urge upon Members to assist them in this way in maintaining the efficiency of the Society.

Looking to the experience of the past year, the Council are disposed to recommend that in the meantime the regular Meetings of the Society should be limited to three, to be held on the second Tuesdays of December, February, and April; and that, in addition to the reading of papers, an effort should be made to add to the attractiveness of the Meetings by the exhibition of works interesting from their novelty or successful manipulation;—the Council having power to call extra Meetings whenever they think it advisable to do so.

As the Society is aware, the Annual Exhibition was opened in Mr. Hay's Fine-Art Saloon, George Street, in December last, and continued open about three months. Like all similar exhibitions, it suffered from the prevailing public depression caused by the lamented death of the Prince Consort, and has resulted in a loss to the Society of about £40.

The Exhibition itself, it is scarcely necessary to remind Members, was one of the best which has been held under the auspices of the Society. On this occasion, three Silver Medals were offered as prizes. For the best portrait or group, the prize was awarded to Mr. D. O. Hill, R.S.A., for his artistic picture of "Dr. John Brown and his Cousin Dr. John Taylor Brown;" for the best frame of six *cartes de visite*, Mr. H. P. Robinson, of Leamington, was the successful competitor; and for the best photograph of any other kind, the Medal was awarded to Mr. Mudd, for his beautiful picture of "The Tay above Dunkeld."

The Council have alluded to one cause of the unsatisfactory result of the Society's last Exhibition, in a pecuniary point of view. They have also for a considerable time been aware that the present place of Exhibition is not well situated for the purpose, and that this operated largely against the success of their Exhibitions. While, therefore, it is very far from their wish to recommend that the Society should discontinue holding their Exhibitions, notwithstanding the loss which has been sustained this year, they would suggest that it should be left to the Council to fix whether or not there should be an Exhibition next year, according as they may succeed in finding rooms better adapted for the purpose, or may otherwise have reason to expect that the Exhibition will not be attended with loss to the Society. In the event of an Exhibition being held, the Council would recommend that the Society's Silver Medal be again offered for the best *portrait* or *group*, and the best *landscape*; and, in addition, that a Medal be given for the best *instantaneous picture*, embracing figures in motion, and of a size not less than 7 inches by 9 inches.

As recommended at the last General Meeting, the Council selected from the Exhibition, and distributed among the Members, a number of valuable photographs. Any Member who may not, from residing in the country or otherwise, have received his copy, will do so, on application to the Honorary Secretary.

As required by the laws of the Society, the President, the Senior Vice-President (Mr. Sheriff Moir), the four senior Members of the Council (Messrs. Scott Elliot, Walker, Kinnear, and Moffat), the Honorary Secretary, and the Honorary Treasurer retire upon this occasion, but are re-eligible.

The Council would suggest that the President, Secretary, and Treasurer be re-elected to their respective offices; and that Mr. Kinnear, who filled the office of Secretary so satisfactorily, be elected a Vice-President; and that the vacancies in the Council be filled up by the re-election of Mr. Elliot, and the election of the Rev. T. D. K. Drummond, Mr. Moir, and Mr. Tunny.

The Treasurer's accounts are herewith submitted to the Society, and a state of the funds is annexed, showing the sum at the Society's credit to be £356 9s. 7d., as compared with £386 18s. 11d. at the close of the preceding year.

After some discussion as to the propriety of reducing the stated Meetings of the Society, it was agreed to leave the matter in the hands of the Council. And,

On the motion of Major Bell, seconded by Professor Macdonald, the Report was unanimously adopted.

On the conclusion of the ordinary business, an exchange of photographs among the Members took place.

*State of the Funds at 1st May, 1862.*

| | £ s. d. | £ s. d. |
|---|---|---|
| Balance due by Royal Bank | | 375 10 1 |
| Arrears of Subscription considered recoverable | | 5 5 0 |
| | | 380 15 1 |
| Balance due for Photographs purchased | 22 6 6 | |
| Balance due to Treasurer | 1 19 0 | |
| | | 24 5 6 |
| Amount of Funds | | £356 9 7 |

*List of Office-bearers*, 1862–3.

*President.*—Sir David Brewster, K.H., F.R.S., &c.
*Vice-Presidents.*—Horatio Ross, C. G. H. Kinnear.
*Council.*—Alex. Young Herries, T. B. Johnston, J. Ramsay L'Amy, Findley Anderson, Wm. Scott Elliot, Rev. D. T. K. Drummond, George Moir, James Tunny.
*Honorary Treasurer.*—H. G. Watson.
*Honorary Secretary.*—A. F. Adam.
*Honorary Auditor.*—John Cay.

### Manchester Photographic Society.

The ordinary meeting of this Society was held on Wednesday, the 4th ult., 1862, John Parry, Esq., Vice-President, in the chair.

Mr. Consterdine presented two views for the Society's portfolio, and which were interesting as illustrating the process of Messrs. Petschler and Mann. The pictures were much admired; and, although the exposure given for the negatives was considered to be beyond that required for collodio-albumen, the process certainly improved in general estimation.

Mr. WARDLEY remarked that the length of exposure required was, perhaps, due to the condition of the collodion. In the Taupenot process this was not an element that affected the result; but it was otherwise with this, for which a sensitive collodion was required for the most rapid results.

Mr. CONSTERDINE also showed some pictures obtained by the microscopic apparatus, explained by Mr. Parry at a recent meeting of the Society, and the instrument which he had constructed was handed round the room.

The CHAIRMAN showed the last result of his experiments in panoramic photography, with an ordinary view lens. In the negative exhibited to the members the joining of the two pictures could scarcely be perceived. He stated that he was persevering with that method of obtaining pictures, and should be able, he believed, to produce satisfactory specimens at the next meeting, and he would then go fully into the subject. At present he would merely observe that the two pictures were taken with one lens, and that he did not cause them to overlap each other.

Mr. NOTON stated that he had an aceto-nitrate bath, which after it had assumed the brown tint which follows the immersion of albumenized plates, became quite colourless; but upon adding acetic acid it again became discoloured.

Mr. WARDLEY said that the usual bath for the Taupenot process always behaved in that manner when the acetic acid had gone off by evaporation: the more acid that the bath contained the darker would be its colour. Taupenot plates, he added, might be excited in a neutral bath which would retain its purity, but they would not keep.

Mr. OFFER asked whether that plan would not also induce blisters?

Mr. WARDLEY thought not. In reference to blisters, he observed that they might frequently be avoided by increasing the strength of the silver bath.

Mr. NOTON said that during the last cold weather he had been troubled much with blisters.

Mr. WARDLEY said that in all photographic processes great attention should be paid to the temperature of the laboratory, when it fell below 60° difficulties were certain to arise.

Mr. HERBERT had observed that humidity in the atmosphere was a great cause of blisters: he had noticed that steam arising from the hand during the coating of the plate often induced them.

Mr. PETSCHLER said a deposit of moisture must of course take place if the plate were colder than the atmosphere.

Mr. ROGERSON said that photographers were in the habit of holding the plate too near the mouth, and a condensation of moisture was therefore inevitable. He thought it a good plan to warm the plate slightly before coating it with collodion. It was also a common practice to hold the plate at one corner, and there the film was always loose, because the moisture from the thumb prevented the collodion from actual contact with the glass.

It was generally thought that much in photographic operations depended upon the temperature of the room, to which Mr. Rogerson added "and that of the operator."

Mr. PETSCALER exhibited some prints taken from negatives on Dr. Norris's dry plates. The subjects were exceedingly interesting, they being groups of ladies and gentlemen taken during a recent excursion of the members of the Field Naturalists' Society.

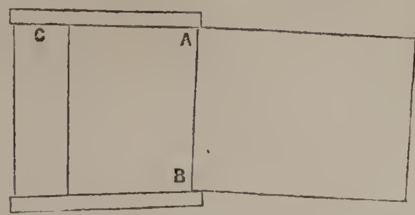
Mr. NOTON said that in working with his double albumen process he had been making some attempts to get iodide of silver into the film by placing it in the albumen previously to coating the plate—his object being to open out the material.

Mr. WARDLEY thought if the thing could be accomplished, without detriment to the picture, that it would not be likely to answer the end in view. He thought that it would rather tend to harden the film.

Votes of thanks having been accorded to Mr. Consterdine and the Chairman, the meeting was brought to a close.—*British Journal.*

# Photographic Notes and Queries.

## A SIMPLE PLATE-HOLDER.




DEAR SIR,—The above is a sketch of a plate-holder of my own invention, which I have found very useful for small plates ¼ or ½-size. If properly made, it will hold the plate quite securely in any position when developing, &c. It may be made of gutta-percha, or wood coated with rosin and wax varnish.

| | |
|---|---|
| Rosin ... ... ... ... ... ... | 4 parts |
| Wax ... ... ... ... ... ... | 3 |

You will see by the above sketch that the thick part of the wood is cut in rather a slanting direction at C, so that the top arm presses firmly on the plate. There is a small place hollowed out at A for the *point* of the plate only, and at B a groove about ½ or ¾ in. long and $\frac{1}{16}$ of an inch deep, just the width of the plate. The arms should be at such a distance than when a plate is put in, the top arm has to be slightly raised, and rests like a spring upon the corner at A, keeping the plate firmly in the groove at B.—Yours most respectfully, D. WARD.

*Manchester, June 21st*, 1862.

P.S.—If made of wood, care must be taken to put a wet plate in after well coating with the hot cement, and whilst the cement is hot, to keep the groove at B, and the round hollow place at A, from being quite filled up. If made well it will hold a plate in the position shown above as firmly as if held in the hand.

# Miscellaneous.

COAL TAR MADE PICTURESQUE.—If coal be regarded as the product of ancient sun-force, then the "light of other days," which has not faded, may be reproduced in colour of every shade and hue. Every one knows that when coal is distilled gas is produced, is carried away and collected, and that among the refuse products of the process is coal, which was formerly sold at a very low price. Coal tar is a very complicated body, and, when carefully distilled, it yields certain volatile fluids, smelling more or less of tar, among which is a naptha called "benzole." Small bottles of benzole are sold for removing grease stains under the name of *benzine collas.* Benzole is next acted on by nitric acid, and by that means changed into nitro-benzole—a liquid having so exactly the smell of the essential oil of bitter almonds that it is substituted for it in the manufacture of almond soaps and of cheap perfumery. When iron filings and acetic acid act upon the nitric benzole it is changed into aniline, and this aniline when acted on by arsenic acid, bichromate of potassium, permangamic acid, stannic chloride, &c., yields a great variety of very beautiful colours. These coal-tar dyes are a characteristic feature of this exhibition. In Perkin's case the visitor will see a cylinder of solid aniline purple, which could easily be carried under the arm. It is worth at least £800, and required for its production the tar obtained from 2,000 tons of coal. It is in tinctorial potentiality equal to 100 miles of calico. Thus are we reminded that death in nature is but new life. Force is, indeed, indestructible; form alone it is which changes. The actual elements caught up from the air millions of years ago, and then quickened into vegetable life by the sun that shone on earlier scenes than Eden, are now delighting the eye and gratifying the taste. The elements of the decayed forests of a pre-Adamite earth are quickened in 1862, and, re-assembling, show that "a thing of beauty is a joy for ever."

## Talk in the Studio.

Saving the Silver.—We have reason to believe that the operation of saving the silver from washing waters, clippings of prints, &c., is much less practised than it might be. It should be remembered, that not more than about ten per cent. of the silver used goes to form the completed picture, and that thus ninety per cent. is wasted, unless precautions be made for its recovery. Mr. S. Fry showed us an ingot the other day weighing upwards of fifteen ounces, for which he received five shillings and two pence an ounce, the produce of washing waters and clippings during two or three months. This did not include developing or fixing solutions. The result is, surely, worth a little trouble. Besides the individual gain, it is a saving, in the gross, to the commercial world, as in the case of waste, so much silver goes, practically, out of existence, and is lost to the world.

South London Photographic Society.—The first out-door meeting of the season will take place on Saturday next, at Hampstead; Jack Straw's Castle being the trysting-place; the hour from one to half-past. We hope the weather will be favourable, when a large attendance may be anticipated.

Requiescat in Pace!—The City of Glasgow Photographic Society, which for upwards of twelve months has been in a languishing condition, is now, we understand, entirely defunct.

Francis Bedford has arrived in England from his Eastern tour, with a large number of very fine negatives.

Marine Glue.—This cement is stated to be made according to the following recipe:—Take one pound of india-rubber, cut into small pieces, and dissolve it in about four gallons of coal-tar naptha; the mixture being well stirred for some time till perfect solution has taken place. After ten or twelve days, when the liquid has acquired the consistence of cream, two parts by weight of shellac are added to one of the liquid. This mixture is put into an iron vessel, having a discharge pipe at the bottom, and heat applied, the whole being kept well stirred. The liquid which flows out of the pipe is spread upon slabs and preserved in the form of plates. When required for use, it is heated in an iron pot to about 248 Fah., and applied hot with a brush.

The Electric Light.—The great advantages of printing by means of this light in winter, have been rendered unavailing to photographers by reason of its costly character. We hope, shortly, to be able to lay before our readers some information regarding a method of forming a cheap and powerful battery, invented by Mr. Fitzgerald, editor of *The Electrician*.

## To Correspondents.

J. P. C.—Much depends on the character of the lens, as to whether it is suitable for enlarging or not. Of course it is desirable to have a very flat field, and the flatter the field, the more perfect the marginal definition. We cannot tell you what you will be able to do with the lens you have; experiment only will inform you on that point. Remember you may be very easily deceived as to the exact amount of marginal definition you actually obtain, from the fact that it is very probable that the original negative often falls off a little to the edges; and that although it may be so slightly as not to excite attention in the original, it will be very palpable in the enlargement. The lens of 4½ inches focus, to which we referred in the article in the Almanac, has a very flat field. Perhaps you may gain something by using the front lens only of your combination for enlarging, stopping it well down. 2. The stereo enclosed is in all photographic qualities very satisfactory indeed.

H. B. B.—Whenever we describe a certain quality of collodion as suitable for a given process, we refer the reader to the formula by which it is produced at the same time. We admit that it may be somewhat tantalizing to those who have no facilities for manufacturing collodion, to refer to such samples, but it is the only course we can pursue. We are only familiar with commercial samples by occasional trial, and cannot speak positively at all times of their qualities, and it would be obviously unfair therefore to dogmatize on the subject, or even recommend any especial maker. That which you refer to as having proved slow, is the one to which we refer as proving slow in our hands. We can only offer suggestions as to those you enumerate, as we have not tried several of them for dry plates; we should give the preference, however, to some one of the first four; perhaps No. 1 will be as likely as any to answer the purpose.

Photos is desired by a correspondent to send us the address of the house at which the orange glass, noticed in our last, as suitable for the dark room, was obtained.

S. J.—You do not state whether you are referring to negatives or glass positives. We presume the latter. The surface reduction to which you refer is really a certain amount of fog, and is not uncommon with certain conditions of chemicals, especially in hot weather. The use of a weaker iron solution, with more acetic acid, is one method of getting rid of it. The addition of a little tincture of iodine to the collodion will sometimes remove it. If these fail, it is probable that the bath is at fault, render it neutral with oxide of silver or carbonate of soda, then sun it, and afterwards acidify properly again. The use of new collodion is often a cause of a similar trouble.

Nemo.—Pure chloride of silver contains a fraction more than three-fourths of its weight (when dry) of pure silver. It will be therefore just three-fourths of the value of pure silver, less the cost of reducing it into the metallic state, which would be but a trifle. We cannot tell you what price you would obtain for it of the refiners. We believe they hesitate to purchase it untried, as it might contain insoluble foreign matter. They prefer to reduce it for a small charge, and hand over to the customer either the silver obtained, or its value as ascertained after reduction. In such case you must trust to their honesty in rendering a correct account.

M. H., M.D.—We are much surprised at the conduct you described, it is utterly indefensible, and if not gross neglect, looks like dishonesty. Regarding the pictures and the process, you do not lose much by not receiving the specimen you have paid for. Judging the process by these specimens we certainly should not recommend it. We should unquestionably recommend the collodio-albumen process in preference, as easier to manipulate, and producing decidedly better results. We are disposed to regard the collodio-albumen process as the best and most certain in result of any of the dry processes. If, however, the tannin and honey prove on further trial as satisfactory as we have hitherto found it, we should give it the preference to any we have tried.

W. H. B.—If the lenses be fixed, without any lateral motion, they may be placed at a distance of from three inches to three and a quarter. The address of Messrs. Hopkin and Williams is New Cavendish Street, Cavendish Square.

Experimentum.—Pure gold leaf is very suitable for converting into chloride of gold. Rub it down first in a mortar, to get it into as small bulk as possible, then pour over it nitric acid 1 part, and hydrochloric acid 2½ parts, water three parts, sufficient to cover it well, and digest with gentle heat. If the whole of the gold be not dissolved in an hour or two, add more of the aqua regia. When all is dissolved, evaporate to dryness over a water bath to get rid of the acid. 2. The grey powder is chloride of silver. It may be reduced to metallic silver by placing in a crucible with twice its weight of equal parts of carbonate and nitrate of potash, and submitting for several hours to a great heat. You may then either sell the silver or convert it into nitrate of silver by digesting it with nitric acid, as described on page 6 of our fifth volume.

G. W. R.—The spots have every appearance of having been caused by the print having been touched with hypo previous to fixation, or with nitrate of silver just after fixation. Gum is the worst substance you can employ for mounting. Use good glue, gelatine, or freshly made starch paste.

A Tanner.—Acetic acid is better than nitric acid in a bath to be used for dry plates.

G. L. Morris.—There are two or three articles on the subject you name, in the numbers published during August and September last. Remember, however, that there is no successful method of turning positives into negatives. That is, if they are good positives they will not become good negatives. A little longer exposure, and more complete development with the iron, are always necessary for a good negative than would have sufficed for a good positive. With a sharp, well detailed, and slightly over-exposed positive, you may proceed thus: moisten the film with water, and then pour over it a solution consisting of one grain of iodine and two grains of iodide of potassium in an ounce of water. After this has remained on a few minutes, wash the plate well; now take a solution of two grains of pyrogallic acid and one grain of citric acid in an ounce of distilled water, to which add a few drops of a 20-grain solution of silver, and proceed to intensify and obtain the right density. You will find full information on modes of intensifying in the Photographic News Almanac for this year.

W. G.—The films of spoiled collodion positives may be saved with the clippings of paper prints, and burnt at some convenient season. The ashes may then be placed in a crucible with a flux, such as borax, or nitrate of potash, and by means of great heat reduced to metallic silver.

F. L. G.—The strength of the fixing solution is varied by different operators. We prefer one ounce of hypo in five of water; but it may be used a little weaker or a little stronger. If it be too weak, imperfect fixation is apt to ensue; if too strong, the tone is too much impoverished. Cyanide is too energetic to serve as a fixing agent for paper prints. 2. The silver may be obtained from old fixing baths of hypo, by precipitating it as a sulphide with liver of sulphur. 3. We cannot form any idea of the size a lens should cover from a statement of the diameter of the lens. It is the focal length which governs the size of the area of definition.

G. U.—If your positive bath contain much nitric acid, it will not give you dense negatives; the image will be thin and grey. The stronger the bath, the more acid it will require, as a general rule, to enable you to work clean.

Verdant Green.—Flatted crown glass answers for glass positives perfectly well. It may be used for negatives also, if proper precautions are taken to avoid breakage of the negative in the pressure frame. The best plan is, to try all glasses intended to be used for negatives, by screwing them down first in the pressure frame. It is better to have a plate of common glass break, than a negative, and the per centage of breakages will not be so large as to make the glass, anything like as costly as patent plate. One side of the glass is generally better than the other, and that should be selected for the collodion film. 2. There are a variety of good cleaning preparations: for new glass alcohol and rotten stone answers very well; if the glass have been used, and especially with iron development, nitric acid should be used for cleaning. Unless a leather have been perfectly cleansed, it is more likely to dirty the plate than to improve it. If the skin have been washed in alcohol, it is then valuable for giving the final polish.

R. G. and Alfred Harman.—Received: notice in our next. Several correspondents in our next.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 201.—July 11, 1862.

## THE "PHOTOGRAPHIC TRADE," AND INFALLIBLE DRY PLATES.

On another page we print an interesting article on "Photography for Tourists and Travellers," from the pen of Professor Pole, F.R.S., in which he urges upon tourists and travellers generally the immense accession of interest and value their excursions may derive from the aid of photography. For simplicity and convenience, he recommends the use of a dry process, and shows how a suitable stereoscopic equipment, with a stock of dry plates, may be added to the tourist's luggage, without, to any extent worth naming, increasing his travelling *impedimenta*.

The article is an interesting one, well calculated to augment the usefulness, by increasing the practice, of our art, and we thank Professor Pole for it. In the course of the article, however, the worthy professor makes some remarks which are, we think, scarcely fair, either to his readers or the photographic trade. After pointing out to the tourist that he may, if he choose, become a photographer, without either preparing plates or developing them, by purchasing sensitive dry plates, exposing them, *en route*, according to instructions, and then getting them developed by a competent person on his return, he asks how it is, since the advantages of such a plan are undeniable, that it is not more frequently used? And, he answers, that is simply because "dealers in photographic apparatus have never yet had the enterprize to establish a manufacture and sale of dry prepared plates, in such a way as to insure their popularity;" and, he adds, that this is not from any imperfection or difficulty in dry processes, that "dry plates *can* be made, satisfying all the conditions named," and "might be rendered thoroughly trustworthy." The conditions referred to are, as we glean from preceding remarks, these:—

That they shall keep "long enough" before and after exposure.

That they shall not "fail in sensitiveness."

That they shall not "spoil soon after they are opened."

That they shall be free from "liability to stains, irregularities, blisters, and all sorts of troublesome and annoying defects."

That these conditions are not fulfilled is attributed chiefly to the "indolence and obstinacy of the trade," and it is hinted that there is room to doubt, "whether some dealers may not be obtuse enough even to encourage defects, from the short-sighted notion of increasing the sale." Now, these are very hard words for "photographic dealers" and "the trade." They are hard words, and, we believe, very unjust ones. That photographic rubbish of all kinds may be bought plentifully enough there is no doubt: demand creates supply; and the demand for "cheapness" has, in the photographic trade, as in all others, introduced, we regret to say, sadly too much "cheap and nasty" material into the market; but that this is universally the case, or even the rule, we utterly deny; and we question whether in any trade more amateur enthusiasm, as well as honest commercial enterprise, has been brought to bear upon its products than in the photographic trade. We have always steadfastly opposed this rage for miscalled cheapness; we have condemned it in every form: we fully endorse the remarks of a contributor in another column on this subject; but at the same time we fearlessly aver that good materials of every kind, both in apparatus and chemicals may always be procured, by the exercise of moderate judgment and the payment of a fair price.

All this is by the way, however. We hasten to the chief object of our comments: Professor Pole assures us that dry plates *can* be prepared fulfilling the conditions named. We think we are fairly entitled to ask him to describe the process; this much is, we think, due to his readers. We are fully aware of the value of the various dry collodion processes; we have seen, nay, we have produced, good pictures by all or the majority of the known methods; but we must confess that we do not know any process by which plates can be produced and placed in the hands of inexperienced amateurs which shall then fullfil all the major conditions, to say nothing of entire immunity from "stains, irregularities, blisters, and all sorts of troublesome and annoying defects." Every one who is familiar with photography knows that even the most skilled operator, with the best understood processes, cannot *always* avoid some of those defects. Is it to be supposed then, in regard to dry processes, in regard to which so much both of theory and practice is yet to be learned, plates can be prepared and placed in the hands of persons imperfectly informed, or often careless as to the conditions of keeping, exposure, &c., without, at the same time, inevitably meeting with a large percentage of failures? Perhaps the largest manufactory of dry plates in existence is that of Dr. Hill Norris, at Birmingham. We hear very frequent accounts of the successes obtained with these plates; and we hear occasional accounts of failures; it is quite possible that such failures may be from a variety of causes unavoidable, but we may state a plan which Dr. Norris himself informed us he constantly practised. When complaints arrived of the imperfection of any of the plates sent out, the purchaser was invited to send back a sample of the imperfect plates. so marked that he could identify them again. On such plates it has happened nine times out of ten the purchaser has received back again perfect negatives. This we have ourselves known to be done repeatedly. Professor Pole states that he knows "no maker who will guarantee the sincerity of his wish to make good plates, by consenting to allow for them if they turn out bad ones." The simple offer to do such a thing, would, we fear, be ruinous to any dealer; for whilst it may be fairly affirmed that the failure might probably, in eight times out of ten, be due to carelessness, or incapacity in the operator, it is scarcely to be expected that he would in half of these cases be either conscious of it, or admit it.

The truth is, that there are two or three primary reasons why the preparation of dry plates has not been practised largely as a commercial enterprize. The processes have been uncertain, the plates have not been largely required, and their manufacture has often been unremunerative and unsatisfactory.

That some uncertainty as to results must exist where the rationale is imperfectly understood, needs scarcely to be affirmed.

That, in an art like photography, where the difficulties to be overcome are amongst its chief charms to a large class of amateurs, the demand for ready prepared should not be large can be well understood. To an Englishman, at least, the prospect of difficulty is generally very seductive. To the knight errant of old, if danger were added to the difficulty, the temptation was irresistible:—

"For if a pass were dangerous known
The danger's self were lure alone."

It is scarcely less so in the present day; the danger and difficulty form no small item in the giving the zest to an ascent up the most steep Alpine crags, or in riding across country after the hounds, in deer-stalking, yachting, and a score of other pursuits. In a modified degree the same pleasure is felt in the overcoming the troubles of photography; there is a keen satisfaction in running a persistent difficulty to earth, or getting the weather side of an obstacle. Many an enthusiastic photographer would not thank you for the pleasure of exposing a plate if he had not prepared it, still less if he could not secure the satisfaction of developing it, as there is, perhaps, no greater pleasure in photography, than to witness the gradual birth and progress of the image in a series of negatives after an excursion. To the tourist who simply requires a record of the scenes he has visited, and cares nothing for the *modus operandi* of producing them, nothing can be more desirable or legitimate than prepared plates ready for use; but of these the number has not hitherto been sufficiently large to cause a very large demand, or render the extensive preparation of such plates an important branch of the trade.

Hitherto the preparation of such plates has not been, generally, a very remunerative or satisfactory undertaking. We remember, less than twelve months ago, having some conversation on this subject with, unquestionably, the ablest dry-plate photographer in this country, or indeed, we may say, without hesitation, the ablest in the world. He had at one time been in the habit of preparing plates for sale; his process was the most certain of all dry processes—the collodio-albumen: his plates, in his own hands, were absolutely certain, or as nearly so as possible. But he could not guarantee that they would be so in other hands; and he finally gave up the practice of preparing plates for sale, as it afforded neither satisfaction nor profit.

We may remark, in conclusion, that we shall be glad to know the process which Professor Pole has found most successful, and we think we can assure him, from our knowledge of the photographic world, and the amount of enterprize in it, that when the demand for prepared plates becomes increased, it will be met with a supply as perfect in quality as the present knowledge of the art will permit to be produced. As to the boon dry-plate photography offers to the tourist, we cordially agree with him, and trust that his advocacy will secure a large accession to the photographic ranks.

## REMARKS UPON SOME OF THE APPARATUS EMPLOYED IN PHOTOGRAPHY.*

BY F. R. WINDOW.

The apparatus and instruments which I have reviewed in the preceding articles, form but a portion of those employed by the photographer; and it was my intention to have carried out the series to greater completeness before bringing it to a close; but a press of private occupation intervening, I am prevented, at least for the present, from extending these "Remarks" beyond the present number. At an early period I hope to be able to resume my half completed task, and examine some of the minor items of the apparatus which we use in our art.

There is one subject, however, upon which I am unwilling to postpone my observations, for although it does not come properly under the heading of photographic apparatus, it concerns it too closely to be passed by without mention. I refer to the unfortunate mania for *cheapness* which has so fatally obtained in all things photographic.

Cheapness is the bane of the photographer. It has done more to produce failure and disgust in this beautiful art, I believe, than all other causes combined, and I regret to perceive that the evil is daily progressing. Photographers have cheapness thrust upon them in every stage of their operations, to the detriment of their productions, and in the greater number of instances, the remedy is beyond their reach. At the same time it is extremely difficult to know upon whom to fix the blame. A respectable dealer may sell worthless articles, sometimes from being practically unacquainted with their nature and use, and through placing confidence in the manufacturers who supply him with them. Manufacturers again are generally ignorant of the details of the practice of photography, and their endeavours are less directed to the production of something better than what is made by others, than to the supply of something cheaper, with little regard to its real comparative value. With respect to the manufacturers of chemicals who deliver adulterated specimens under the name of pure salts, the plea of ignorance cannot be urged, as they must be perfectly aware of the nature of the goods they make. Yet we all know the difficulty there is in obtaining pure photographic chemicals. In this case, again, the mere dealer is not *necessarily* to blame for supplying impure chemicals, as he may have bought them in good faith for what they profess to be.

Be the blame, however, where it may, the competition in every branch of the photographic market is now become such, each vendor trying not to excel, but to undersell his competitors, that in many localities good things are not to be bought at all, even by the photographer willing to pay a proper price for them, while the commoner goods are everywhere in plenty. It is also a thing to be borne in mind that both manufacturer and seller generally reap a larger profit upon common cheap goods than is to be obtained on those of a higher class, and therefore, it is frequently their interest to push on the unwary purchaser the cheaper article in preference to the dearer one.

It is a very difficult matter to suggest a remedy for such a state of things, as at the very outset one is met by the fact that photographers are most frequently not in a position to decide for themselves upon the positive goodness, or otherwise, of their apparatus and chemicals. Many photographers are not sufficiently mechanicians to decide upon the workmanship of their apparatus, and to such, a brilliant coat of French polish will hide bad work. Still fewer photographers are familiar enough with chemical manipulations to be able to decide upon the purity of the chemicals which they buy; therefore, in either case they are likely to be led by advertisements, which may either set forth truly the value of the wares, or be simply mendacious puffs. Unfortunately, the chances are nearly equal.

It would be very unwise to counsel the photographer, in the absence of more direct knowledge to guide him in his purchases, to eschew entirely articles because they may be cheap, as this advice would be directly opposed to the spirit of the age. But I would recommend him never to buy a thing *because* it is cheap; to purchase his goods only of tradesmen upon whom he believes he can rely, and who have a reputation to lose (fortunately there are plenty of such); and lastly, before deciding upon the purchase of any article, cheaper than can be had elsewhere of an apparently similar quality, to carefully ascertain whether the real thing can be manufactured and sold profitably for the price asked. For instance, in nitrate of silver there is 64 per cent. of the pure metal, which, at 5 shillings and 2 pence per ounce, which is a fair commercial price for pure silver, makes 3 shillings and 3 pence halfpenny worth of metallic silver alone, in every ounce of the nitrate. To this has to be added the expense of manufacture, together with the manufacturer's and the retailer's profits: therefore, if we find the nitrate sold for 3 shillings and 4 pence per ounce, as it sometimes is, we may fairly conclude that its purity is doubtful.

I make the preceding observations with the certainty that they will not be misinterpreted. The many respectable and trustworthy houses which use their best endeavours to supply photographers with really good things at remunerative prices, will gain by being distinguished from those who are less scrupulous, and I imagine it is only these latter who will be inclined to cavil at my remarks.

* Concluded from p. 243.

## Scientific Gossip.

Discovery of New Metals in the Sun, Calcium, Aluminium, and Magnesium—Identification of Frauenhofer's Lines—Igniting Point of Coal Gas.

Since we last reported on the subject of the solar spectrum, some very interesting as well as important researches have been published by Angström which led to some further conclusions respecting the composition of the solar photosphere. It may, he considers, be taken for granted that the Frauenhofer lines for the most part originate in the sun's photosphere, or the gaseous envelope that immediately surrounds that body. As an objection to this hypothesis, it has been urged that the lines in that case ought to appear stronger and more distinct when the rays come from the centre of the disc. According to an oft quoted observation of Professor Forbes this has not been thought correct. Forbes' observation, however, took place during the occurrence of a solar eclipse, under which circumstances it would be very difficult to preserve the appearance of the spectrum accurately in the memory. Angström therefore considered that the experiment was worth repeating. He used for this purpose an optical theodolite with two telescopes, one of which was furnished with a slit-opening to admit the sunlight. The height of this aperture was reduced very considerably, and the sun's image was projected upon it from a Dolland object glass of about ten feet focus. The diameter of the image thus formed was about an inch: and by allowing the rays from different parts of this image to fall successively upon the opening, it was easy to see whether the Frauenhofer lines underwent any change. No very remarkable difference was perceptible; all that could be noticed was, that the intensity of the spectrum light is somewhat less when the ray comes from the edge than when from the centre of the disc; this being evidenced by the circumstance that the fainter Frauenhofer lines show themselves in the latter case comparatively stronger, whereas when the light comes from the centre of the solar disc, the fainter lines will sometimes even totally disappear, while the stronger lines, some of the iron lines for example, appear with correspondingly increased brilliancy: this observation is not repugnant to what we already know concerning the absorbing power of gases, and does not, therefore, militate against the hypothesis of the metallic composition of the sun's atmosphere. Angström has verified Kirchhoff's statements respecting the coincidence between the lines of iron, magnesium, nickel, and the chromium, and corresponding ones in the sun's spectrum. The iron lines identified by Angström are not quite so numerous as affirmed by Kirchhoff but are quite sufficient to establish beyond a doubt the presence of iron in the solar atmosphere. These lines are the most characteristic in the whole solar spectrum: and if a sufficient magnifying power be employed, or the light be refracted through more than one prism, the stronger ones among them appear perfectly black.

It has been further remarked, that the lines belonging to the air or to the gas through which the electric spark passes when working with an induction coil, are less distinct, and wider, in proportion as the strength of the electricity is increased; whereas, the lines belonging to metals, especially when somewhat refractory, like iron, remain perfectly sharp under these circumstances. The metal lines may also be distinguished, in some measure, in the solar spectrum, when examined with adequate magnifying power; with moderate power, certain lines appear somewhat prominent, and imbedded, as it were, in a mass of fine lines, which, upon the application of increased illumination, appear to withdraw themselves, and disappear, while the first-mentioned lines, on the contrary, only stand out in stronger relief. These are metal lines, and the most remarkable among them almost invariably belong to iron. Thus, between H and G we have fifteen stronger iron-lines, all having their counterparts in the solar spectrum. The two strongest of these lie $\frac{1}{4}$ and $\frac{3}{4}$ of the distance between H and G, and that nearest to G is double, as belonging also to calcium. Moreover, at G, and in its immediate neighbourhood towards F, we have five strong, besides eight fainter lines; at F, again, five; and lastly, around E, a numerous group, all answering to dark lines in the solar spectrum. An additional fact is also given respecting magnesium; the third of the lines, marked *b*, reckoning towards F, is double, and belongs, accordingly, both to magnesium and iron. The existence of four bodies in the sun has been shown by Kirchhoff; and to these, Angström now proposes to add calcium, aluminium, and manganese, and also, in all probability, strontium and barium. *Calcium* has three strong lines at the violet end of the spectrum, of which two are especially remarkable as being identical with the well known pair of lines H, and the third in order forms, with one of the iron lines, the strong double line mentioned above. Calcium has also several lines in other parts of the spectrum, all of which have their counterparts in that of solar light. *Aluminium* is also characterized by two strong lines lying between the H lines of the solar spectrum, and there corresponding to two dark lines. Manganese gives a spectrum which very much resembles that of iron; the different groups between G and H, and thirteen manganese lines between G and F, closely approach similar ones in the iron spectrum, and are also identical with corresponding lines of the solar spectrum. Strontium has two strong lines between F and G, which apparently correspond to solar lines, and this also seems to be the case with the line F. It must, however, be mentioned, that the presence of strontium in the sun is very uncertain, owing to the very brilliant blue line which this metal shows between F and G, having no corresponding line in the solar spectrum. Barium has four lines between F and D, which seem to have their counterparts in the solar spectrum; this also requires confirmation.

To give in a general view the principal coincidences between the Frauenhofer lines and those in the artificial metallic spectra, we have the following general view:—

| | | | |
|---|---|---|---|
| The line | B | belongs to | potassium. |
| ,, | C | ,, | hydrogen. |
| ,, | D | ,, | sodium. |
| ,, | B | ,, | magnesium and iron. |
| ,, | F | ,, | strontium and iron (uncertain). |
| ,, | G | ,, | iron. |
| The 2 lines | H | ,, | calcium. |

The remainder of Angström's paper goes into theoretical and mathematical discussions on the theory of the reciprocity of radiation and absorption, and of the theory of thermometric heat, those of our readers who care to pursue this interesting subject in its further details, will do well to refer to the entire paper which will be found at length in this month's number of the *Philosophical Magazine*.

Some interesting experiments have been lately tried by Dr. Frankland on the temperature at which coal gas ignites. The heterogeneous mixture of gases and vapour known as coal gas may for this purpose be assumed to consist of—olefiant gas and other luminiferous hydro-carbons, light carburetted hydrogen or fire damp, hydrogen, carbonic oxide, and bi-sulphide of carbon, as under certain circumstances these gases can become separated to some extent, it was thought advisable to examine separately their respective igniting points. Olefiant gas required to inflame it, the heat of an iron which appeared of a cherry red colour in diffused daylight. Light carburetted hydrogen can be inflamed by white shot sparkling iron, but not by iron at a red heat; it is, therefore, less inflammable than hydrogen, carbonic oxide, or olefiant gas. Hydrogen requires for its ignition, an iron heated to a temperature beyond visible redness in a tolerably well lighted room. Carbonic oxide inflames at a little higher temperature that that required to set fire to hydrogen. Bisulphide of carbon vapour was found to ignite at as low a temperature as 300° F. Owing to the law of the diffusion of gases, these several constituents of of coal gas, would diffuse into the atmosphere through leakage or any large opening in the pipe, with different velocities, and thus it is possible that when gas is escaping into a room, the mixture may have different igniting points, close to, and at some distance from the pipe. A great many experiments were tried by Dr. Frankland on the igniting points of different mixtures of the gases: thus, a mixture of carbonic oxide with about three per cent of bisulphide of carbon vapour, issuing from a jet into the air was readily ignited on the approach of a glass tube containing oil heated to 410° F.; hydrogen and bisulphide of carbon igniting when the temperature of the oil tube was 420°. Fortunately, however, it was found that the presence of a minute trace of olefiant gas, instantly raised the igniting point of the mixture, and neutralized the ill effects of the bisulphide of carbon. The Doctor therefore concludes that under the most favourable circumstances, coal gas cannot be inflamed at a temperature below that necessary to render iron perceptibly red hot by daylight, in a well lighted room; this high igniting point being due to the presence of olefiant gas and other similar hydro-carbons. A mixture of coal gas and air is however more easily ignited than the explosive mixtures in coal mines, and therefore the safety lamp in ordinary use in mines is not considered safe in a mixture of coal gas and air; this latter being also readily inflamed by sparks struck from metal or stone. Thus, an explosion may arise from the blow of a tool of a workman against iron or stone, from the tramp of a horse upon pavement &c.

# The International Exhibition.

## PHOTOGRAPHIC CHEMICALS.

One of the most important chemical manufactures of the country, and one also which is indirectly of the utmost importance to photographers, is that of soda. The process of preparing the pure caustic alkali from sea salt is a triumph of scientific ingenuity, and is well illustrated in many cases in the British chemical department. Leblanc's process for making carbonate of soda is scarcely of sufficient interest to our readers to merit a detailed account; but we will just glance at the principal operations as a preliminary to the manufacture of caustic soda, which is an entirely novel branch of manufacture, and one which, before long, will be of considerable importance for household and manufacturing purposes.

Sea salt or chloride of sodium is first of all to be converted into sulphate of soda. For this purpose it is necessary to have large quantities of sulphuric acid, and as this is not an article which can be carried about safely, it is always prepared at the soda works. Either pyrites (bisulphide of iron) or sulphur is burned in a furnace with proper arrangement for oxydizing the resulting sulphurous acid into sulphuric acid, which is condensed in enormous leaden chambers, the bottoms of which are covered with water. This acid is then allowed to act on the salt, when hydrochloric is evolved and sulphate of soda is produced. The crude sulphate is then mixed with coal and chalk, and the whole heated together in large reverberatory furnaces, when the so-called black ash is produced. This is exhausted with water and yields a solution containing considerable quantities of caustic soda. The old process was to convert this by successive steps into carbonate of soda, but now caustic soda is prepared in a great measure from it. The crude alkali has lately been converted into an almost absolutely pure product by a very ingenious plan, carried out by Dr. Pauli, of the Union Alkali Works, St. Helen's. He takes the commercial caustic soda, in quantities of about three tons at a time, containing excess of water, alumina, and all the impurities which commonly occur in this substance, and fuses them in a cast iron pot. During the evaporation nearly all the carbonate, and by far the larger quantity of the other salts separate out on the surface as a scum, and can be easily removed. The liquid mass is then heated to dull redness, and kept at that temperature during the night. In the morning the mass appears perfectly transparent, the sides and bottom of the vessel being coated with cauliflower-shaped masses of crystals, consisting of silicate of alumina, with chloride and sulphate of sodium, and a little lime. The clear fused liquid is ladled off from these crystals, and when cooled is ready for use. The soda prepared in this way is perfectly free from alumina; a small quantity of the soda was fused in a platinum crucible and some pure alumina added. This remained undissolved in the fused mass, swimming about like a precipitate in the red hot liquid. On cooling, water was added to this fused mass, and the alumina was found to dissolve completely. If the commercial soda contains oxide of iron, this also separates out completely during the process of fusion. Lime, on the other hand, is dissolved in large quantities by the caustic soda, but it is completely separated by solution in water. The caustic soda prepared in this way is hard and brittle, and can easily be obtained as a fine powder by attrition in an iron mortar. It contains only a trace of carbonate of soda.

We have devoted more space than we intended to a description of this body, but it is before long destined to play an important part in many manufactures, and will prove an invaluable adjunct to the photographic laboratory, for neutralising acidity in the bath or other solutions, which it will do in a manner at once certain and unexceptionable. The great difficulty has hitherto been to get it pure; now this is accomplished, its uses will be manifold.

## BRITISH PHOTOGRAPHIC DEPARTMENT.

The contributions of coloured photographs to the Exhibition do not call for extended notice, especially in a photographic point of view. Such interest as the coloured portion of the Exhibition did possess is now materially diminished. The majority of the contributors concerned have taken our hint as to the dampness and removed their pictures. Almost all the water-coloured specimens are gone; some also of the yellow and fading plain pictures have been removed, so that bare walls in many cases meet the eye instead of photographs. The most noticeable coloured pictures, or certainly those which will attract the most attention, are the coloured enlargements of M. Claudet. Strictly speaking, these are not photographs at all, that is, they are not drawings by light. M. Claudet recently described the method by which they are produced by projecting the image of a small negative on to canvas by the aid of a solar camera and artificial light, and then tracing the principal features on the canvas by means of a crayon. The general outline, chief shadows, &c., are thus secured in their due proportion as a basis for the further operation of the skilled painter, who is further aided by a print from the small negative to serve as a guide. We know that exception has been taken to the presence of these pictures amongst photographs; but we scarcely think the exception is just. They are at least valuable applications of photography; they are produced from small photographic negatives, and the enlarged image is produced by photographic appliances. As the final image is not produced by the chemical action of light, they are not, as we have just said, in the strict sense of the word, photographs; but they are so nearly related to the art, and the result of such an interesting and valuable application of it to the purposes of portrait painting, that we think there is no more legitimate place for them than the photographic department; and it must be distinctly remembered that they are not put forward as photographs, but the method by which they are produced is described. Some of those exhibited are very admirably painted, and excellent likenesses. The portrait of Mr. Chance, of Birmingham, is a very fine piece of painting, vigorous and forcible, yet, withal, quiet and low in tone, free from the laboured smoothness of finish which is generally known as "tea-boardiness." Several other of M. Claudet's pictures, both enlargements and those taken direct, are exceedingly well painted. Whilst referring to the productions of M. Claudet, we may call attention to a couple of his pictures which have recently been added to the French department. These consist of two large groups, taken direct, one consisting of portraits of the secretaries of the English and French Photographic Societies, Dr. Diamond and M. Laulerie; and the other of five persons, the jurors of Class XIV, Photography. Both these pictures are admirable, and are as fine specimens of photographic portraiture as are to be found in the Exhibition. The photography leaves nothing to be desired; the composition is good; the tone is rich; the images are round, soft, vigorous, and well defined. The likenesses are also admirable. Those in the group of two are perfect in this respect, and full of character. We commend visitors to see those pictures, both for the interest of the subjects, and the excellence of the photography.

Mr. Kilburn, or rather his successor in his name, contributes some very good specimens coloured in oil, and some which are styled "demi-tinted" in water-colours, which are almost as bad as possible.

Mr. T. R. Williams exhibits some of the finest oil-coloured specimens in the department; true and natural in colour, they give both the hue and the texture of flesh; the colouring is indeed well worthy of the photographs, and that is saying a great deal. We must except, however, two specimens apparently coloured by another hand, the portraits of "A Lady and Child," and of "A Highlander;" these are cold and crude, and certainly, to our taste, inferior to the rest of Mr. Williams's contributions. A tinted enlarged portrait by Mr. Williams is hung too high for criticism, but it appears very good. Mr. Brothers of Manchester exhibits a coloured photograph on ivory, which is very good, and a large coloured group, which, so far as we can see at the height at which it is hung, is also very good. Messrs. McLean and Melhuish exhibit a frame of coloured miniatures, which are also hung too high for careful examination, but they appear very perfect indeed, and have all the character of ivory. M. Bassano exhibits a large coloured group of officers which has very little art, and is thoroughly unsatisfactory as a picture. Mr. T. Price has some very good miniatures in oil. Mr. Bowers has one or two very good coloured enlargements. Messrs. Smyth and Blanchard have a coloured solar camera picture, which is far inferior to their uncoloured work. Messrs. Gush and Ferguson, Mr. E. Sutton, and Messrs. Lock and Whitfield have some very carefully coloured miniatures, but with the majority of which visitors to former exhibitions are familiar; they have many beauties, but are marred by some exaggerations in drawing. The latter firm exhibit a very fine life-sized head of a child; this is well painted, and a very charming picture. Mr. Mayall exhibits a few coloured specimens, some of which are good, but none of which we think are equal to his best plain untouched pictures. We regret to observe a growing tendency in photographic colourists, of which this Exhibition furnishes many examples, to the production of mere prettiness, to the entire sacrifice of all true art qualities; transparency, solidity, and the sober quietness of nature are sacrificed for the purpose of obtaining a brilliant display of colour, and that smoothness and miscalled "finish" which is destructive of all texture, vigour, or appearance of life. This arises, doubtless, in good artists, from the habit of constantly painting according to "descriptive particulars," instead of from life; inferior artists will follow bad examples; and in addition to this, we fear that too often the public desire and patronize this "pretty," but unnatural style of colouring.

The colouring of photographic landscapes has from some cause never received much attention or favour. How far it might be done successfully by good artists, we cannot tell; but we doubt if the result would ever be worth the pains it would require, if done properly. Certain it is that most exhibited attempts have been failures; of all the vile things of the kind, however, we have never seen anything worse than the "Views coloured in Tempera and Bistre," exhibited by Mr. Poulton, the photographs are spoiled without anything approaching in the remotest degree to art having been obtained; the result is coarse and gaudy, inferior to our taste to the commonest coloured engravings.

We append one or two extracts from the criticisms of the daily press on photography. The opinions of the outside press are always more or less valuable as fairly representing the opinions of the general public. The article in the *Daily News*, which we give first is in the main thoroughly just, and appreciative. The incongruity of the classification is shown in a forcible light by the heading appended to the article being simply thus:—

"Machinery: Photography." After this heading comes the criticisms on pictures, premised, however, by a few trenchant remarks on the classification:—

"It is very evident that at some period of their existence, the powers that be at South Kensington have been made the distorted victims of some incompetent photographer, for the incessant war that Her Majesty's Commissioners have never ceased to wage against the votaries of the camera plainly indicates a grievous wrong done on one side, only to be wiped out by the most implacable revenge on the other. They commence by classifying photographs amongst machinery, because, forsooth, a camera is a philosophical instrument, a principle which, if carried out, would place lithographs in Class 1 amongst stones, and engineering in Class 31 with copper-plates. A very fierce opposition to this sapient decision was immediately raised, photographers from all parts of the kingdom uniting in protesting against the arrangement. But the opposition was useless, the only result being an enormous mass of official correspondence, all sound and fury signifying nothing. Having insulted the new art by a false classification, the next thing was to burke its display by hiding it from the public. It was accordingly placed in a lofty, though cheerful garret, called the Central Tower, far above the high struggling mark of even the soundest winded visitors. To further degrade it, the Commissioners mixed it up with toys. What, in the name of Cremer, photography has done to be placed side by side with baby jumpers, wax dolls, and other appliances for the improvement of the infantile mind, we do not undertake to determine—we only know that in our opinion the union seems to be at least incongruous.

"Had the search for this attic been ten times as long, and the stairs twenty times as many, we should have been fully repaid for our exertions by the splendid display of photographs of all kinds contributed under the depressing influence of an unjust classification. In spite of their first determination not to exhibit, the best houses have come forward with their best works, determined to show to the world that a photographer is not a mechanician, and that photography is something more than a manufacture. It is at all times a most difficult thing to criticise photographs. There are so many influences at work which may destroy at any moment the result of unceasing pains and educated skill, that the photographic critic is continually in danger of blaming the photographer for shortcomings utterly beyond human control. There is, too, great difficulty in viewing photographs from a medium point just between manipulatory excellence on one side, and natural beauty on the other. The photographs exhibited are, perhaps, the best collection ever brought together, numbering nearly one thousand frames, containing works by all the best photographers, very few of which are below mediocrity. They fall naturally into four divisions—portraits, landscapes, reproductions, and scientific photographs.

"We would warn our readers that the list of exhibitors contained in the ordinary shilling catalogue is useless, and advise every one to procure the detailed catalogue published by Trounce, and sold in the room, the numbers given in it being made use of in the following remarks.

"Commencing at the south-west corner of the room, the first frame of portraits we come to is a collection of studies by an old public favourite, Mr. O. G. Rejlander (2), which are placed so far out of the line that it would be unjust to criticise them rigorously. From the distance, they appear to be worthy specimens of manipulatory skill and artistic humour. J. B. Dancer (17, 18) exhibits two frames of what appear to be microscopic portraits; but as there is no means of viewing them, nothing can be said about them. R. F. Barnes (33). This gentleman sends portraits of several musical celebrities, but they appear to be coarser than most of his former productions. Ross and Thomson (34, 35) contribute two frames of excellent portraits, which are, however, much diminished in merit by the backgrounds being generally much too dark. These two frames are very good illustrations of the great difference in type between English and Scottish physiognomy. On the south-east screen (732) is another frame of portraits, from the same artists, containing some very meritorious efforts in artistic grouping. The heads of the sitters are, however, generally too large. T. R. Williams (49-52, 55-57, 166, 399-404, 414, 821-829, 835) sends a number of exquisite vignettes in his well-known style. It appears to be now generally allowed that vignettes are the most artistic of all photographs. The reason of this no doubt is that a greater amount of artistic feeling is requisite to procure a good result by shading off the background exactly in the proper place and with the right amount of gradation. The productions of Mr. Williams are, as a whole, the best portraits in the exhibition. John and Charles Watkins (58-60, 64-66) exhibit six frames of first-rate portraits, the *cartes de visite* being the best in the exhibition. These gentlemen excel in placing their sitters in a characteristic position, generally with one or two well-disposed accessories. The lighting, too, of their pictures is excellently managed, the head of the sitter being the most brilliant portion of the picture, the other parts being illuminated distinctly but feebly. Apropos of these very beautiful little works of art—we see a great tendency in other photographers to use backgrounds, more or less badly painted, on which are depicted in the worst taste the pillar, curtain, balustrade, and gathering storm of the ancient La Creevy school of art. This is surely a retrogression. A photograph, to be an artistic production, needs no extraneous aid in the way of bad scene-painting; and we point to the *cartes de visite* sent by Messrs. Watkins as the best proof that we are right in our notions. Herbert Watkins (24, 85, 96, 135) sends a frame of portraits of Ristori, in eighteen or twenty of her dramatic creations. The photographs are all that could be desired in the way of artistic treatment, but the effect is marred by the absence of spontaneity in the position and expression of the actress. This must always be the case in photographing expression, dramatic effect consisting in the very instantaneity of the movement.

"H. P. Robinson (128-132, 142, 572, 594, 595, 703). The productions of Mr. Robinson are always pleasing from the amount of beauty always contained in his pictures. They are, as our readeas are no doubt aware, subject pictures, made up in a very ingenious manner from several different negatives. "The Top of the Hill" (128), is simple and good, the action of the girl being extremely natural. "The Holiday in the Wood" (131), with its bevy of children enjoying themselves to their heart's content, is too well known to need description. The greatest effort yet made by Mr. Robinson is "The Lady of Shallot" (132). She that "floated down to Camelot" is a very beautiful girl, (well known to us through "Fading away," and other of Mr. Robinson's productions), lying, with dishevelled hair in a boat, that barely ripples the surface of the black stream down which it is gliding. The scene is laid in early spring, and the calmness of the surrounding landscape appears to indicate that the time is evening—a supposition borne out by a strong side light that falls in a magical manner on a willow on the opposite shore. This picture is the best of Mr. Robinson's works, and will, we hope, bring him the fame he deserves.

"Mayall (152, 153) exhibits two frames of portraits in which the photograph is quite hidden by the black and white touches added by the artists. This gentleman's show is by no means what it should be; he should either have not exhibited at all, or have sent specimens worthy of his established reputation. The same remark applies to Kilburn, Mayer Brothers, and one or two more, whose success has no doubt rendered them somewhat careless of fame. Mr. H. N. King, of Bath, sends a large number of theatrical portraits, which would be much better with plain backgrounds. It is really a pity to see good pictures spoiled by ill-painted scenery introduced. Maull and Polyblank exhibit a number of large portraits of celebrated men, which, but for a certain uncomfortable air which they all possess, would be entitled to a foremost place. C. Wright (151) sends a number of portraits with very spotty backgrounds. The general treatment of these photographs appears to indicate that Mr. Wright has great artistic ability; but why should he mar the effect of good work by careless manipulation? A very characteristic group of "Young Toole" and "Old Paul" is exhibited by Mr. C. T. Newcombe (171). He also sends some excellent *cartes de visite*. T. H. Hunnah, 182, 183, 201, 202, 415-422. These are the best plain portraits in the exhibition. To say at once that everything in them is good, is the best criticism to give them. In general treatment, in position, in lighting, in printing even in mounting and framing, they are worthy of the imitation of every photographer. Joubert exhibits some charming little *cartes de visite*, the effect of which is entirely marred by the slovenly way in which they are mounted in a very shabby frame.

"There are several enlarged portraits exhibited by A. Claudet, but they cannot be called anything more than successful attempts. Enlarged photographs are, in our opinion, a great mistake. It is not the province of photography to supersede the crayon or the life-size canvas. There are many other portraits that we cannot notice from want of space. Our readers must not therefore suppose that silence is necessarily indicative of censure.

"The coloured portraits are numerous, and for the most part good. Foremost in excellence are those of Messrs. Lock and Whitfield. These gentlemen certainly have succeeded in collecting together, in one frame, an amount of female and infantine beauty rarely seen. Having such models to work upon, and being, as they undoubtebly are, our best photographic colourists, the result could not be otherwise than super-excellent. Next come the very beautiful propuctions of Mr. Williams, 821-829, which consist principally of vignetted heads, charmingly coloured in oil. The rest of the display is made up by Messrs. Claudet, Heath and Beau, Kilburn, and Mayer Brothers, whose productions are well known to the public. There is a large coloured group of officers, which has received a place to which it is certainly not entitled. It is a large group of military men, made up from a number of negatives, taken at differeut times and under different conditions of light. The colouring is very bad, and the officers appear to have no connection with each other; in fact it reminds one strongly of the well-known plates in 'Le Follet,' and other books of tailoring art. There are several frames of guarantors' portraits, about which the less that is said the better. M. Claudet contributes a stand of daguerreotype stereoscopic portraits, which come back to one like a dream of ancient days."

Some other extracts from the daily press, and comments thereon, are compelled to stand over to our next.

## DECOMPOSITION IN COLLODION.

BY M. AUG. TESTELIN.*

We have often remarked that crystallizations of a peculiar kind are produced in collodion whenever we introduce into it slips of metal, the rough surfaces of which present salient angles and asperities, upon which these crystals, of an

* Continued from p. 306.

elongated prismatic form, preferably deposit themselves, and finally completely cover them.

We believe that this body is an isomeric modification of aldehyde, known under the name of metaldehyde. For the analogy of the characteristics we have remarked completely confirm this opinion. Thus, the formation of the crystals of metaldehyde is greatly favoured by the asperities of metallic fragments, such as zinc and iron turnings, and heat volatilizes without melting them. But a very remarkable phenomenon, which we have not always succeeded in reproducing, and which shows the identity of these two bodies is, that the vapour arising from the volatization of the crystals which gather together in the air, condense under the form of light, snowy, flakes.

In winter, we sometimes remark, when these collodions are exposed to very severe cold, that there is formed in the centre of the liquid long and thin transparent needles, resembling frozen water. We have found it impossible to isolate this substance from the collodion, as it appears to melt as soon as the liquid is disturbed; and if we happen to succeed in isolating it, it disappears by evaporating immediately it comes into contact with the air. This substance must be elaldehyde, another modification of aldehyde, which is found whenever there is an oxygenation of ethereal substances.

The formation of similar prismatic needles had been previously observed in old collodions, but they were regarded as being nitrate of potassa, produced at the expense of the nitric acid, attributed to the decomposition of the pyroxyline. This mode of regarding it does not explain the properties of the body in question. Besides, we have remarked these crystallizations in collodions which contained no iodide of potassium. Those of iodide of ammonium, zinc, cadmium, iron, and others of organic bases, produce just the same phenomenon.

We conclude by remarking, that it is an error to introduce any metal whatever into collodion, with the view of rendering it colourless, and making it keep longer. In this case, the reactions are hidden from the eye, but they take place just the same, and even more rapidly, as we have already stated.

Besides, it is from want of experience that we believe it so absolutely necessary to have the collodion colourless, in order for the photographic operations to proceed successfully, especially when we make of it a generality which must be extended to all modes of working. In most cases it is, in fact, advantageous that the collodion be not too much coloured by iodine, when the development of the picture is effected by means of a weak reducing agent, such as gallic or pyrogallic acid; but, on the other hand, there is an inconvenience—an obstacle even, when the development is effected by sulphate of iron, a case in which the best specimens are those obtained with a collodion reddened by the addition of a considerable portion of iodide, and a weak and acid sensitizing bath.

There is a very material difference between a collodion reddened by decomposition, and another reddened by the addition of free iodine. In the latter case it loses none of its sensibility when its normal state is that of slowly becoming colourless. Then, whatever be the quantity of iodine added within the limits of $\frac{1}{1000}$ to $\frac{2}{1000}$, it always tends to become colourless when sheltered from the influence of light.

We often make use of collodions to which we add a very strong dose of free iodine, and still obtain as much sensibility as when these products are neutral; but it is then necessary to employ weak and acid nitrate of silver baths, prepared with commercial nitrate of silver, crystallized; while with a neutral and concentrated bath, the obtaining of an animated subject will be impossible, however long the exposure may be prolonged.

Iodine added to collodion does not diminish its sensibility when the silver bath is prepared in accordance with it, but with a neutral or alkaline bath the impression will be extremely slow. The same thing takes place when the collodion is neutral, and the silver bath possesses an acid reaction. But when we employ iodine in the collodion, and the sensitizing bath is feeble, and contain a quantity of free nitric acid, in equivalent proportion to the acid disengaged from the article by the free iodine, we then obtain the maximum of sensibility, with weak and acid products, which offers undoubted advantages.

Free iodine in collodion produces not only nitric acid by its contact with nitrate of silver, but it must be remembered that the alcohol and ether, which also moisten the film at the time of its immersion, tend to complicate the phenomenon by giving rise to nitrous or nitric ether, which the iodine decomposes by oxydizing at the expense of the oxygen of the nitric acid, a part of which is thus transformed into aldehyde and aldehydic acid, ether properly so called, which was united to the compounds of nitrogen.

The elements resulting from this reaction, and which are principally nitrous ether, iodous acid, and hyperiodic acid, act in their turn upon the silver of the nitrate, with which they form special salts, the presence of which very probably modifies the sensibility of the collodion film, to the degree of communicating to it the precious qualities it possesses when there exists in the collodion a quantity of iodine limited to the circumstances.

For collodions reddened by iodine we must employ acid baths; but in place of adding nitric acid to the solution, or of preparing the latter with crystallized nitrate, as is generally done, we infinitely prefer to employ pure fused nitrate of silver, to which, after it is dissolved in water, a certain quantity of alcoholic solution of iodine. To this end we add the iodine solution drop by drop, until the precipitate of iodide remains palpably in excess. The sensitizing bath is in this manner saturated with iodide of silver, at the same time there occurs a formation of special products of a strong and penetrating odour, the presence of which is extremely favourable to the luminous impression.

Among these products we have identified particularly the presence of iodic and hyperiodic acids, which greatly participate in the properties of chloric and hyperchloric acid, and exercise upon the collodion film an action analogous to that of the hyperchlorite of lime upon positive proofs when it is introduced into the toning bath: that is, these acids keep the collodion film clear and clean, without diminishing the sensibility; on the contrary, they seem to augment it considerably, either because of the dilatation they produce in the organic film (pyroxyline), or on account of the salts which these acids form with the silver of the nitrate bath.

*(To be continued.)*

## STUDY OF THE WET COLLODION PROCESS.

BY E. REYNAUD.

Examination of the Principal Chemical Products Employed in this Process—Researches into the various Accidents which Occur in Practice, and upon the Means Employed to Prevent them.

The wet collodion process is, undoubtedly, the most extensively employed in photography, on account of the many advantages it possesses over most other processes. Still, however, it is not free from defects, and a very brief experience with it is sufficient to convince us that, although it has undoubted advantages, especially as regards rapidity, it is also, like them, liable to many causes of failure.

To study these causes, and to overcome them, has appeared to me a profitable task; and it is in this hope that I have collected and classified the instructions which have furnished me with the method I now practise.

This task will, then, form a methodical and classified picture of the numerous failures which frequently occur to the operator, especially when he first begins the practice of this process, and has not acquired sufficient experience to be able to recognize immediately, by habit, the disturbing causes to which he must attribute the accidents that occur.

Before commencing this vast study, it appears to me necessary to indicate briefly the simplest means, by the aid of which the operator may satisfy himself of the purity of the materials he employs. No one can be ignorant that this purity is an indispensable condition of success, and that most of the failures and imperfect results are due solely to the employment of adulterated or impure chemicals.

This is particularly the case with the products employed in the preparation of collodion, and the sensitizing bath, to which the presence of foreign bodies, even in minute proportions, is injurious.

Among these products the pyroxyline, or gun-cotton, as it is improperly called, as regards the quality of the collodion, has most influence on the results, I therefore begin with the examination of this substance.

A powdery cotton, too much acted upon by the acid and salt employed in its fabrication, gives a brittle non-tenacious film, which offers but a poor resistance to the action of the liquids with which it is covered, and yields only mediocre pictures. We cannot, by simple inspection, judge if such a cotton will give an unsatisfactory result or not; therefore, to satisfy ourselves on this point, we must dissolve a small quantity in a mixture of alcohol and ether, in suitable proportions. For example, 1 drachm of cotton in 20 of alcohol and 40 of ether; and, after allowing it to stand a sufficient time for the undissolved fibres to subside, cover a small piece of glass with it, allow it to set, and then, with the finger, break up the film: the aspect of the fracture will enable us to ascertain the quality of the cotton; if this fracture shows a film without cohesion, if the part separated does not adhere to the glass, the cotton is of bad quality; if, on the contrary, the rupture takes place with difficulty, and if the part separated adheres strongly to the glass, if the film presents the aspect of thin parchment, then the cotton combines all the indispensable physical qualities.

To satisfy ourselves that this substance fulfils all the conditions necessary in the preparation of a good collodion, it only remains to discover if the cotton has been sufficiently washed to remove all traces of the acids employed in its fabrication, The simplest means to this end consist in putting a sample of the cotton to be tested in a bottle with a given quantity of water, shaking it well, and then by means of a piece of litmus paper, testing the water for acidity.

Commercial rectified ether is generally sufficiently pure for photographic purposes. It almost always contains a little alcohol, which however, cannot naturally disturb the photogenic properties of the collodion. The presence of an acid, on the contrary, is a very serions defect, and will produce the most mischievous results. The proportion of water contained in the ether has also to be taken into consideration.

The most suitable density is that which corresponds to 62° of Cartier's areometer.

It is also necessary to examine the nitrate of silver employed in the sensitizing bath, as its good quality is indipsensable to success in this process.

An excellent method of ascertaining whether the nitrate of silver contains foreign salts, consists in precipitating its aqueous solution by means cf hydrochloric acid, (carefully avoiding leaving an excess of acid or of silver salt in the liquid), filtering and evaporating the solution, which should leave no residue.

If the liquid leaves a residue it will be easy to recognise its nature, and determine its weight, and obtain the exact composition of the nitrate tested.

A simpler method in most cases, consists in dissolving in 60 grains of distilled water, 12¾ grains of the nitrate to be tested, and then adding, drop by drop, an aqueous solution of chloride of sodium (pure), containing 18 grains of salt to 100 grains of distilled water. By briskly agitating the liquor after the addition of each drop of the salt solution, it is easy to determine the exact moment when the precipitate of chloride of silver causes to be produced, and noting the volume of salt solution which has been employed, we may deduce the quantity of nitrate of silver really contained in the nitrate tested.

To this end, it suffices to take note that the proportions of nitrate of silver, and of chloride of sodium, indicated above, are equivalents, and that, consequently, if the nitrate of silver be pure, the 20 grains of its solution will require 20 grains of the salt solution to be exactly decomposed. If, therefore, instead of employing 20 grains of this solution, we take only 15 grains, this shows that the nitrate contains 15 parts of pure nitrate of silver, in 20, or 75 per 100.

Sometimes the nitrate of silver may contain a little acid and water without any detriment to photographic success; to test for these it is necessary to dry the nitrate completely.

I do not speak in this place of the other substances employed in photography with collodion. Distilled water is readily procured pure, but it must be kept securely corked, to prevent access of dust and atmospheric impurities. Sulphate of iron is also easy to obtain pure; and the purity of the other articles employed has no sensible influence upon the result.*

I shall here conclude this preliminary, and proceed to the study of the causes of the accidents most frequently encountered by the inexperienced operator, and analyse each of them in succession, concisely, and determine, as fully as possible, their causes, and the means of avoiding them.

*(To be continued.)*

## FORMULÆ FOR COLLODION.

BY M. DISDERI.

Extreme sensitiveness in collodion is an indispensable quality for a good representation of living objects, but is not of itself sufficient for the perfect execution of a portrait, which requires that the artist have time to pose his model, arrange the drapery, and modify the effect: he will lose all the benefit of the rapidity of the luminous impression if the sensitive film dries too quickly. With the collodions whose composition I give, this result need not be feared: they remain humid a long time after being removed from the silver bath. In winter, the film retains all its sensitiveness for nearly an hour; and, during the hottest summer weather for twenty minutes at least.

### For Winter Operations.

*1st Formula.*

| | |
|---|---|
| Alcohol of 42° ... ... ... | 400 |
| Ether of 62° ... ... ... ... | 600 |
| Pyroxyline ... ... ... ... | 11 |
| Iodide of ammonium . ... ... | 6 |
| Iodide of cadmium ... ... ... | 4 |
| Bromide of ammonium ... ... | 0·6 |
| Bromide of cadmium . ... ... | 0·4 |
| Iodine ... ... ... ... ... | 0·5 |

*2nd Formula.*

| | |
|---|---|
| Alcohol 42° ... ... ... ... | 400 |
| Ether 62° ... ... ... ... | 600 |
| Pyroxyline ... ... ... ... | 11 |
| Iodide of ammonium . ... ... | 5 |
| Iodide of potassium ... ... ... | 5 |
| Bromide of ammonium ... ... | 1 |
| Bromide of potasium . ... ... | 1 |
| Iodine ... ... ... ... | 0·5 |

Dissolve the iodide and bromide of potassium in a few drops of distilled water, to facilitate their solution: if too much water were added it would produce striæ in the film: and on this account we must reject weak alcohol.

These two collodions are very sensitive, and give vigourous pictures. We must not expect extreme delicacy from them.

The silver bath must be of the strength of 10 per cent.

* The acetic acid must, however, be weighed, in order to ascertain if it be of the requisite density.

*3rd Formula.*

| | |
|---|---|
| Alcohol at 42° ... ... ... | 400 |
| Ether at 62° ... ... ... ... | 600 |
| Pyroxyline ... ... ... ... | 10 |
| Iodide of ammonium . ... ... | 6 |
| Iodide of cadmium ... ... ... | 4 |
| Bromide of ammonium ... ... | 1·5 |
| Bromide of cadmium . ... ... | 1·5 |
| Iodine ... ... ... ... | 0·5 |

The results obtained with this collodion are extremely delicate.

In the above three formulæ for collodion, the proportion of bromides and iodides differ. The first formula must be employed with a good light; it will not fog: the second with a medium light: the third may be employed when the light is weak. This collodion is strong in bromides, and well adapted for giving all the details of a feebly illuminated model. It fogs if the light be too strong.

For Spring Operations. At a Medium Temperature.

*1st Formula.*

| | |
|---|---|
| Alcohol at 42° . ... ... ... | 500 |
| Ether at 62° . ... ... ... | 500 |
| Pyroxyline ... ... ... ... | 10 |
| Iodide of ammonium . ... ... | 5 |
| Iodide of cadmium . ... ... | 5 |
| Bromide of ammonium ... ... | 1 |
| Bromide of cadmium . ... ... | 1 |
| Iodine ... ... ... ... .. | 0·5 |

*2nd Formula.*

| | |
|---|---|
| Alcohol at 42° . ... ... ... | 500 |
| Ether at 62° ... ... ... | 500 |
| Pyroxyline . ... ... ... | 10 |
| Iodide of ammonium . ... ... | 5 |
| Iodide of potassium ... ... ... | 5 |
| Bromide of ammonium ... ... | 0·5 |
| Bromide of potassium . ... ... | 0·5 |
| Iodine . ... ... ... ... | 0·5 |

The silver bath must be of the strength of 8 per cent. This collodion will suit a strong light

For Summer Operation. At High Temperature.

| | |
|---|---|
| Alcohol at 52° . ... ... ... | 400 |
| Ether at 62° . ... ... ... | 600 |
| Pyroxyline . ... ... ... | 8 |
| Iodide of ammonium ... ... ... | 5 |
| Iodide of cadmium ... ... ... | 3 |
| Bromide of ammonium ... ... | 0·5 |
| Bromide of cadmium ... ... ... | 0·2 |
| Iodine ... ... ... ... ... | 0·3 |

The silver bath must be 7 per cent. During very hot weather the silver bath must be 6 per cent.

This collodion gives very fine pictures: it may be used with a strong light

The Silver Bath.

*Composition of the Silver Bath according to the Season and the Temperature.—In Winter.*

| | |
|---|---|
| Water ... ... ... ... ... | 100 |
| Nitrate of silver ... ... ... | 10 |

*In Spring and Autumn.*

| | |
|---|---|
| Water ... ... ... ... ... | 100 |
| Nitrate of silver ... ... ... | 8 |

Developing Solution.

| | |
|---|---|
| Water ... ... ... ... ... | 1000 |
| Sulphate of iron ... ... ... | 40 |
| Acetic acid ... ... ... ... | 40 |

Strengthening Solution.

| | |
|---|---|
| Water ... ... ... ... | 100 |
| Nitrate of silver ... ... ... | 3 |
| Acetic acid ... ... ... ... | 3 |

*Another Formula.*

| | |
|---|---|
| Distilled water ... ... ... | 500 |
| Pyrogallic acid ... ... ... | 4 |
| Acetic acid ... ... ... ... | 40 |

For strengthening. The same solution as above.

Fixing.

| | |
|---|---|
| Water ... ... ... ... ... | 500 |
| Hyposulphite of soda... ... ... | 50 |

When the negatives have been exposed too long, and have a grey, feeble, and foggy aspect, they may be strengthened, after fixing, with the following solution:—

| | |
|---|---|
| Water ... ... ... ... ... | 1000 |
| Bichloride of mercury ... ... | 3 |
| Hydrochloric acid ... ... ... | 6 |
| Chloride of gold ... ... ... | 1 |

Varnish.

| | |
|---|---|
| Benzine... ... ... ... ... | 100 |
| White picture varnish . ... ... | 15 |

Another Varnish.

| | |
|---|---|
| Benzine ... ... ... ... | 100 |
| Copal ... ... ... ... ... | 7 |

## PHOTOGRAPHY FOR TRAVELLERS AND TOURISTS.

BY PROFESSOR POLE, F.R.S.*

It is the natural wish of most persons who visit a new locality to bring back pictorial representations of the scenery; and this want is usually met in one of two ways—either by published views or by sketching. In well-frequented places, published views are generally to be had, and command a large sale; and the accuracy of these publications has of late been much increased, and their circulation much promoted, by the more general introduction of landscape photography, and the great increase of its professional practitioners.

But the facility of obtaining views in this way is not without its drawbacks. In the case of engravings, both the accuracy and artistic merit may be anything but satisfactory; ordinary photographs, though they must be tolerably true, may not represent the particular objects, or show them in the particular way the purchaser may desire; and it need hardly be said that there are vast numbers of localities visited by both travellers and tourists, particularly the former, where neither engravings nor photographs are to be found, and of which it is, for that very reason, most peculiarly desirable to get accurate views. To meet these difficulties, the only resource has usually been hand-sketching. Now, the power to sketch well is undeniably one of the greatest advantages that a traveller can possess; but, unfortunately, though drawing is now one of our stock school accomplishments, only a small minority of those who travel are able to transfer efficiently to paper what they see; and even in favourable cases, though clever and artistic pictures may be produced, the faithfulness of the representations must always be more or less uncertain.

Doubtless, the idea must often have occurred to almost every traveller, what an advantage it would be if he could himself take photographs, where he likes, of what he likes, when he likes, and how he likes. But such an idea must soon have been dismissed, from the supposed incompatibility of this with ordinary travelling arrangements. The usual notions of photographic operations comprehends a fearful array of dark rooms, huge instruments, chemical paraphernalia, water, and mess, which no sane person, out of the professional photographic guild, would think of burdening himself with, on an ordinary journey, and which only a practised adept could use if he had them; and so the idea of a traveller taking views for himself on his tour is generally dismissed at once as an impracticable chimera.

Now, it is the object of this article to show that such a view of the matter is a delusion, and that any traveller or tourist, gentleman or lady, may, by about a quarter of an hour's learning, and with an amount of apparatus that would go into the gentleman's coat pocket, or the lady's reticule, put himself or herself into the desirable position we have named.

* From *Macmillan's Magazine.*

It is not our intention to write a treatise on photography; but we must state generally what the operations are, in order to make our explanations intelligible.

The process, then, of taking a photographic picture consists essentially of three main divisions, namely—1. Preparing the plate; 2. Taking the picture; and 3. Developing the image; and the most common and best known arrangement of these is as follows:—A glass plate of the proper size is coated with collodion, and made sensitive to light by dipping in a bath of a certain solution. It is then, *while it remains moist*, placed in the camera obscura, and exposed to the image formed by the lens; after which, *but still before the plate has had time to dry*, it is taken out, and treated with certain chemicals which have the property of developing the image so obtained. The plate is then what is called a "negative;" from which, after it has been secured by varnish, any number of impressions, or "prints," may be taken at any time.

Now, it will be seen, by the words we have printed in italics, that, according to this method of operation, the whole of the three parts of the process must be performed within a very short space of time; and, since the first and third require to be done in a place to which daylight cannot enter, a dark room, supplied with a somewhat extensive assortment of chemical apparatus, must be provided *close to the place* where the picture is taken. This method, from the necessity of the plate remaining moist, is called the *wet* process. It is always employed for portraits, and has the advantage not only of great beauty of finish, but of extreme sensitiveness, requiring only a few seconds' exposure in the camera.

The wet process was the first, and we believe, for some time, the only collodion process in use. But, in a happy moment, it occurred to somebody to inquire whether it was really indispensable that the plates should be kept *moist* during the whole operation, and it was found that, by certain modifications of the process of preparing them, they might be allowed to *dry*, and that some time might elapse between the preparation and the exposure, as well as between this and the development. The immense advantage this promised to landscape photography led to extensive investigation; and several processes have now been perfected which will secure this result. Plates may be prepared at any convenient time and place, and may be carried about for months, ready for use at a moment's notice; and, after the picture has been taken, they may also be kept some time before development. The only price we pay for this advantage is the necessity for a little longer exposure in the camera; which, for landscapes, is of no moment at all.

The bearing of this discovery on our more immediate subject will be at once apparent, as it gets rid of the necessity of providing, on the journey, for the preparation and development, with all their cumbersome and troublesome apparatus, and limits what is necessary to the simple exposure, or taking of the picture. And another advantage of still more importance follows from this—namely, that the plates may be prepared and developed, not only in another place, but by another person. The knowledge, care, and skill required for photography, as well as the stains and all other disagreeables attending it, refer almost exclusively to the preparation and development; the exposure to take the view is an operation of the simplest kind, which anybody may learn in a few minutes, and which is attended with no trouble or inconvenience whatever.

Limiting, therefore, the traveller's operation to the taking of the picture, let us consider what this involves. The first question which affects materially the portability of the necessary apparatus, is the *size* of picture to be taken. We are accustomed to see very large and beautiful photographs of scenery and architecture; but these would be impracticable for the traveller, as the dimensions of the plate increase so materially every portion of the apparatus. Differences of opinion and of taste may exist as to the degree of inconvenience it is worth while putting up with; but the writer of this paper, after considerable experience, has come to the conclusion, that the smallest size in ordinary use—namely, the *stereoscopic* plate—is by far the most eligible one for travelling. The object is not to make large and valuable artistic pictures—that we must always leave to the professional man—but it is simply to preserve faithful representations; and this may be done as well on the small as on the large scale, and with infinitely less trouble. For, though the size is small, the delicacy of detail procurable with well-prepared plates, even in a large extent of view, is something marvellous, as may be easily seen in some of the magnificent stereoscopic views that are to be had in the shops; besides which the stereoscopic effect gives an air of reality to the view, which greatly enhances the value of the representation.

The camera for taking stereoscopic views has now been reduced, by ingenious contrivances, to a very portable size. The one used by the writer is nine inches long, five and a half inches wide, and three inches high—about the dimensions of a good-sized octavo book. It weighs a little over two pounds, and hangs by a strap round the neck in walking with no inconvenience. The stand folds up into a straight stick, which is carried easily in the hand. A stock of eight plates, in slides ready for use (sufficient generally for a day's operations), go into two folding pocket cases. The tourist can thus walk about without the slightest sense of incumbrance, and is prepared, at any moment, to take a perfect stereoscopic view of anything he sees—an operation which will occupy him from five to fifteen minutes, according to the light, and the time he may take to choose his position.

Considered as adding to the baggage of the traveller, these things are hardly worth mentioning—as, with the exception of the stand (which travels well in company with an umbrella), they will all lie snugly in a spare corner of a portmanteau. Of course, however, a stock of plates must be added. A dozen of these, with appropriate packing, will occupy about eight inches long, four inches wide, and one and a half inch high; and from this the space occupied by any number it is proposed to take on the journey may be easily estimated. Suppose there are five dozen—a pretty fair allowance—these, with camera and all complete, will go into a very portable hand-box, or into one of the small black leather bags now so common.

If the operator chooses to go to a little extra trouble, it is highly satisfactory to be able to *develop* the plates on the journey—which may conveniently be done in the evenings, at a hotel or lodging; and the apparatus for which adds very slightly to the bulk of the preparations. A small case of bottles, five inches square and two and a half inches thick, together with one or two small loose articles, are all the author takes with him. The development of a plate takes five or ten minutes, and is a process easily learnt; and the satisfaction of being able to see, the same evening, what one has been doing in the day, is quite inducement enough to do it. But still, we repeat, this is not *necessary*, as the development may be left to another person and to another time.

We think we have shown how every traveller or tourist may be his own photographer, with much less trouble and difficulty than is generally supposed; and we may add that this is no untried plan. The writer of this article has been much in the habit of travelling; and, for years past, when he has gone on a journey, the little camera has been put into the portmanteau, as unassumingly and as regularly as the dressing-case. It has travelled in all sorts of countries, and has cast its eye on scenes which camera never looked at before; it has been a never-failing source of interesting occupation and amusement, and has recorded its travels in hundreds of interesting views, some of much excellence, and very few otherwise than successful.

But it may be asked, Since the advantage and usefulness of this plan are so undeniable, how is it that we do not see it in more frequent use? Simply for the reason that the dealers in photographic apparatus have never yet had the enterprise to establish a manufacture and sale of dry prepared plates, in such a way as to insure their popularity.

The manufacture and sale of photographic apparatus and chemicals is now becoming a very large branch of commerce; but many of the large numbers of tradesmen who prosecute it appear to have a much more earnest view towards the profits of the business than to the advancement of the art—for, since the death of poor Mr. Archer (to whom we owe almost entirely the present state of photography, and who lost a fortune in its improvement), nearly every advance made has been by private individuals. We must not be misunderstood. There are many people who profess to sell dry plates, and these may often be found to possess many of the requisites they should have; but few can be depended on, and *none* combine all the qualities which are necessary to give the system the full benefit of its inestimable value. Some will not keep long enough before exposure; some that will not keep at all after exposure; some fail in sensitiveness; some spoil soon after they are opened; to say nothing of the constant liability to stains, irregularities, blisters, and all sorts of troublesome and annoying defects, which not only spoil the operator's work, but—what is of more importance—destroy all reliance on his operations, and so discourage him from undertaking them. We are not sure whether some dealers may not be obtuse enough even to encourage defects, from the short-sighted notion of increasing the sale; but this we can say—that we know no maker who will guarantee the sincerity of his wish to make good plates, by consenting to allow for them if they turn out bad ones. If this state of things arose from imperfection in the art, we should not grumble, but could only urge improvement; but this is not so. It is well known that dry plates *can* be made, satisfying all the conditions we have named, and which, with care and system in the manufacture, might be rendered thoroughly trustworthy. It is only the indolence or obstinacy of the trade that prevents their becoming regular articles of commerce.

We do not wish, however, to discourage the traveller who may wish to adopt this admirable aid to his wanderings; for the object to be gained is so important that it is worth striving a little for. In the present state of the matter, he must either learn to prepare his own plates—which, after all, is no great exertion—or, if he buys them, he must at least learn to *develop* them, and must, at the same time, lay in with them a certain stock of patience and temper to meet disappointment; and we can assure him that, even at this price, he will find himself amply repaid. But we again urge that the case ought not to stand thus. The application of the dry processes to portable photography offers a boon almost inestimable to, but yet quite unappreciated by, the traveller and the tourist; and it only needs the zealous and earnest co-operation of the dealer, by so conducting the manufacture as to render it perfect and trustworthy, to raise this application into a branch of commerce of an extent, importance, and profit, little inferior to any in the trade.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris*, *9th July*, 1862.

Some important additions to our photographic literature demand a passing notice. Photographic treatises and manuals are superabundant, so much so that it might reasonable be supposed there was little left, that is new, to be expected from them. But, fortunately, the field of photography is a wide one, and different authors occupy different portions of it, and, by pursuing a special branch of the art, an author is enabled to give us the fruit of his experience, which must unquestionably possess an interest and value as such. One lends all his faculties to perfecting the waxed-paper process. To another collodion, wet, dry, or preserved, is the *summum bonum* of photographic bliss; while to another, photographic perfectibility seems to lie in carbon printing.

I shall begin with M. Disderi, to whom photographers are under so many weighty obligations for his efforts in popularizing the *carte de visite* portraits. M. Disderi made them fashionable, and, consequently, universal, setting in motion various branches of industry, the extent of which is incalculable, and whose limits are immeasurable.

The *Art de la Photographie, par M. Disderi*, is a splendid volume of 400 pages, printed on vellum paper, suitably illustrated, and professes to be a complete treatise on the collodion process. Every one who has seen the excellent pictures taken by M. Disderi must have felt some curiosity to know his method of producing them. This volume is intended to gratify that curiosity, and dull indeed must that photographer be who, after carefully studying these pages, should fail to become an adept in the art. At this date, there can be few secrets in photography, although "dodges" may still find favour among those who work by the rule of thumb; but without intelligence, tact, and practical knowledge, the would-be photographer must be like a ship adrift on the wide ocean, without rudder or compass. M. Disderi promises to initiate his readers in all the manipulations of his art, and ensure success to those who follow him, step by step, in the operations he describes.

The book is divided into three sections:—1st. A general introduction and description of the "materiel" of art. 2nd. The collodion process, and positive printing; the 3rd bears the title of *Photographic Esthetics;* this is a new chapter in photography, in which the author acknowledges his obligations to M. Lafon de Carmasac, the inventor of photography on enamel, from whom he has derived esthetic principles specially applied to photography, the extent and precision of which have had a remarkable effect in extending and improving the domain of photographic art.

There is also a chapter on enlarged portraits, to which M. Disderi has devoted his talent; in this he urges the immense aid carbon printing affords to photography. To what perfection carbon printing has been brought, you are doubtless fully informed from inspection of the specimens sent by our most competent artists to the International Exhibition.

This book does M. Disderi great credit. The style is clear and concise without being dry; it is easy to recognise that it proceeds from the pen of a *master* in the art. Especially valuable are the hints as to the causes of failure, and the most rational means of avoiding them, and no less so are the suggestions for varying formulæ, according to the season of the year.

In an *Introduction* to the volume, M. Lafon de Camarsac has given a very clever summary of the present state of the photographic art, from which the reader may gather conclusions as to the *future* of photography. It needs no ghost to tell us that this future must be in the direction of carbon printing.

The reader who searches the pages of this volume for new formulæ, will be disappointed. The author has shown a wise discretion in not multiplying these barriers to success. We have too may recipes already, and our policy should be to prune, not to multiply them. The author gives the formulæ he has found most satisfactory in practice, and such as he daily employs himself.

M. Poitevin has published a "Treaties on Photographic Printing without Salts of Silver." It contains the history, theory, and practice of the methods and processes of carbon printing, of helioplastics, of photolithography, photochemical engraving, &c. In view of the valuable, and highly successful labours of M. Poitevin in these branches of photographic art, his volume is as interesting an one as we have yet perused. There is, however, one chapter which it would have been gratifying to have met in it, and that is—*The Photozincography* of Colonel James, which, from the specimens lately submitted to my inspection, I am led to conclude is one of the most valuable and important applications of the photographic art, yet M. Poitevin's volume has an Introduction, from the able pen of M. Ernest Lacan, one of the editors of *La Moniteur de la Photographie.* The volume is illustrated with specimens of the various processes described.

M. A. Belloc has also published a volume of 420 pages, entitled *Photographie Rationelle; Traité Complet Theorique et Pratique Applicationes diverses.* Some four years ago M. Belloc published his *Compendium* of the four branches of photography. Since that date, one of the four, the Daguerreotype, has completely disappeared from practice; nevertheless, M. Belloc's volume will always retain a certain amount of interest, seeing that it was clearly written and skilfully arranged. The present volume is no less creditable to its author, and deserves a place in every photographer's library.

The attention "enlarged portraits" command at the present time, and the difficulties that beset their production, so far as optical arrangements are concerned, render M. Chevallier's treatise "On Amplification" very acceptable, seeing that it is the production of an accomplished optician, who endeavours to place the matter on a satisfactory basis.

Major Russell's Treatise on the "Tannin Process" has been translated by M. Gerard, Secretary to our Photographic Society, a very convincing testimony of the estimation in which the process is held.

A short time ago there appeared in Germany a "Manual of Practical Photography," from the pen of L. S. Kleffel, which, from its details of the process of instantaneous photography, met with a good reception. Its popularity on the other side of the Rhine has led to the publication of a French translation, which promises to be no less popular than its original.

One more, and I have done. M. Ch. Bride, has published a volume entitled, *L'Amateur Photographe*. It is a summary account of all the leading elements of the photographic art, and if it fails to satisfy all enquiries, it will, at least, be found useful as an indicator of what the amateur may turn his attention to.

## Talk in the Studio.

The Oldest Existing Photographs.—At a recent dinner of "The Photographic Club," we had an opportunity of examining one of the most interesting mementoes of early photographic investigation and experiment. It consisted of a heliograph, in the possession of Mr. Joseph Ellis, of Brighton, whose name will be familiar to old photographers. Mr. Ellis gave some interesting details of the history of the picture, and of his possession of it. M. Nicéphore Niepce, it may be remembered, had obtained permanent photographic pictures many years before the publication of Daguerre's discovery, and in the year 1827 visited this country, in the vain hope of being able to obtain the attention of the Royal Society. It appeared that he resided at Kew, and the picture in question had been given by him to his landlord at that time, in whose hand an inscription at the back is found to the following effect:—"This prototype [probably error for phototype] was presented to me at Kew, in the year 1827, by M. N. Niepce, the discoverer of the art.—B. Cussell." Mr. Ellis had seen it in Mr. Cussell's possession some years ago, and desired to obtain it. Mr. Cussell refused, however, to part with it, regarding it with almost superstitious regard and reverence. For the time, Mr. Ellis had to waive his desire, resolving, however, to keep his eye upon it. He recently learnt that the owner had died, and found, on enquiry, that his effects had been sold by auction. A little search discovered this picture in the hands of a broker, whose chief idea of its value was based on the notion that it was executed on silver. The back had been scratched to test it, and it is to the fact that the metal used was pewter and not one of the noble metals, that this interesting memento, probably one of the earliest sun pictures in existence, was saved from the melting pot. Mr. Ellis purchased the picture, and preserves it with the care naturally pertaining to a picture possessing such historic value. It is a copy of an engraving produced in the camera by the action of light on a film of bitumen, on a pewter tablet. The size was about the ordinary half-plate; the effect is in some respects similar to a Daguerreotype, the image being vigorous and well defined. We may here take occasion to refer the reader interested in the historic details of photography, which are somewhat scarce and scattered, to a couple of published lectures of Mr. Ellis, who, with considerable research, has carefully, and with much ability, traced the earliest known facts, evidently entering upon the task as a labour of love.

Mr. Bedford's Eastern Pictures.—We hope shortly to announce definitely the opening of an Exhibition of Mr. Francis Bedford's Eastern Photographs, most probably in the German Gallery. After upwards of four months of very rapid travelling by every mode of transit, he has arrived at home in excellent health and spirits, with something like two hundred good negatives, having met with no more serious casualty than the smashing of his camera by an Arab to whom it was entrusted to carry up a rock. The bulk of the negatives were by the wet process. A stock of Dr. Hill Norris's plates which were taken, gave excellent negatives during the earlier part of the journey; but some trying changes of temperature having rendered them doubtful, Mr. Bedford, not having time for experiment, confined himself in future to the wet process. The appliances for this, we are violating no confidence in stating, were a stock of Ponting's collodion, and a stock of Thomas's bromo-iodized, both of which were used with the pyrogallic acid development. The former was found very sensitive, but, owing to the very glaring light, solarized very readily. The use of the bromo-iodized collodion obviated this difficulty, and was found therefore most suitable for the work. Notwithstanding the great intensity of the light, a tolerably long exposure was generally necessary to bring out detail in the black shadows. The heat was found very trying, the plate not unfrequently being partially dry before it could be developed; the use of a weak pyro developer was found the best mode of meeting the difficulty. All the negatives were on 12 by 10 plates. The lenses used were a single Ross and a Grubb, both of which we understand did their work very well. His Royal Highness the Prince of Wales manifested a deep interest, we understand, in Mr. Bedford's success, making daily enquiry as to the result of operations, and making an occasional attempt at some of the manipulations. His brother, the Prince Alfred, we may here add, is an enthusiastic amateur, undertaking any department of the work himself, from cleaning the plates to focussing the negative. Messrs. Day and Sons, as we have before announced, will publish Mr. Bedford's pictures.

## To Correspondents.

Hypo.—The dark spots occurring in albumenized prints, is a trouble which most photographers of much experience have occasionally met with. The cause is somewhat uncertain, but there is little doubt it is in some way due to the albumenized paper. It most frequently occurs with old albumenized paper, and sometimes, we believe, with fresh, if the eggs were stale. From its appearance, and the circumstances under which it generally occurs, it is probably caused by some decomposition of the albumen, probably causing some sulphur compound to be formed by the contact with silver. The same cause may have produced the discolouration at the edge where the albumen is thick; or that might have been caused by the fingers not having been free from other chemicals while manipulating during printing. The latter cause, especially if the fingers have touched hypo, is a common cause of such stains. 2. The milky appearance immediately after pouring the developer on the plate, is doubtless due to the use of common water, containing chlorides, carbonates, &c.; and the silver on the plate being thus thrown down, of course robs and injures the image. 3. The proportion of hyposulphite of soda required for fixing prints, is not a constant quantity, and cannot be stated definitely; not only will it be affected by the quantity of chloride of silver formed in the paper in the first preparation, and by the presence or amount of free nitrate, but also by the character of the picture. A vignetted head, for instance, or a landscape with a large extent of white sky, will require more hypo than a print containing a large proportion of black objects, because in the latter case the bulk of the chloride of silver is reduced by light, whilst in the other case it is unaltered, and will require to be dissolved by hypo. Mr. Hardwich says, under ordinary circumstances, an ounce of hypo in six ounces of water should fix forty stereoscopic prints; but he recommends for safety that only half that quantity should be fixed in the solution, which should not be used again.

Tannin.—Negatives generally look a little denser before fixing than after, and in some cases they do actually lose something in the course of fixing, especially where organic matter enters into the composition of the image, as in gelatine plates, such as you describe. The best mode of meeting the difficulty is to develop a little further, and thus allow for the reduction: moreover, a thoroughly well developed plate is less liable to this reduction than one less developed. The hypo solution being weaker, or having a little acetic acid added, may also be tried. 2. Let the warm water remain longer on the film to soak a little; when thoroughly moistened, it will not dry so rapidly as to cause difficulty in covering with the developer.

N.—A light background screen, but not a perfectly white one, is best for vignette heads. The transparency and atmosphere which give relief to the head are lost, if there be no slight cloudy traces of background about the head, merging into the white beyond. A light drab or grey is the best colour to paint the background for such a purpose. Or, if the sitter be placed well in advance, and the screen well in the shade, unbleached calico answers admirably. 2. A sheet of iodized paper, and a film of iodized collodion are not quite analogous, the latter dessicating more completely, or being much less permeable to aqueous solutions after drying than a sheet of paper. Nevertheless, a film of collodion may, as you suggest, be used, with proper precautions. Some of the many preservative processes answer admirably where they have only to be kept a day or two; honey, or glycerine and honey, are good: but dust is the great drawback. But honey and tannin solution is just as easy to apply; the manipulation is very simple, and the results very good. 3. A double thickness of stout calico overhead, projecting a few feet in front of the sitter, will not be too much to protect the head from toplight, especially if there be any chance of direct sunlight.

Amateur.—You require a white reflecting screen to throw a little more light on the shadowed side of the face. The position is not bad; but the two or three sprays of foliage against the background are destructive of artistic, as they almost look as if they grew out of the head. A little longer exposure is necessary.

X. Y. Z.—There are no means of efficiently cementing the halves of a broken negative together. The best plan is, place them together on another plate of similar size, to which they may be attached by a little cement, or canada balsam at the corners, so as to keep them together. Then print in diffused light. A slight mark will probably show; but by adopting this method, the amount of evil will be reduced to a minimum.

A.—Practically the cement described will be very similar to marine glue, and that does not injure photographic solutions. We generally use it for making dippers.

New Subscriber.—There were no prints enclosed in your letter: our answer regarding them must be delayed until they arrive. 2. Albumenized paper prints are best for colouring in oil. Isinglass dissolved in gin or in water, with a little alcohol subsequently added, answers best for preparing the surface. We cannot tell you the exact proportions; for although we have always prepared prints for oil colouring in this way, we never weighed the proportions, but simply used our judgment. Take care not to make the solution too strong, and apply it two or three times, allowing the print to dry between each application. Then try one corner before commencing to paint. We have, however, used gelatine without trouble; you have probably used it too weak. 3. Nos. 188 and 192 contain articles on the honey and tannin process. The price of the Photographic News Almanac is one shilling. You omitted to send your name and address. If you forward these, together with the balance of stamps, the Almanac will be forwarded.

G. Price.—Mr. Alfred Harman, the new secretary, will supply your print if you call on him as you suggest.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 202.—July 18, 1862.

## AWARDS OF JURORS IN THE EXHIBITION.

The second great ceremony in connection with the International Exhibition is over. How processions were marshalled, how addresses were delivered, and bands played, how the grand pageant was performed in all its parts, it is unnecessary to describe here, as our readers are doubtless more interested in the important announcement that the awards are made and published. The record of medals and honourable mentions fills a bulky volume, sold by the Commissioners for five shillings, this being the cheapest rate at which successful exhibitors were apprized of their good fortune, and the unsuccessful that they had been overlooked, or were undeserving of recognition.

In another page we give the awards in Class XIV., with the reasons appended, as published in the official record. In the main we believe the decisions are tolerably just, and will give as much satisfaction as could be anticipated, under the circumstances. We have before stated that the constitution of juries was in many cases far from satisfactory, consisting as they in many cases notoriously did, of nominees of the Commissioners rather than of exhibitors. Nevertheless we believe the work is as well done as is customary on such occasions. That some injustice will be perpetrated there cannot be a doubt. Perhaps in examining the works of twenty-five thousand exhibitors, and awarding nearly seven thousand medals and five thousand three hundred honourable mentions, it would be impossible to escape some act of unfairness. That the jurors generally have been actuated by a desire to be liberal in their awards, is evidenced by the somewhat unusual fact that nearly one-half of the competitors in the race obtain some honour, that considerably more than one in four obtain the highest award, and more than one in five obtain the honourable mention. In the class devoted to photography, it is satisfactory to observe that the proportion of honours exceeds the general average. The total number of contributors in all parts of the world to this class, so far as we can ascertain, are slightly under four hundred, whilst the total number of awards is two hundred and thirty-two. It is somewhat singular, however, that on a further analysis we find that the number of medalists in this class is rather less than the average, the number being eighty-five, or rather more than one in five; the number of honourable mentions is one hundred and forty-seven, being a little more than one in three. On proceeding to ascertain the proportion of these honours carried off by British photographers, we are still less satisfied with the relation between medals and honourable mentions. The number of British contributors is about one hundred and sixty; whilst the number of medals is only twenty-six, or less than one in six: the honourable mentions are fifty-two, or nearly one in three. In France, where the contributors are about one hundred and twenty, the medalists are thirty-two, or over one in four, and the honourable mentions forty seven, or over one in three.

Now, as we are utterly unwilling to admit that the proportion of first-class merit in the British Photographic Department was less than elsewhere, we are driven to other unpleasant conclusions; we are not willing to charge the three French gentlemen, who were on the jury, with being less generous in their decisions regarding the works of British contributors, than they were to the productions of their own countrymen, still less are we disposed to admit some other reasons which might be suggested; but we are impelled to conclude that the wretched position assigned to British photography has affected the judgment of the jurors, as it must that of the public; that the crowded, irregular arrangement, and too often obscure and unreachable position of the contributions, has placed them at a disadvantage which has affected the decisions; that the damp too, which has destroyed their works, has also induced adverse opinions of their merits. That the last cause has, in some cases, been in operation, we have the best reason to believe, and pictures which were marked for medals, have on a further examination, when the damp walls had begun to do their fell work, been reduced to honourable mention merely. Thus the injury to British photography and British photographers done by the Commissioners, pursues them throughout the whole business.

But there is another point in connection with this subject which strikes our attention, and which the circumstance to which we have just referred does not serve to make explicable. We have no wish to cavil with the awards of the jurors. We know that, in the Photographic Department, they were the subject of much discussion and consideration, and that the jury divided again and again in arriving at some of their decisions. But we cannot overlook the singular fact that whilst in the British department there are no medals whatever for photographic apparatus, lenses excepted, there *are* medals for apparatus in the French department. It will scarcely be affirmed by any one that, in apparatus generally, and in cabinet work especially, the French contributions surpass those in the British department. We apprehend that a contrary verdict must be given even by the most prejudiced person. We find in the list of honourable mentions, such names as Ottewill, Hare, and Meagher, amongst manufacturers; and such as Murray and Heath, Horne and Thornthwaite, Bland and Co., McLean and Melhuish, Hockin and Wilson, Solomon, and others, amongst dealers and manufacturers. It may be that there was such uniformity of quality in the articles exhibited in apparatus, that whilst all were meritorious, none so far exceeded the rest as to deserve the distinction of a medal. If such were the case, we cannot see, since medals were sown broadcast in some directions, why they might not have been as liberally bestowed here. Medals for apparatus were given in the French department: with this we find no fault; but we do protest against the distinction implied, when it is notorious that in thorough excellence of apparatus generally, the English manufacturers are unsurpassed, we might say unequalled in the world. We find in one case a medal is given in the French department "for an arrangement for altering the focus of a lens!" This is to M. Derogy for his ingenious method of lengthening or shortening the focus of a portrait combination by the insertion of a supplemental lens. We find no fault with the award in itself, but it does give bitter point to the fact that all the clever invention, and all the excellent workmanship and material in the British department failed to secure more than an honourable mention. Another singular circumstance in connection with the awards for apparatus, is, that notwithstanding the excellence or superiority of their contributions, we do not find the names of such houses as Ross, Dallmeyer, Rouch, and others, referred to at all. It is true that medals have been awarded to the latter for pictures, and to the first and second for lenses, but we fancy that this will scarcely render entire silence on their apparatus generally, satisfactory.

Some of the omissions in the award for pictures are in no sense less singular. If anything deserved recognition in the distribution of honours, we apprehend that steady and successful perseverance in the path of photographic discovery, invention, and application to the arts, should claim a foremost place. M. Joubert, whose name is honourably familiar to photographers, in connection with his process of photographic enamelling on glass, and with his method of carbon printing, known as the phototype process, exhibits fine specimens of both these inventions, as well as some excellent portrait photographs; but his name is not referred to in the award at all, neither with a medal nor honourable mention! It may be suggested that the jurors have perhaps avoided honouring secret or patented processes; but this is not the fact, since numbers of such receive medals. We could point to many more omissions, and to many which receive honourable mention only, which, not our opinion only, but that of the photographic public generally, would place in the very highest position. The task would be, however, an invidious one, and we forbear. In other departments, we believe still more injustice has been done, and protest has been followed by a rectification upon the score, alleged, of misprint in the list of awards! It is possible that some in Class XIV. may be in that position, and may yet be set right.

We turn with pleasure from this part of the subject to glance at that in which we can cordially endorse the decision of the jurors. We notice that good instantaneous photography has in all cases obtained recognition. The London Stereoscopic Company a medal for Mr. England's beautiful instantaneous stereoscopic slides, those of Paris receiving especial mention; Mr. Wilson a medal for his charming pictures of clouds, waves, shipping, &c.; Mr. Breese, a medal for his exquisite transparencies; M. Warnod a medal for his large and unsurpassed cloud, water, and shipping scenes. Mr. Blanchard's instantaneous slides have obtained honourable mention: these we consider more worthy of a medal than some which have obtained it; but, as implying a distinction between the instantaneous productions of a younger experimentalist in this interesting branch of the art, and those of veterans in its practice, we do not complain of the award. We feel especial pleasure in Mr. Breese's medal, inasmuch as it endorses our strongly expressed conviction of the very great excellence of his pictures generally, when we first called public attention to them twelve months ago, and it also tacitly accepts as a fact the moonlight photography about which so much cavil has been made. We may mention here a statement by the superintendent of the department, that the enquiries made regarding these pictures by the public, are forty to one more numerous than about any others. The names of the majority of the established and recognised favourites of the photographic public appear either amongst the medalists, or those obtaining honourable mention, although, as we have said, we regret to miss some, and are surprised to see the name of one or two amongst their superiors.

We may here mention that, in many instances, we have heard much dissatisfaction expressed with the award of "honourable mention" as being worse than nothing, implying comparison, and confessed inferiority, being in short "second best." It should be borne in mind, however, that, as but one class of medals existed, and all could not receive them, honourable mention was the only further distinction available, and does imply superiority; so far as the awards are valuable at all, honourable mention is worth having, and implies that the contributions had too much merit to be passed without recognition.

The distribution of medals is yet to come, and may be expected in about six weeks we believe, when it is not improbable it will be the subject of another ceremony. The medals are of bronze, about two inches and a half in diameter, and are fitted with a morocco case. In about the same time we believe, as the distribution, or shortly after, the Reports of jurors will be published These, it is probable, will be more interesting than the awards, and may possibly do something to dispel the anomalies which now appear to exist. We shall look with interest for that relating to photography, as we know it is in able and honourable hands.

In the ceremonial of last Friday, photography was represented by Dr. Diamond, M. Claudet, and Mr. Thurston Thompson, as jurors; and by Messrs. R. Fenton, T. R. Williams, H. White, and H. P. Robinson, as a committee to receive the awards. The names of the Lord Chief Baron as chairman, and of Mr. Bedford and Mr. Kater, as members of the committee, were also mentioned in the programme of the ceremonial, but only the gentlemen we have named were present.

## THE AMATEUR PHOTOGRAPHIC ASSOCIATION.

We have pleasure in calling the attention of our readers to the fact recorded in another column, that His Royal Highness the Prince of Wales has recently consented to become president of this association. We are glad to record an act which indicates that the Prince is treading in the steps of his lamented royal father, not only as a patron of science and art generally, but of our own art especially. We rejoice, moreover, that his countenance is given to an association which will, we believe, do good work in photography. As our readers may remember when we first called attention to this organization, a little more than twelve months ago, we were not very enthusiastic as to its success. We knew many of the difficulties in the way, and we were, moreover, somewhat jealous of anything which might easily become a trading scheme, under the guise of a society or association. We are glad to say, however, that so far as we have been able to observe, and we have kept our eye on its movements, the association has not only been successful, but in every way trustworthy and praiseworthy in its operations. The object with which it was established, appears to have been thoroughly accomplished. An additional impetus has been given to the operations of a large number of amateurs, the first love revived, and the waning zeal of many being quickened, by finding a public for their productions, and an extensive system of exchange established. And all this has been effected, we are happy to believe, without any interference with the progress or success of the regular trade and professional practice of photography.

Of the excellence of many of the pictures brought out by the association we have before spoken; many of them are to be seen at the International Exhibition, where we are happy to announce, they have secured the highest honour, having obtained a medal. We cannot conclude this very brief notice of the meritorious progress of the association, without referring to the untiring activity, uniform courtesy, and unflagging zeal of its secretary, Mr. Arthur Melhuish, who has succeeded in a manner worthy of the highest acknowledgement in separating a trade connection with the association, in being a member of the firm to whom is secured its printing, from that of the ever-ready and valuable honorary secretary, in which capacity he has contributed largely to the success of the undertaking.

## ON THE EXPENDITURE OF SILVER AND GOLD IN PHOTOGRAPHIC OPERATIONS.

BY JOHN SPILLER, F.C.S., SECOND ASSISTANT CHEMIST TO THE WAR DEPARTMENT.

When the practice of photography is undertaken on an extensive or manufacturing scale, it must always be deemed an object of interest and importance to inquire into the legitimate expenditure of silver and gold salts in the various stages of the photographic processes. To reduce the consumption of the precious metals to the lowest limit consistent with the production of a first-rate result, must assuredly be a chief endeavour on the part of the professional photographer; and very exact information has no doubt been acquired by those who find it necessary to be prepared with an estimate of cost for materials and labour in every step of these commercial undertakings. There is small chance, however, of these nicely calculated results being announced in the columns of our scientific journals, and thus it happens that but few details have been published respecting the exact proportion of silver which may be economically recovered during the production of the ordinary proofs upon albumenized paper. MM. Girard and Davanne were probably the first to show how small an amount of silver remains actually in the finished print; their analytical results led them to conclude that about five per cent. only of the silver originally employed for sensitizing the paper is fixed in an insoluble form, and constitutes the dark colouring matter in the picture. More recently we are indebted for an important addition to our knowledge of the printing process to Mr. W. T. Mabley, who has, through the medium of the Manchester Photographic Society, communicated a series of quantitative results, which indicate clearly the direction in which economy may be practised.

Irrespective of the labours of these gentlemen, I have for some time past, at intervals of leisure, been engaged in investigating the more prominent circumstances connected with the employment of silver and gold in photography, and although my results corroborate in the main the conclusions lately arrived at by Mr. Mabley, there are points of difference, chiefly attributable to variations in manipulation, which appear to me sufficiently marked to justify my submitting them in the character of supplementary data.

The operations of the photographic establishment of the War Department, of which to some extent I have the supervision, include of necessity the reproduction of a great number of impressions from plates, illustrating important achievements in artillery practice, construction, and the means of defence; the printing branch at Woolwich is carried out therefore upon a tolerably extensive scale, and assumes the character of a manufacturing department. During the ordinary course of working, I have frequently availed myself of opportunities of ascertaining and controlling the quantities of silver, gold, and other salts expended upon a known amount of photographic work, and the results have throughout demonstrated the importance of observing a strict watchfulness in regard to precipitating and collecting the silver from the numerous waste solutions which rapidly accumulate during a busy season of photographic printing. In practising the system of recovery, to which I shall presently refer, we have been enabled to return to the photographic laboratory many pounds weight of nitrate of silver, made from the metal reduced from the chloride and sulphide of silver, which are separately forwarded to us in the shape of residues.

A large earthenware jar is provided, in which the whole of the nitrate washings are collected, and therein precipitated with common salt, the chloride of silver being allowed to subside during the night, the supernatant liquid is poured off in the morning to prepare the jar for the reception of another day's produce. The hyposulphite solutions, and the exhausted toning baths are mixed together, and treated with "hepar sulphuris" (crude sulphide of potassium), when the small proportion of gold contained in them will be completely precipitated along with the sulphide of silver, will be reduced with it when fused with carbonate of soda and nitre, and may be ultimately recovered on redissolving the melted lump of metal in nitric acid. As a general rule the "nitrate washings" will be found to yield by far the larger proportion of the silver, usually more than three times as much metal being procured in the state of precipitated chloride as that recovered from the fixing solutions in the form of sulphide of silver.

With regard to the details of the printing process adopted in these experiments, it may be stated that the albumenized paper employed was Spencer's best quality, bearing the maker's name "B. F. K. Rives, 1862," in the water mark; the full sized sheet measured $17\frac{1}{2}$ by $22\frac{1}{4}$ inches, and, as an indication of substance, weighed from 335 to 345 grains. Quarter sheets of this paper were successively floated upon a 70-grain solution of nitrate of silver for five minutes, lifted up and suspended for the same time over another dish to drain, the droppings being returned to the bulk of the solution. The sheets of sensitized paper were used in the pressure frame under negatives having a fair distribution of light and shade; the pictures were then washed in three changes of common water, about a gallon in all being employed for twenty proofs, equivalent to five whole sheets of paper; they were toned in an alkaline gold bath, containing four grains of the chloride of gold, with excess of carbonate of soda; washed once or twice, and fixed in a solution of hyposulphite of soda, containing four ounces of the crystals to a pint of water.

I append the results indicated as the mean of several experiments, made with ordinary care, and with the object of observing the amount of silver which it would be practically possible to recover in the shape of reduced metal, or as valuable silver compounds. The numbers are based upon the consumption of five sheets of paper.

| | |
|---|---|
| Diminution in bulk and strength of the nitrate of silver bath ... | 240 grains |
| Recovered from water used to rinse the dishes—chloride of silver ... | 10 „ |
| The nitrate washings gave of— | |
| Chloride of silver ... ... ... | 121 grains |
| The fixing solution gave of— | |
| Metallic silver ... ... ... | 27 grains |
| Metallic gold ... ... ... | ·5 „ |
| Total amount of silver recovered equal to nitrate ... ... | 197 „ |
| Unavoidable consumption and loss by difference ... ... ... | 43 „ |

Equivalent to 17·92 per cent. of the silver employed.

Other experiments made upon ten and fifteen sheets of paper respectively, furnished results in close accordance with the above. In the latter of these a small bulk of nitrate of silver solution was employed, with a view to ascertain more particularly the degree of exhaustion, or diminution in strength suffered by the 70-grain bath. It had lost in measure nearly six and a half ounces, and had become reduced in strength to a 57-grain solution of nitrate of silver. The amount of silver taken up by the sheet last immersed must therefore have been considerably below the 48 or 50 grains which I found to be usually abstracted from a 70-grain bath.

As a general summary of these analytical and quantitative experiments, it may be stated that the preparation of a full sized sheet of albumenized paper necessitates the employment of 50 grains of nitrate of silver, which at the rate of four shillings per ounce troy costs four pence; of this amount, however, 10 grains only need be actually expended, or one pennyworth of silver per sheet, since the remaining 40 grains, or its equivalent in metal, or silver compounds, are recoverable from the waste solutions and other products obtained in the course of these operations. The value of the chloride of gold expended in the process of toning the prints amounts likewise to one penny per sheet; whilst the whole of the remaining chemicals, viz.: the hyposulphite and carbonate of soda, common salt, hepar sulphuris, and kaolin, all taken together, fall within the limits of an extra halfpenny.

## FORMIC ACID IN THE NEGATIVE DEVELOPER.

We have more than once recently called the attention of our readers to the great advantages claimed by many first-class photographers, for the use of formic acid in the iron developer. We have pleasure in calling attention to a formula, communicated by Mr. Henry Claudet, in which this acid is used with the pyro developer, and by which, it appears, very rapid and fine results are obtained. Our readers may remember a reference in our last to two very excellent groups, by M. Claudet, consisting of the photographic jurors, and the Secretaries of the English and French Societies. These, it appears, were taken with a $5\frac{1}{2}$ in. Voigtländer portrait lens with a $2\frac{1}{2}$ in. aperture, and focus of 20 inches for a distance of seventeen feet from the lens. One of the groups now before us, that of Dr. Diamond and M. Laulerie, of which we spoke very highly last week, is about 12 by 10, and was produced with an exposure of seven seconds in a dull light. We have also received some excellent card portraits, one produced in less than a second, and others in one or two seconds. Mr. Claudet attributes much of this rapidity to the character of the developing solution, which he describes in a letter to Dr. Diamond, a copy of which he has kindly furnished us. We ought to remark here, that a typographical error has inadvertently crept into the formula, as given in our excellent contemporary, the *Photographic Journal*, which, in the letter, as below quoted, is corrected. After referring to the group, and the circumstances under which it was produced, Mr. Claudet says:—

"Acting on the principle of my father, that superiority in photography does not depend on the secret of some manipulation, I did not hesitate to tell you that I had arrived at this extraordinary senstiveness by substituting formic acid in place of acetic acid in the developing-solution, and adding nitric acid to the nitrate of silver bath. I promised that I would give you a full description of my process, to enable you to publish it in the *Photographic Journal* for the interest of all. In fulfilment of my promise, I now give you that description.

"The formic acid I use is made by Messrs. Morson & Son, and in my developing-solution it replaces acetic acid. The nitrate of silver bath must be of the strength of 35 grs. to 1 oz. of distilled water. To 1 pint of this bath I add 3 drops of strong nitric acid.

"The developer consists of pyrogallic acid 20 grs, distilled water $7\frac{1}{2}$ oz., formic acid 1 oz., and 6 drs. of alcohol.

"The plate must be well drained after having been taken out of the nitrate bath; and this is a grand poiut for the success.

"By this process, in an ordinary fine light, with a 3-inch double lens by Voigtländer, of $7\frac{1}{2}$ inches focal length for a distance of 25 feet, I take a portrait in the glass room in less than a second.

"I have found that Thomas's collodion (one-half of his ordinary negative collodion and one-half of his cadmium collodion) is the best for my process, which has the following advantages:—

"1st. The picture is brought on as quickly as with protosulphate of iron, being on a *carte-de-visite* plate, developed in one minute; and the half-tones are as delicate.

"2nd. It does not require intensifying when the exposure has been for the right time.

"3rd. If pictures can be taken instantaneously in the glass room at 25 feet, a process of such unusual rapidity must be invaluable for fixing the image of moving objects. This, for want of time only, I have not yet had the opportunity of attempting.

"I do not know by what process Messrs. Ferrier, Warnod, Wilson, England, and Breese, have been able to produce the beautiful instantaneous views which are admired at the International Exhibition; but I have no doubt that the accelerating action of formic acid, if not known by these successful operators, is capable in their hands of producing results still more extraordinary. HENRY CLAUDET."

We may add that M. Ferrier, some time ago, attributed part of his success in instantaneous work to the use of formic acid. Messrs. Wilson, England, and Breese, all use an iron developer with acetic acid, and a bromo-iodized collodion.

## PHOTOGRAPHIC CHEMICALS:

### THEIR MANUFACTURE, ADULTERATIONS, AND ANALYSIS.

*Potassium Salts* (continued).—*Chromate of Potash.*—This and the bichromate are very important salts in photography. The chromate is prepared on the large scale from chrome iron-ore (a mixture of sesquioxide of chromium and protoxide of iron), by ignition with nitre; the chromium is oxydized to chromic acid, and after strong ignition for some time the mass is allowed to cool and exhausted with water. From this solution chromate of potash is prepared for commercial purposes by crystallization. If bichromate of potash be present in solution with this salt, the former may be converted into the normal salt by the addition of potash; it may be separated from nitre by crystallization, or by fusion, and the cautious addition of charcoal-powder till the violent detonation ceases; the mobile liquid then becomes pasty. and a small quantity of chromic oxide is separated; the mass is then exhausted with water, the solution filtered and allowed to crystallize. The salt crystallizes in right prismatic crystals, which are of a brilliant lemon-yellow colour, changing to a red tint when heated. At a red heat it fuses, previous to which it decrepitates violently by emitting a green light; the crystals have an alkaline reaction, and a cooling, bitter metallic taste; the salt is permanent in the air, and is not decomposed when heated *per se.* It is a powerful oxydizing agent, and causes the rapid combustion of charcoal, cotton, wool, and other organic substances, when they have been dried after saturation with its solution. Chromate of potash dissolves in about two parts of water, at the ordinary temperature, and is slightly more soluble at the boiling point. During its solution the temperature falls considerably. The colorific properties of this salt are very considerable, one part, by weight, imparting a distinct yellow colour to 40,000 parts of water. It is insoluble in alcohol, which also precipitates it from an aqueous solution. Commercial chromate of potash is seldom pure; to separate the impurities it must be freed by recrystallization from silica and alumina, then mixed with nitric acid, and nitrate of baryta dropped in as long as sulphate of baryta is precipitated. The chlorine is separated by adding chromate of silver to the filtrate, as long as chloride of silver is formed, after which the solution is filtered, evaporated to dryness, and the residue ignited in a platinum crucible; it is then dissolved in water, and the solution left to crystallize. When sulphuric hydrochloric, nitric, acetic, and many other acids are added to the aqueous solution of this salt, it gives up half its potash to them, being converted into bichromate, which separates after a slight concentration.

Bichromate of potash forms large, bright red, rectangular, tables and prisms; its powder is reddish yellow; when heated, it decrepitates, and then fuses considerably below redness, forming a transparent red liquid which crystallizes on cooling. The salt is permanent in the air, and is acid to test paper. When heated with oil of vitriol, pure oxygen is evolved; this method is sometimes used for preparing this gas. The salt dissolves in about ten parts of water at the ordinary temperature, and is much more soluble in boiling water. The solution is of a deep orange yellow colour. It is also remarkable for the intense colour which it is capable of communicating to water. Possessing two equivalents of chromic acid for one equivalent of alkali, this salt is still a more powerful oxydizing agent than the chromate; when mixed with organic matter, it has a great tendency to part with some of its oxygen with reduction of the chromic acid to the state of sesquioxide of chromium. This change, however, only takes place under the stimulating action of solar radiation, and on this account bichromate of potash has become a very important addition to the photographic laboratory. Bichromate of potash is liable to contain the same impurities as the neutral chromate, and may be purified in the same way.

*Permanganate of Potash.*—Through the exertions of Messrs. Condy, this salt is now procurable in a state of almost perfect purity, and at a very cheap rate. It is likely to be of considerable use to photographers, on account of the wonderfully rapid and perfect oxydizing action which it exercises on most kinds of organic matter. One of the greatest annoyances in the preparation of photographic solutions is the presence of organic matter in the distilled water. The name distilled is generally considered sufficient guarantee of the purity of water, and its fitness for photographic purposes; this, however, is by no means the case: distilled water, unless prepared especially for chemical purposes, usually consists of the condensed vapour from steam machinery, and then almost always contains greasy matter and other impurities. It is of the utmost importance that such water is never employed for photographic purposes, and hence a test which will at once detect the presence of this injurious impurity in distilled water cannot be too highly valued; such a test is afforded by the salt in question. The salt is prepared by mixing eight parts of peroxide of manganese, seven parts of chlorate of potash, and ten parts of hydrate of potash, dissolved in a very small quantity of water; the mass is evaporated to dryness, during which a small quantity of mineral chamelion is formed: the finely-powdered mass is ignited in a platinum crucible over a spirit lamp, till the whole of the chlorate of potash is decomposed (a low red heat is quite sufficient for this); the semi-fused mass is then reduced to coarse powder, and boiled in a larger quantity of water; the insoluble portion is allowed to subside, and the clear solution decanted off and evaporated rapidly; it is again decanted from the freshly precipitated peroxide of manganese, and the solution is allowed to crystallize by cooling. The crystals are then washed in a small quantity of cold water, dissolved in the smallest possible quantity of boiling water, and the solution left to crystallize by cooling. In this way the salt is obtained in large needle-shaped crystals, amounting in weight to about a third of the weight of the peroxide of manganese employed. If it be desired to filter the solution, in order to avoid the loss arising from decantation, a funnel may be used, having a stopper of asbestos, or gun-cotton, loosely stuffed into its neck. The salt forms dark purple needles, belonging to the right prismatic system. They have at first a sweet, and afterwards a rough taste, and are permanent in the air: they are neutral to test paper. When heated, the crystals decrepitate, evolve oxygen, and are converted into a black powder, from which water extracts manganate of potash. The crystals dissolve in sixteen parts of water at the ordinary temperature. All organic substances exert a deoxydizing action on the solution; alcohol acting with peculiar rapidity, whilst gum, sugar, paper, &c., act more slowly. When the liquid is exposed to the air in open vessels, organic particles falling into it, it is also decolourised in a short time, carbonic acid from the atmosphere combining with the potash. Chemical solutions which have been filtered through paper, and indeed most specimens of distilled and ordinary water, contain sufficient organic matter to decompose permanganate of potash, taking away the excess of oxygen and precipitating permanganate of potash.

## THE INUNDATIONS IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.

Some few weeks ago, our ordinary photographic routine was disturbed by the receipt of a hastily written letter from an enthusiastic photographic friend of ours, it ran as nearly as we can remember as follows:—

"Dear B.—We are on the eve of a calamity, the like of which this district has not seen for 300 years. The middle level sluice has burst, and in consequence of the rush of tidal water into the drain it is full from bank to bank. How long it will stand the strain we know not, but it is only a question of a few hours, for it might break at the weakest point, and then we shall have Marshland fen under water. I would advise you to pack up your photographic apparatus and come at once."

The picture presented to our eyes by the contents of the letter did not tempt us to obey our friend's request. We knew the sluice well, and though it was considered, when first built, some sixteen years ago, quite a triumph of engineering skill, still, in its ruined condition, it would be but a mass of tumbled brick-work, offering but few materials for an artistic picture; and as for the middle level drain it presented no salient point of attack, for a river some seven miles long, and straight as an arrow, even when full from bank to bank, though offering a capital subject for the study of perspective, was no tempting object for the photographer in search of the picturesque; but when, in the next day's paper, we saw that the banks had broken, and each succeeding day's intelligence increased the magnitude of the catastrophe, and that the worst fears had been realized, and Marshland fen was once more in its primitive condition—a vast sheet of brackish water—when we found that the daily papers had sent down special reporters to the scene, and that a column was given daily to the description of events, we must confess we felt a feverish desire to witness the scene with our own eyes, or rather with the eye of our camera. We accordingly packed up and started for the Fens.

We must admit some fond remembrances of boyish days tended considerably to increase the desire to see this well-remembered spot under its new and unexpected aspect, for many a time in years gone past, when we had occasion to ride frequently by train across this country, now submerged, we have looked out upon the vast unvaried scene in the dim twilight, and have quite realized the idea that we were looking out upon an immense inland sea, such a one as Tennyson describes when he writes:—

> "whence we see,
> Stretched wide and wild, the waste, enormous marsh,
> Where from the frequent bridge,
> Like emblems of infinity,
> The trenched waters run from sky to sky."

And we felt desirous to see how like the "counterfeit presentment" was unto the real scene now to be witnessed. We felt, also, that though such an immensity of flatness, with but few incidents to break the monotony, beyond an occasional cottage or homestead under water, presented, under ordinary aspects, but few temptations to a photographer, it might, under the magic influence of the setting sun, give all that could be desired; for how few materials are needed to make a picture. A slimy shore, with water beyond, and a broken boat in the foreground, lit up by the golden glories of sunrise or sunset, and we have a scene that the genius of a Turner but imperfectly depicts after years of labour.

The morning was a magnificent one when we started, and we left town buoyant with hope for successful results; but as we drew nearer to the end of our journey, the day put on a garb of leaden hue, and long before we reached our destination, the rain came down in such a manner as to clearly indicate there would be no photography done that day. We soon found, by the conversation in the carriage, that we were not alone in our desire to witness the catastrophe, for several were upon the same errand. When we got to Watlington, some people entered the carriage, who had just returned from an inspection of the scene. They informed us that they came all the way from Norwich to see the inundation, and they had walked some three or four miles from the station down the disused Wisbeach line until the water barred their further progress, and that though the journey had been performed in the rain, they felt that the strange sight fully repaid them for all toil and discomfort they had endured. All this only served to whet our desires the more, but we had no alternative but to go on to Lynn, and wait patiently for the morrow.

The next day got up dull and heavy, as though still suffering from the effects of the copious libations so recently indulged in. We determined, however, to take an early survey, and select points for future operations; and now came a difficulty we had not anticipated. Lynn was full of visitors, and as everybody wanted to see all they could, and as there was no direct railway communication, all the old fashioned means of locomotion were in requisition, and not a piece of horseflesh, or anything in the shape of a trap was to be had, except at fabulous prices. However, thanks to the efforts of an old acquaintance well up in these matters, we succeeded in getting something of the dog-cart kind, which answered our purpose, and we were soon on our way. The journey by rail would have been about five miles, but as we were compelled to travel the roads laid down by the wisdom of our ancestors, and as their views, on road making at least, were anything but straightforward, we had to travel 11 miles before we reached the scene of our destined labours. Our jehu enlivened the journey by some capital tales of the good old coach days, when the driver considered it a duty to endanger his own neck and those of all the pasengers, rather than let the rival coach pass him. One tale is worth repeating:—Once upon a time when he drove the Wells coach, they had a guard who could turn a tune on the key bugle most beautifully—he was especially celebrated for his playing of the "Old English Gentleman." One Sunday he had been playing this tune for the gratification of a passenger very near to Holkham Hall, for he thought the family from home. When he came in sight of the house, however, he was made very uncomfortable by the sight of the Earl of Leicester at one of the windows, and therefore tried to make amends by pulling up and playing the huudredth psalm very vigorously. A servant however came out with a request from the earl that he would repeat the "Old English Gentleman" which he did accordingly. During the performance some refreshments were sent out for the invigoration of the passengers. V. B.

(*To be continued.*)

# The International Exhibition.

## JURY AWARDS IN CLASS XIV.

MEDAL.

UNITED KINGDOM.

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Amateur Photographic Association ... ... ... | For general photographic excellence. |
| Beckley ... ... ... | For a valuable series of photographs of spots on the sun, and for the application of photography to astronomical science. |
| Bedford, F. ... ... ... | Photographs. For landscapes and interiors of great excellence. |
| Breese, C. S. ... ... ... | For a series of instantaneous views on glass of clouds, waves, &c. |
| Colnaghi and Co. ... ... | For a valuable series of large photographs of antiquities, copies of cartoons, miniatures, &c. |
| Dallmeyer, T. H. .. .. | For excellence of lenses, and introduction of a new triplet lens free from distortion, with chemical and visual foci coincident. |
| De la Rue, W. ... ... | For the application of photography to astronomical science. |
| Fenton, R. ... ... ... | For great excellence in fruit and flower pieces and good general photography. |
| Frith ... ... ... ... | For views in Egypt taken by himself. |
| Heath, Vernon ... ... | For excellent landscape photography. |
| James, Col. Sir H., R.E. ... | For specimens of photography, photozincography, and photopapyrography. |
| London Stereoscopic Company ... ... ... ... | For great excellence of photographic views, and especially series of stereoscopic pictures of Paris. |
| Mayall, J. E. ... ... ... | For artistic excellence in photographic productions. |
| Mudd, J. ... ... ... | For very excellent landscapes produced by the collodio-albumen process. |
| Negretti and Zambra ... | Beauty and excellence of photographic transparencies and adaption of photography to book illustration, &c. |
| Piper, J. D. ... ... ... | For general excellence in the pictures exhibited, especially in landscape photography. |
| Ponting, T. C. ... ... | For the excellence of his iodized sensitive collodion. |
| Pretsch, P. ... ... ... | For a series of specimens of photographic printing by various means as improved and invented by himself. |
| Robinson, H. P. ... ... | For good photographic manipulation, and great artistic excellence in combined pictures, as well as in carte de visite portraits. |
| Ross, T. ... ... ... | For superiority of his photographic lenses. |
| Rouch, W. W. ... | For small photographs taken with his new binocular camera with Hardwich's bromo-iodized collodion. |
| Sidebotham, J. ... ... | For beautiful landscape photography by the collodio-albumen process. |
| Talbot, Fox W. H. ... | For photographic engravings on copper and steel produced by the action of light alone. |
| White, H. ... ... ... | For great artistic excellence in landscape photography. |
| Williams, T. R. ... ... | Photographs. For excellence in photographic portraiture, &c. |
| Wilson, G. W. ... ... | For the beauty of his small pictures of clouds, shipping, waves, &c., from nature. |
| | AUSTRALIA. |
| Osborne .. ... .. . | For the photolithographic process invented and patented by himself. |
| | CANADA. |
| Notman .. ... ... ... | For excellence in an extensive series of photographs. |
| | INDIA. |
| Simpson, Dr. ... ... .. | For a valuable series of portraits of the native tribes. |
| | JERSEY. |
| Mullins ... ... ... ... | For general photographic excellence. |
| | VICTORIA. |
| Daintree... ... ... ... | For an extensive series of photographs illustrative of the colony. |
| Haigh ... ... ... ... | For stereoscopic and other views in the colony, excellent in photographic treatment. |
| Nettleton ... ... ... | For excellence of photographic views in the colony. |
| | AUSTRIA. |
| Angerer, L. . ... ... | For general excellence and great definition of the photographs exhibited. |
| Dietzler, Ch. ... ... ... | For photographic lenses of excellence. |
| Ponti, Ch. ... ... ... | For the alethoscope, with the photographs exhibited therein. |
| Voigtlander and Son ... ... | For great excellence of photographic lenses. |
| | BADEN. |
| Lorent, Dr. ... ... ... | For a beautiful series of large pictures of great photographic excellence. |
| | BAVARIA. |
| Albert, T. ... ... ... | For a valuable series of reproductions of pictures and objects of art. |
| | BELGIUM. |
| Fierlants, Ed. ... ... ... | Photographs. For excellence in a series of photographs taken by the albumen process for the Government. |
| | FRANCE. |
| Aguado, Count O. .. | Enlarged photographs. For specimens of enlargements from small negatives. |
| Aguado, Viscount O. ... | Enlarged photographs. Pictures of shipping, &c., enlarged from small negatives. |
| Alophe, M. ... . | Photographs. For excellent photographs, especially as regards artistic arrangement. |
| Baldus, E. ... ... ... | Large photographs. For large views of monuments, views from nature, reproductions, &c. |
| Bayard and Bertall ... ... | Photographs. For excellence of photographic pictures. |
| Bertand ... ... ... ... | For excellence of lenses. |
| Bertsch, A. ... ... ... | For excellence of articles exhibited. |
| Bingham, R. ... ... ... | Photographs. For excellent reproduction of pictures and other objects of art. |
| Bisson, Brothers ... ... | Photographs. For panoramic views of Mont Blanc, pictures of monuments, &c. |
| Braun, A. ... ... ... | Photographs. For pictures of natural flowers, views, &c. |
| Cammas ... ... ... ... | Photographs. For large views, on waxed paper, of Egypt and its monuments. |
| Darlot ... ... ... ... | For excellence of articles exhibited. |
| Davanne and Girard ... ... | Photographs. For pictures of photographic excellence. |
| Delessert, E. ... ... ... | Large photographs. For large views of monuments in Paris, untouched. |
| Derogy ... ... ... ... | For an arrangement for altering the focus of a lens. |
| Disdéri ... ... ... ... | Photographs. For excellency of enlarged and other pictures. |
| Dubosq, L. J. ... ... ... | Photographic apparatus. For photographic appliances, lamp, &c. |
| Duvette and Romanet .. | Photographs. For excellent architectural views of Amiens cathedral. |
| Fargier ... ... ... ... | Photographs. For pictures done by the carbon process. |
| Ferrier ... ... ... ... | Large photographs on glass. For excellent pictures on glass, instantaneous views in Paris, &c. |
| Garnier and Salmon ... ... | For the carbon process invented by them. |
| Jeanrenaud ... ... ... | Photographs. For excellence of photographic views, &c. |
| Lafon, De Camarsac ... ... | For photographic reproductions in enamel. |
| Lyte, Maxwell ... ... ... | Views in the Pyrenees. For excellence of landscapes in the Pyrenees. |
| Marville ... ... ... ... | Photographs. For photographic pictures of objects of antiquity, landscapes, &c. |
| Muret ... ... ... ... | Views of the Isère. For good landscape photography. |

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Nadar ... ... ... ... | Photographs. For pictures obtained by the aid of electric light. |
| Nègre, C. ... ... ... | For heliographic pictures on steel. |
| Niépce de St. Victor ... ... | For heliographic engravings on steel, and various specimens by processes described by himself. |
| Poitevin, A. ... ... ... | Carbon photographs. For carbon pictures and photolithographs, &c. |
| Robert ... ... ... ... | Photographs. For landscapes and copies of works of art, &c. |
| Warnod ... ... ... ... | Photographs. For views of shipping, natural clouds and waves, &c. |
| | GREECE. |
| Constantin ... ... ... | For views in Greece of great excellence. |
| | HANSE TOWNS. |
| Kruss ... ... ... ... | For photographic lenses of great excellence. |
| | ITALY. |
| Alinari, Brothers ... ... | For great excellence of photographic productions. |
| Van Lint, E. ... ... ... | For excellence of pictures exhibited. |
| | PRUSSIA. |
| Busch, E. ... ... ... | For excellence of lenses and photographic apparatus. |
| Oehme, G., and Jamrath ... | For excellence of photographic productions. |
| Schering E. ... ... ... | For chemical products and photographs. |
| Wothly, J. ... ... ... | For excellence of large pictures by the process invented by himself. |
| | ROME. |
| Cuccioni... ... ... ... | For general photographic excellence. |
| Dovizielli, P. ... ... ... | For general photographic excellence. |
| | RUSSIA. |
| Denier ... ... ... ... | For general photographic excellence. |
| | SAXONY. |
| Manecke, F. ... ... ... | For excellence of photographs. |
| | SWEDEN. |
| Manerke ... ... ... | For excellency of photographs exhibited. |

## HONOURABLE MENTION.

UNITED KINGDOM.

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Austen, W. ... ... ... | For superior arrangement of head rests, and beauty of action of rolling press for photographs. |
| Barrable, J. G.... ... ... | For artistic excellence. |
| Beatty, F. S. ... ... ... | For heliographic surface and intaglio printing. |
| Bland and Co. ... ... ... | For very excellent workmanship and arrangement, especially adapted for India and foreign countries. |
| Bourquin and Co. ... ... | For general excellence of articles exhibited, especially for photographic albums, of his own manufacture. |
| Brothers, A. ... ... ... | For artistic excellence, and for a photographic group finished in water colours. |
| Bull, J. T., and G. ... ... | For photographic accessories and backgrounds. |
| Burnett, C. J.... ... ... | For experimental researches in photography, as exhibited in the specimens of printing by uranium, platinum, palladium, copper, &c. |
| Caithness, Earl of ... ... | For photographic landscape, especially the representation of hoar frost. |
| Cox, F. J. ... ... ... | For general excellence of articles exhibited. |
| Cramb, Brothers ... ... | For a series of views in Palestine. |
| Cundall, Downes, and Co. ... | For photographic reproductions. |
| Dancer, J. B. ... ... ... | For microscopic photographs, landscapes, and portraits. |
| Davies, T. S. ... ... ... | For excellent arrangement of his photographic manipulating camera for field purposes. |
| Gordon, R. ... ... ... | For excellent views in the Isle of Wight. |
| Green, B. R. ... ... ... | For artistic excellence in coloured photographs. |
| Hare, G. ... ... ... | For excellence in the manufacture of cameras. |
| Hemphill, Dr. W. D.... ... | For excellence of views of antiquities in Ireland. |
| Hennah, T. H... ... ... | For photographic portraits. |
| Hering, H. ... ... ... | For artistic excellence. |
| Highley, S. ... ... ... | For excellence of apparatus exhibited. |
| Hill, D. O. ... ... ... | For great artistic merit in photographs exhibited. |
| Hockin and Wilson ... ... | For excellence of articles exhibited. |
| Hopkin and Williams . ... | For excellence of photographic chemicals. |
| Horne and Thornthwaite ... | For general excellence in articles exhibited. |
| Jocelyn, Viscountess . ... | For artistic effect in landscape photography. |
| Kilburn, W. E. . ... ... | For artistic excellence in coloured photographs. |
| Lock and Whitfield ... ... | For artistic excellence in coloured photographs. |
| Maclean, Melhuish, and Co... | For general excellence of photographic apparatus, and artistic excellence in coloured photographs. |
| Mayland, W. ... ... ... | For good photography in views, &c. |
| Meagher... ... ... ... | For great excellence and cheapness in the apparatus exhibited. |
| Moule, T. ... ... ... | For his apparatus for taking portraits by night. |
| Murray and Heath ... ... | For superior arrangement and work in articles exhibited, and especially for usefulness of Smart's tent. |
| Olley, W. H. ... ... ... | For photographs from the microscope by the reflecting process |
| Ottewill, T., and Co. ... ... | For excellence in the manufacture of cameras. |
| Ramage, J. ... ... ... | For applications of photolithography. |
| Reeves, A. ... ... ... | For microscopic photographs. |
| Rejlander, O. G. ... ... | For artistic photographic effect. |
| Ross and Thompson ... ... | For artistic portraits. |
| Russell, J. ... ... ... | For views of the ruins of Chichester Cathedral after the fall of the spire. |
| Sedgefield ... ... ... | For good stereoscopic views. |
| Skaife, T. ... ... ... | For a pistolgraph and a series of productions called pistolgrams. |
| Smith, Lyndon ... ... | For landscapes, &c., artistically taken. |
| Smyth and Blanchard . ... | For a series of instantaneous views for the stereoscope. |
| Solomon, J. ... ... ... | For the introduction of many useful aids to photographic manipulation as exhibited. |
| Sutton, E. ... ... ... | For artistic excellence in coloured photographs. |
| Thompson, S. ... ... ... | For excellence in architectural photography, &c. |
| Tracr, J. R. ... ... ... | For excellence of photographs of microscopic objects, &c. |
| Wardley, G. ... ... ... | For excellent landscapes by the collodio-albumen process. |
| Warner, W. H... ... ... | For photography in a series of enlargements from small negatives. |
| Wortley-Stuart, A. H. P., Lieut.-Col. ... ... ... | For views of Vesuvious during the eruptions of 1861-62. |
| Wright, Dr. ... ... ... | Portable photographic apparatus for field purposes, combining tent, &c., adapted for railway travelling. |
| | BRITISH COLUMBIA. |
| Claudet, F. ... ... ... | For a series of views in New Westminster. |
| | BRITISH GUIANA. |
| Tucker ... ... ... ... | For photographic views in the colony. |
| | INDIA. |
| Sellon, Capt. ... ... ... | For a series of views in India. |
| | JAMAICA. |
| ——* ... ... ... ... | For a valuable series of photographs of the fish of the island. |
| | MELBOURNE. |
| Cox and Lukin ... ... | For photographic excellence. |
| | NEW BRUNSWICK. |
| Bowren and Cox ... ... | For photographic views, being the earliest taken in this colony. |
| | NEW ZEALAND. |
| Crombie, J. N.... ... ... | For views in the colony. |
| | QUEENSLAND. |
| Challingor, G. ... ... ... | For excellence of photographs. |
| Wilder, J. W. ... ... ... | For excellence of photographs. |
| | SOUTH AUSTRALIA. |
| Hall, Rev. ... ... ... | Ethnological studies of the aborigines. |
| | TASMANIA. |
| Allport, M. ... ... ... | For interesting pictures exhibited, including stereoscopic and other views. |
| | VICTORIA. |
| Bachelder and O'Neill . ... | For photographs of volunteers, &c. |
| Charlier... ... ... ... | For portraits of the aborigines of the colony. |
| Davis ... ... ... ... | For excellence of photographs in Melbourne and Fitzroy. |
| Johnston ... ... ... | For a collection of photographic views. |
| | AUSTRIA. |
| Lemann, C. ... ... ... | For excellent reproductions of objects of art and archæological subjects. |
| Leth ... ... ... ... | For a new carbon process, and copies of wood engraving accomplished by the same. |
| Melingo, A. ... ... ... | For general photographic excellence. |
| Oestermann, C... ... ... | For illustrations of Buda-Pesth, the metropolis of Hungary. |
| Rupp, W. ... ... ... | For his valuable application of photography. |
| Tiedge, T. ... ... ... | For a large collection of photographic pictures of peasantry, costumes, &., from South Hungary. |
| Widter, A. ... ... ... | For general excellence of pictures exhibited. |
| | BAVARIA. |
| Gypen and Frisch ... ... | For excellence of pictures exhibited. |
| | BELGIUM. |
| Ghémar, Brothers ... ... | For general excellence of photography. |
| Mascré, J. ... ... ... | For photographic copies of pictures, &c. |

* The name is blank in the official list of awards, and there is no mention of the contribution in question in the catalogue.

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Michiels, J. J. ... ... ... | For general excellence of photographs. |
| Neyt, A. L. ... ... ... | For excellent specimens of photographic micography. |
| | DENMARK. |
| Hansen, G. E. ... ... ... | For excellence of photographs. |
| Lange, E. ... ... ... | For excelleuce of photographs. |
| Striegler, R. ... ... ... | For his portrait of the Princess of Denmark. |
| | FRANCE. |
| Albites, T. ... ... ... | For excellence of articles exhibited. |
| Aleo ... ... ... ... | For delicacy in landscape photography, &c. |
| Bérenger, Le Marquis de ... | For good landscape photography on wax paper, &c. |
| Berthier, P. ... ... ... | For excellent reproduction of works of art. |
| Blanc, N. ... ... ... | For good artistic arrangement in portraiture and excellent photography. |
| Bobin, A. ... ... ... | Photographic reproductions of maps and plans with great accuracy. |
| Breton, Madame ... ... | For archæological views, &c. |
| Briois, C. A. ... ... ... | For exce'lence of chemicals used in photography. |
| Carjat and Co. ... ... | For excellent photographic portraits. |
| Charnay, D. ... ... ... | For excellence of photographs exhibited. |
| Charavet ... ... ... | For his carbon pictures. |
| Collard ... ... ... ... | For excellence of photographic views. |
| Crémière ... ... ... | For instantaneous pictures of animals, &c. |
| Dagron, E. ... ... ... | For microscopic photography applied to bijouterie. |
| De Clercq, L. ... ... ... | For excellence of photographs exhibited. |
| Delondre, P. ... ... ... | For excellent views obtained by the wax-paper process. |
| Delton ... ... ... ... | For instantaneous pictures of animals. |
| De Champlouis ... ... | For views in Syria, obtained by his "wet-dry" process, as described by himself. |
| Garin ... ... ... ... | For excellence of photographic chemicals. |
| Gaumé ... ... ... ... | For reproductions of photographic pictures for glass in churches, &c. |
| Hermagis ... ... ... | For excellence of photographic lenses. |
| Jouet, E. ... ... ... | For landscape photography. |
| Ken, A. ... ... ... | For good photographic portraiture. |
| Koch ... ... ... ... | For excellence of articles exhibited. |
| Lackerbauer ... ... ... | For excellence in microscopic photography. |
| Laffon, J. C. ... ... ... | For studies of still life, photographs on silk. |
| Lecu, F. N. ... ... ... | For excellence of articles exhibited. |
| Lemercier ... ... ... | For specimens of photolithography, &c. |
| Mailand, E. ... ... ... | For excellent photographic landscapes by the wax-paper process. |
| Marion ... ... ... ... | For excellence of photographic paper. |
| Masson ... ... ... ... | For excellence of photographs exhibited. |
| Mayer and Pierson ... ... | For excellent photography. |
| Michelez, C. | For reproductions of works of design ancient and modern, &c. |
| Millett, A. ... ... ... | For excellence of photographic lenses. |
| Moulin, F. ... ... ... | For excellence of photographs exhibited. |
| Pesme ... ... ... ... | For excellence of photography. |
| Plessy, M. ... ... ... | For excellence of photographic chemicals. |
| Potteau ... ... ... ... | For excellence of photographs exhibited. |
| Puech, L. ... ... ... | For excellence of photographic chemicals. |
| Quinet, A. M. ... ... | For excellence of articles exhibited. |
| Richebourg ... ... ... | For good photography in portraiture and objects of art. |
| Rolloy, Fils ... ... ... | For excellence of articles exhibited, especially for his photographic varnish. |
| Roman, D. ... ... ... | For excellence of photographs exhibited. |
| Silvy ... ... ... ... | For good photographic pictures. |
| Tournachon, A., jun. ... | For instantaneous pictures of horses and other animals. |
| Villette, E. ... ... ... | For large photographic pictures obtained by Duboscq's electric light. |
| | FRANKFORT. |
| Hamacher ... ... ... | For excellence of articles exhibited. |
| | ITALY. |
| Roncalli, A. ... ... ... | For excellence of microscopic reproductions. |
| | MECKLENBURG-SCHWERIN. |
| Dethleff ... ... ... | For excellence of pictures exhibited. |
| | NETHERLANDS. |
| Eyck, Dr. J. A. van ... ... | For his photographic copies of etchings by Rembrandt, the size of the originals. |
| | NORWAY. |
| Selmer ... ... ... ... | For a series of pictures of the peasantry of the country. |
| | PERSIA. |
| Pesce, Luigi ... ... ... | Views of Teheran, Persepolis, and other localities in Persia. |
| | PORTUGAL. |
| Silveira, J. W. ... ... | For excellence of photographs. |
| | PRUSSIA. |
| Beyrich, F. ... ... ... | For photographic paper. |
| Kunzmann, H. ... ... | For photographic paper. |
| Minutoli, Von ... ... | For a valuable series of reproductions of objects of art. |
| Schauer, G. ... .. ... | For excellence of pictures exhibited. |
| | RUSSIA. |
| Mieczkowski, J. ... ... | For good portraiture and artistic effect. |

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Rumine, G. ... ... ... | For a series of views in the East, and general photographic excellence. |
| | SWEDEN. |
| Unna and Höffert ... ... | For general photographic excellence. |
| | SWITZERLAND. |
| Georg ... ... ... ... | For general photographic excellence. |
| Poncy, F. ... ... ... | For general photographic excellence. |
| Vuagnat ... ... ... | For general photographic excellence. |
| | UNITED STATES. |
| Dexter ... ... ... ... | For a series of busts of the Governors of States in America. |
| | WURTEMBURG. |
| Sprösser ... ... ... | For photographic excellence. |
| | ZOLLVEREIN. |
| Exhibitor not identified ... | For excellence of photographic impressions. |

## PHOTOGRAPHIC CHEMICALS.

The official report of the awards of the Juries is at length published. It will prove an apple of discord with a vengeance. Already complaints are reaching us from all sides, of the sins of commission and omission which characterise this ponderous volume. Confining ourselves in these articles to the chemical section, we must say that our feelings on examining the list of medals, and honorable mentions in Class II. is one of indignation, mingled perhaps with a very small proportion of gratification at finding, that the few firms whom we have especially noticed in these columns are, with scarcely an exception, rewarded by a prize medal.

For the rest, the Jury appear to have gone round with a yard measure in their hands, and to have bestowed prize medals upon those cases which were above a certain size; honorable mentions to those which did not quite come up to the mark of magnitude, and to have passed over most of the cases which did not expose an area of more than a few square feet.

Firms which have not the slightest pretensions to such distinction, have borne off the highest honours, whilst others, the gigantic scale of whose operations is known throughout Europe, are not considered worthy of mention. In answer to some indignant remonstrances which have been addressed to those in authority, it has been explained that there are *numerous errors* in the published awards, which will be shortly rectified when the agrieved individuals will of course find that they had a prize medal awarded them. The fact of having a medal bestowed in so ungracious and underhand a manner, being considered ample atonement for the unjust and public insult which has been thus indelibly inflicted upon some of the exhibitors by the slovenly way in which this most important official document has been revised and given to the world. Until the appearance of the amended list, it may be considered premature to make further comments on this subject.

To return to our notices of the photographically interesting products; we must not omit to mention the beautiful collection exhibited by Bolton and Barnett. A vast number of rare chemicals, together with most of those used in photography, are collected together in this case. To those of our readers who have not a very good acquaintance with the appearance and physical characteristics of those chemicals which are frequently mentioned in these pages, but seldom used except in experimental photography, an attentive examination of this case will prove very instructive.

Some good specimens of ether, hyposulphite of soda, acetic acid, &c. are shown by F. Allen, and some fine specimens of iodine and various metallic iodides, are exhibited by Messrs. Wright, Francis and Co. This firm also exhibits several varieties of collodion, including negative and positive for photographic purposes, and a non-contractile variety for use in surgery.

A most valuable and instructive series of artists' colours with the materials used in their manufacture, is shown by the well known firm of Newman. The student who is curious in such matters may see a piece of metallic cadmium and a lump of brimstone, as the component parts of the brilliant cadmium yellow. In like manner cobalt blue is seen to consist of phosphate of cobalt and alumina: vermilion is shown by the side of a bottle of caustic potash, some mercury and a piece of sulphur. Chrome yellow, has for its origin acetate of lead and chromate of potash; emerald green is formed from acetate of copper and arsenious acid and is therefore to be avoided by all those who object to the wholesale employment of this deadly poison in every-day life. Chinese white (oxide of zinc) is represented by a lump of the metal, the atmosphere in the case being, we suppose exhibited as the other component of this colour, it being prepared by burning zink in air. The manufacture of ultra-marine, both natural and artificial. is one of the specialities of this firm, and a magnificent collection is to be seen of this beautiful colour in all varieties of tint, together with the *lapis lazuli* from which the natural colour is obtained. and the quartz, carbonate of soda, sulphur and china-clay.

## THE PRINTING OF POSITIVES.

BY E. REYNAUD.

The influence on the beauty of positive pictures exercised by the circumstances in which the printing is performed, is well known to photographers generally. For instance, a negative, which on certain occasions yields but a poor and valueless print, would frequently, if obtained under better conditions, furnish a satisfactory production.

The importance, then, of an investigation leading to the determination of the best conditions, according to the nature of the negative, in order to obtain the best possible result, can easily be conceived.

I will briefly detail some hints, the result of my experience on the subject.

The chief points to be considered are:—

1. The intensity of the light.
2. The nature of the paper employed.*
3. The proportion of free nitrate of silver which it contains.

The intensity of the light, in which the operation of printing is performed, must always have a certain relation with the intensity of the negative. A negative that has been exposed too short a time in the camera presents, as is well known, large transparent portions without detail, which produce deep shades or masses of black in the positive prints, whilst the lights are opaque, and the middle tones are wanting. Printing from such a negative requires a bright light in order to be successful: in such a case the direct light of the sun is to be recommended. If, on the other hand, the negative has been exposed, contrast will be wanting in the light and shades, the delicate half tones about the lights being effaced, and those of the shades too far advanced. Such a negative exposed to an intense light will yield a grey and monotonous print; whilst on the other hand a weak light will produce more vigour. The following is an excellent means for obtaining a suitable degree of luminous intensity at a time when the rays of the sun are too brilliant:—it consists in placing between the glass of the printing-frame and the negatives, a sheet or two of white paper, quite homogeueous and more of less transparent. By this means the intensity of the glass becomes moderated, and arrives at the negative in a proper condition for the production of a good print.

I must here remark, that it is from the relation existing between the lights and shades of the negative, that we can deduce the proper degree of light to be employed, and not from the absolute opacity of the lights. For instance, certain parts of a negative may be extremely opaque, and yet, if the time has been too long, the whole of the negative will present but little contrast; in this a feeble light is indicated as the best for producing a good print.

Thus, then, to state the matter briefly, since a feeblo light, other things remaining the same, produces more contrast between the extreme tones of the prints, such a light is to be employed when the negatives are too weak or uniform; whilst an intense light, on the contrary, produces more monotonous images, this light is appropriate for harsh negatives, that is to say, for such in which the lights are too opaque and the shades too transparent.

But these phenomena are modified more or less by the nature of the positive paper; it is, therefore, necessary to study the properties of this substance, and to examine the influence of its elements on the beauty of its prints.

In the first place let me remark that a large proportion of free nitrate of silver acts like an increase in the intensity of the light. For instance, paper sensitized in a bath of twenty per cent. or 100 grains to the ounce, will produce, with the same negative, and the same light, a more monotonous or less contrasted print than if it were sensitized in a bath containing only fifteen per cent. of nitrate of silver.

Hence it may be deduced, that paper, sensitized in a bath rich in silver, is preferable for harshly contrasted negatives; whilst, on the contrary, paper sensitized in a weak solution is adapted to feeble and uniform negatives. Nevertheless, it must be observed that, since the vigour of tone depends also on the excess of nitrate of silver, the proportion of the latter cannot be diminished sensibly below fifteen per cent. if the toning and the fixing are to be properly effectuated.

I will now examine the influence of the first preparation of the paper.

Positive paper is divided into two distinct heads:—

Plain salted paper.

Albumenized paper.

Ordinary plain salted paper contains simply a certain proportion of some soluble chloride.

Albumenized paper contains, besides this chloride, organic matter—albumen.

After sensitizing, the former contains chloride of silver; and its surface is covered with a film of nitrate of silver.

The latter contains, besides these two salts, a large proportion of a peculiar body but little known; the same which is produced when a solution of nitrate of silver is poured into albumen. The fact is described and perfectly explained in an excellent article by Abbé Pujo.* Now this body, which the author denominates *albuminate of silver*, has the peculiarity of producing extremely vigorous or harsh images. It is to this salt that albumen paper owes the well known property of producing, with the same negative, prints endowed with much greater contrast than is found in those obtained on plain salted paper.

It is easy to comprehend, therefore, that the proportion existing between the albuminate and the chloride of silver, will exercise considerable influence on the prints. A large excess of the albuminate is adapted for gray or monotonous negatives, whilst negatives with great contrast require a large proportion of the chloride.

In short, the proportion between the albuminate of silver and the chloride of silver modifies the results, in the same manner as an excess of the nitrate, or the intensity of light; and it is on a correct relation between these four elements that positive printing depends for its success.

It is impossible to determine the proportion to be observed between these elements in accordance with the different degrees of intensity of the negatives; experience alone can teach the peculiar rules to be applied in each case.

I shall occupy myself further with the study of the influence which the above-mentioned elements exercise on the fixing and toning of prints, that is, the tone and vigour they assume in the gold bath and the fixing solution, hyposulphite of soda, and lay the particulars before the Society.—*Moniteur.*

* I understand here not the intimate nature of the paper, but that of the preparation which renders it appropriate for the purposes of photography, as salting and albumenizing.

* See pp. 291 and 302, Vol. v, Photographic News.

## Proceedings of Societies.

### Amateur Photographic Association.

A meeting of the Council of the Amateur Photographic Association was held on Monday the 7th instant, at 26, Haymarket. The Right Hon. the Earl of Caithness in the chair.

The minutes of the last meeting having been read and confirmed, the Secretary laid before the meeting the prizes of the Association, consisting of a highly ornamented claret jug, a plainer silver mounted ditto, three silver goblets, and two silver inkstands.

The Chairman having reported that His Royal Highness the Prince of Wales had graciously condescended to become the President of the Association, he was unanimously elected, and the Secretary was directed to address a letter to his Royal Highness, expressive of the great gratification experienced by the Council at his condescension. The following Vice-presidents were then elected :—

The Most Noble the Marquis of Drogheda.
Tho Right Hon. the Earl of Caithness.
The Right Hon. the Earl of Uxbridge.
The Right. Hon. the Viscount Ranelagh.

As also Lieut.-Col. Dudley Fitzgerald de Ros, and John Gooch Esq., Members of Council.

The Secretary then laid before the Council the names of the following members and subscribers who have joined the Association since the last meeting.

| | |
|---|---|
| Lord Carew. | S. J. Wethrell, Esq. |
| Lady Carew. | R. A. Cayley, Esq. |
| Dr. Diamond. | R. B. Bowman, Esq. |
| G. Wharton Simpson, Esq. | J. Burd, Esq. |
| The Hon. Nassau Joscelyn. | W. J. Owen, Esq. |
| Col. Challoner. | J. H. Page, Esq. |
| Major J. Wyngate. | A. Fentrill, Esq. |
| Capt. J. C. Bonamy. | W. L. Banks, Esq. |
| Capt. R. J. Henry. | Osmar King, Esq. |
| Capt. Burnaud. | F. Beasley, jun., Esq. |
| Capt. Fairlie. | C. Walters, Esq. |
| Rev. W. Law. | C. J. Tozer, Esq. |
| Rev. W. Eardley. | W. H. Harton, Esq. |
| Rev. H. Salnay. | C. Topham, Esq. |
| John Gooch, Esq. | Miss Clough. |
| W. W. King, Esq. | C. R. Jones, Esq. |
| F. Chambers, Esq. | A. Eichholtz, Esq. |
| W. M. Barnes, Esq. | C. F. Dickenson, Esq. |
| W. Jeffrey, Esq. | H. Boycott, Esq. |
| W. H. Bullock, Esq. | D. White, Esq. |
| Miss E. Scott. | W. Weare, Esq. |
| S. Hamilton, Esq. | J. W. Fall, Esq. |

The Right Hon. the Viscount Ranelagh having enquired whether professional photographers were eligible as members, was informed by the Secretary that amateur or non-professional photographers could alone become members of the Association. This having given rise to a discussion upon the mode of admitting members, it was decided that henceforth candidates for admission as members or subscribers must be proposed and seconded by existing members, and elected at a meeting of the Council.

The proceedings of the meeting then terminated.

A. J. Melhuish, Hon. Sec.

### The American Photographical Society.

The Society held a regular meeting at the University, on Monday evening, 9th ult., President Draper in the chair; C. Wager Hull, Secretary *pro tem.*

*Use of Sugar, &c., in the Tannin Process.*—Mr. Hull said he had been making trials of sugar, honey, &c., which had been recommended for the tannin process, and had found no advantage in them. If sometimes they gave a little gain in sensitiveness it was not sufficient to compensate for the extra trouble and risk. He preferred the tannin process in its simplest form.

Other members followed Mr. Hull to the same effect, fully endorsing his conclusions, and adding that plates which contained foreign matter would not be likely to keep so well.

*A New Photometer.*—The President said that he had recently modified one of the ordinary photometers so that it might be used for measuring the intensity of the chemical rays. The photometer in question is the one which is made of two cardboards united at one edge in the form of the letter V, and the lights to be tested being placed opposite the inclined surfaces, at points where the illumination on the surfaces would be equal, and then measuring the distances from the surfaces to the respective lights. The instrument thus far has been used only to measure the illuminating power of light, which is quite a different thing from the actinic power. The modification he had made was simply a contrivance for observing only the actinic rays, and consists of a blue medium through which the observation is to be made. He takes a piece of plate-glass, three inches square, and in the middle cuts out a hole one and a-half inches in diameter; this is laid on a second piece of plate-glass, also three inches square, and the cell thus formed is filled with a solution of the ammonia-sulphate of copper, and a third piece of plate-glass is laid on as a cover, and the fluid is closely sealed in, without danger of being disturbed. Through this solution only the actinic rays can pass, and if the operator makes his photometric observations through it, he measures the intensity of these rays.

Professor Seely.—This device for measuring actinic light is wonderfully simple, and there can be no doubt that it is accurate enough for all practical purposes. It costs only a little labour, cannot get out of order, and gives its indication almost as plainly as a thermometer. By a trifling modication, also, it may be used to measure daylight, so that a photographer may know, simply by looking, how much light he has.—*American Journal.*

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris, 16th July*, 1862.

The question is often asked, What connection exists between photography and the art of war? That there is a direct and natural connection, we think it will not be difficult to show.

An army has always had, and always will have, need of numerous auxiliaries; the mathematical, physical, and chemical sciences; the graphic and the mechanical arts form part of a course of military education: they afford a valuable and often indispensable aid to the combinations of war. Drawing, in its various branches, renders immense services; photography, which proceeds from all these scientific and artistic branches, and abridges their applications, has also an unquestionable affinity with military studies.

Regarded, at first, as a scientific curiosity and wonder, photography soon made rapid progress: it has advanced as a science, and, as a useful application of science, to the point of becoming a means, which, put into the hands of every one, has received its legitimate naturalization among the arts, sciences, and civilization.

Hitherto, however, photography has not fully co-operated with the art of war. Isolated applications have, it is true, been attempted for some time past; as, for example, in copies of plans, maps, and topographical drawings on an enlarged or reduced scale, have superseded the productions of the pantograph; views of plans of battles also; but these essays have been only individual and isolated, no general application of the photographic art has been made by the Government.

Only last year the State formed, under the direction of M. Disderi, a kind of school or class, of officers selected from various regiments, to whom he gave lessons in photography.

What, let us ask, is the value of this step? Will it have the utility claimed for it? We think not. For we must, in our opinion, view the application of photography to the art of war in a different light.

The officers who attend M. Disderi's lessons are, for the most part, merely amateurs, who only contemplate practising this art as an amusement; they are very far from suspecting that they are entering upon a very difficult career, the utility of which can hardly conceal its aridity: it requires, on the contrary, at the beginning especially, men endowed with much perseverance, and well convinced that a glorious future awaits them in this path, a well-earned reputation to be acquired, and a name to be made.

If photography, as seems manifest, is to render powerful aid to military operations, and if the Government is seriously disposed to attach photographers to land and sea expeditions, it is necessary that it should clearly comprehend the importance of such a decision.

Military photography, among other applications, may embrace perspective views of fortresses, military posts, redoubts, and general views, to accompany despatches, and furnish an explanation of the results obtained, and the means employed to obtain them. In other respects, this new art will give greater precision than any written documents. We obtain, instantaneously, *proportional and measured perspectives* of the *extent* and *distances* of forts, promontories, the distribution of groups in fleets and armies: we can obtain military positions, and an infinity of essential representations, without reckoning the application of the camera to topographical plans—a problem already partly resolved—and would have been completely so if men possessing competence and leisure had devoted themselves to the art under a military point of view, instead of making of it only an object of idle curiosity. The first proposals to the Minister of War to establish a class of photography among the military staff were rejected. But when Marshal Vaillant succeeded to that post, he gave it a more cordial reception. The terms of the proposal were mainly as follows:—

To introduce photography usefully into the army, it is first necessary to select officers devoted, apt, and especially with a decided talent for this kind of operations.

To establish in each military school a proper course of instruction in photography. Four or five lessons obligatory upon all, in order that every pupil may obtain a knowledge of the rudiments of the art; then, every year to make choice of a certain number of pupils, who, having already manipulated and shown a decided vocation for the art, and perfect them in a special establishment—the military depôt, for instance—and by these means obtain a result doubly advantageous; first, to endow all the young officers with a new art; and next, to excite in them a love for the physical and chemical sciences, which they are now very far from possessing.

To provide each regiment with the apparatus requisite for taking views, plans, &c.

It will be quite easy to stimulate and sustain the zeal of the officers by a daily application of the art to works of acknowledged utility, such as views, maps, uniforms, horses, the material of war, and in fact of everything interesting to the soldier.

It will be seen from the foregoing that all that is necessary in order to render photography as useful to the art of war as many arts and sciences already are, is, first, to recognize the great aid it is capable of rendering, and then to systematically organize a course of instruction among the young officers, and maintain their interest in the art by daily application to it.

## Photographic Notes and Queries.

### Intensifying Honey and Tannin Plates.

Dear Sir,—Perhaps it might be useful to some of your readers, who work the honey and tannin process, to know that those plates can be intensified to any extent by a solution of iodine, washed and then redeveloped; a good negative should not require this, but a plate over-exposed, and then too feeble to print, can be made a good printing negative in the manner above stated, and finally well washed.

I find a plate prepared with a mixture equal parts (say 15 grs. to the oz.) of caramel and tannin far more rapid than honey and tannin.—Yours truly, G.

### Fading Prints.

Dear Sir,—Your article on the fading of positive proofs in the last number of the News induces me to bring the subject forward again from circumstances of casual observation only.

My premises going under repair, and all useless lumber being turned out, amongst which were some old photographs printed in 1838–39–40, very few of which were faded; in referring to my Journal I find the method to vary little from that of the present time, the formula I give as follows:—Best drawing paper soaked in salting bath a few minutes composed of

| | |
|---|---|
| Water ... ... ... ... | 1 pint |
| Chloride of sodium ... ... | 400 grains |

Pin up to dry.

*Silver Bath.*

| | |
|---|---|
| Nitrate of silver ... ... ... ... | 8 drs. |
| Water ... ... ... ... ... ... | 8 ozs. |

one side of the paper to be brushed over or floated on the solution in a flat dish,* to be dried in the dark. When removed from the printing frame immersed in hyposulphite of soda, 4 oz., water, 4 oz., a few minutes; washed several times in boiling water, and dried between blotting paper. These photographs were all mounted on plate with gum water, which I used in mounting botanical specimens, animal preparations, &c., it contained—

| | |
|---|---|
| Turkey gum ... ... ... ... | 4 ozs. |
| Water ... ... ... ... ... | 2 „ |
| Saturated solution of bichloride of mercury | 2 „ |

I am inclined to think the bichloride of mercury assists the preservation of the prints, for of late years I have used other substances for mounting, and washed the prints with great care, and many have faded quite away.—Yours obediently,

H. R. Nichols.

[As the prints were on thick drawing paper, it may be that the bichloride of mercury never came into contact with the image; if it had done so it must inevitably have acted upon it, and probably in an injurious manner, as its usual effect upon a silver print is to bleach it. The perfect condition of the prints referred to, and indeed of very many old prints, which did not receive a tithe of the washing, &c., which prints now generally receive, is somewhat puzzling. The only suggestion we can make on the subject is, that at one time prints were washed individually, and that now they are washed in batches; a circumstance which materially alters the case. We shall have pleasure in receiving our correspondent's account of various waterproof compounds, as the hints of practical men on such subjects are always of value.—Ed.]

## Miscellaneous.

Physiognomy and Photography.—Looking over the portraits of men who have risen above their fellows, who have blessed, cursed, or influenced their race, we find no commonplace faces—none whose visages are beneath their greatness. Napoleon thought a large nose a mark of strength of character. So it is; but not alone the nose, but all the features are well developed in men of mark and vigour. A small and insignificant face is unknown to greatness. In saying so, we only claim, with the phrenologist, a large brain, which manifests itself in a corresponding countenance. None will deny that character is expressed in the face and body; the only doubt is as to the possibility of the skill that can read its complex and intertwined signs with any certainty. Lavater did not cultivate physiognomy in the specific spirit which alone can discover and secure truths for mankind. If any one would give to physiognomy the labour and genius Gall gave to the brain, and Professor Owen has given to comparative anatomy, there is little question but valuable results would be attained. He would have the world with him for sympathetic and admiring students, for we are all curious about one another, and ready to take stock of each others' attainments and possibilities. One of Lavater's constant difficulties was in careless and incorrect portraits. Now we have photography, we can not only study the living at our leisure as they are, but can obtain faithful transcripts of the best pictures of men famous and infamous who have passed from earth.—*Chambers's Journal.*

* I have now in use some of the wooden dishes used by me at that period; they are made of pine wood, lined with caoutchouc and Stockholm pitch, equal parts, melted together.

I can furnish you with many interesting compounds also of gutta-percha, having used the latter for various purposes for several years. I may say fully fifteen years. H. R. N.

## Talk in the Studio.

Copyright in Fine Arts.—The Copyright (Works of Art) Bill passed through committee, in the House of Lords, on Tuesday evening.

Royal Portraits.—We have pleasure in announcing that their Royal Highnesses the Princesses Helena and Louise honoured Mr. Jabez Hughes with sittings for portraits, at his studio, in the arcade, Ryde, by appointment, on Tuesday last. Several successful portraits, both single and grouped, were obtained. Their Royal Highnesses were accompanied by Major Elphinstone and Lady Caroline Barrington.

Large Angle.—We recently received from Major Gordon, of the Ilse of Wight, some 12 by 10 photographs, produced by a Voigtlander orthoscopic lens of 11½ in. focus. The pictures were very good indeed, and the definition pictorially sufficient to the edges. This, of course, includes a large angle, and with very satisfactory effect.

M. Claudet's Enlarged Drawings.—We received from Mr. Macandrew, a few weeks ago, a letter on M. Claudet's enlarged drawings, produced from a photographic negative by the aid of the solar camera, in which it was stated that a specimen exhibited at a meeting of the Photographic Society as produced in the manner described, was simply a painting, and whatever excellence it possessed was due only to the skill of the painter, who alleged that he had erased the slight traces on the canvas before commencing work, as being more hindrance than aid. We declined to insert the letter, as it simply involved a question of personal veracity in some of the parties concerned, and not of photographic possibility, as, if the pictures were not produced as described, they might have been; and we did not wish to give publicity to gossipping on the part of this painter, which, to speak mildly, was at least very imprudent. As the letter appears, however, in two of our contemporaries, in one of which it is accompanied by a letter from M. Claudet, who has been courteously permitted an opportunity of vindicating his veracity in the same page in which it is called in question, we now notice the matter to remark that M. Claudet distinctly describes every picture of this kind which he exhibits in the International Exhibition as having been traced by himself in the manner described in his paper, and painted under his own eyes. The only portrait not so painted was that of Professor Faraday, in relation to which the painter's assertion has been made. The true explanation of this matter is to be found, we fear, in a little of that jealousy in which so many artists indulge, and which induces them to seize every opportunity of decrying the merit of the photographic drawing, and alleging their independence of its aid. Not every painter who even now condescends to earn money by colouring photographs, is like our friend Wall, an ardent and enthusiastic lover of photography, as well as a skilled artist with the brush. Our opinion of M. Claudet's method was expressed last week. Its products are not photographs, but illustrations of a valuable application of photography to large portraiture, and as such worthy of much praise.

New Method to Amalgamate Zinc.—To amalgamate zinc of electric batteries, Mr. Berjot uses the following process:—Dissolve 7 ounces 375 grains of mercury in 3 pints 4 ounces of nitro muriatic acid (nitric acid 1 part, hydrochloric acid 3 parts). Heat the mixture a little, and add to it 2 pints 4 ounces hydrochloric acid. It is sufficient to put the zinc a few seconds in this mixture to have it amalgamated. The process is very simple and not costly. The above amount of mercury is enough to amalgamate 150 to 200 cylinders of zinc.

Gun-cotton as a Filter for Strong Acids.—Bottger recommends chemists to use gun-cotton as a filter for concentrated acids and liquids decomposable by organic matters. The author employs it with the greatest advantage for filtering concentrated nitric acid, fuming sulphuric acid, chromic acid, permanganate of potash, and even concentrated solutions of potash, and aqua regia. He says that properly prepared gun-cotton is only attacked at the ordinary temperature by acetic ether.

New Explosive Pyroxyline.—The latest explosive material consists of the flour of starch, which, boiled in a peculiar way with nitric acid, possesses a far greater projective force than the gunpowder in ordinary use. It also has the great advantage of not fouling the piece to any appreciable extent, and, from the nature of the materials used, is produced at a far cheaper rate. Another point in its composition which recommends it especially for fortresses and magazines, is the facility with which the ingredients are mixed together, thus rendering it possible to keep them separate until wanted for actual use. In this state the powder is non-explosive. The experiments now in course of progress in Vienna and Berlin are said to leave little doubt as to its general adoption in the Austrian and Prussian armies.

## To Correspondents.

Teesdale.—If you call upon us when you are in town we will advise you 2. The "halo" of which you speak is most probably a reflection from imperfect mounting of the lens. 3. Prints after washing are generally allowed to dry spontaneously. Many operators place them between leaves of blotting paper kept for the purpose, to remove excess of moisture, and then leave them to dry. Some operators make it a point to dry faint prints by the fire, under the impression that rapid drying gives a little more brilliancy.

"Mr. Warner, of Ross," presents his compliments to the editor of the Photographic News, and will thank him to state in his "Notices to Correspondents," that owing to the damp from the walls in the International "*Sky Parlour*," his specimens of enlarged photographs from small negatives (for which he has just obtained an "*Honourable Mention*" and Certificate of Merit) have been taken down; but that similar ones, with copies from the small negatives attached, may be seen at the exhibition of the *South London Photographic Society*, at the Crystal Palace, Sydenham.

C. A. R.—The deposit on the deep shadows of your negative, which obstruct the light in printing, and cause parts which should be black to be very pale, is really a form of fog. You do not describe the details of your manipulation; but it is probable that you develop with iron, and strengthen with pyrogallic acid and silver, and it is in the course of the latter operation that this deposit takes place. If so, you will probably find the use of citric acid in the pyro solution, instead of acetic acid, will aid in preventing this deposit. Pouring a weak solution of tincture of iodine over the plate, and then washing it off, prior to the application of pyro and silver, will also aid in preventing it. If these remedies do not apply, state your operations more clearly, and we will assist you further. Your other specimen has some good qualities, but it is a little hard, and the definition might be better.

A. B. C.—The general proportions of your proposed glass house appear to be very good. We should prefer nine feet dark over the head of the sitter to six, and about six feet at the sides, next the background, might be dark also. The amount of slope or "pitch" should be rather more than you propose, in order to prevent the slightest chance of water lodging and gradually soaking in. If the total height be 14 feet, let the sides be nine or ten feet, which will make the slope more steep than you propose, and will rapidly throw off water in very heavy showers. If your position will admit of placing the house so that the sitter will face the north, it will be an improvement. Except for ventilating purposes, we do not see the necessity of making any of the sashes to open.

W. Bartholomew.—A correspondent, who has not Mr. Bartholomew's address, asks us to put the following questions relative to the morphine dry process, and will be glad if Mr. Bartholomew will kindly help him with a few hints:—"Is old or new collodion the best? Must the plates be perfectly washed, or only with a limited quantity of water? My bath I have made at the rate of 1 grain muriate of morphine to 10 ounces of bath; is that enough or too much? The plates I have tried have been rather less sensitive at the corners and edges: should this be so? The bath deposits a dark looking film on the glass bottle in which I keep it; how can I prevent this?"

New Subscriber.—The specimens you enclose are very bad examples of mealiness, and we regret to say that we cannot give you a certain cure for the defect. It arises from a variety and combination of causes, primarily we believe the paper is at fault, but a variety of causes will bring it about when the predisposition is in the paper, and some modes of dealing will mitigate, if they do not cure. In the first place, the use of a thin, weak, or fogged negative will materially aid in producing the defect, whilst a clean, brilliant negative, which permits perfect reduction in printing will largely prevent it. In many cases we ascertain that the use of a neutral of alkaline silver bath, or of the ammonia nitrate silver bath for exciting the paper will prevent it. In some cases washing well with *distilled* water before toning will prevent it. In some cases the use of a bath of acetate of soda prior to toning will prevent it. It is a defect which has rarely if ever occurred in our own hands, and therefore we can only record the experience of others as to its cure or prevention. A very great deal has appeared in our pages on the subject during the last twelve months, but the chief remedies suggested are those we have just named. Good paper and good negatives are of the chief importance. The fifth print is altogether a puzzler, we cannot assign any certain cause for the effect. 2. The shadows turning red during intensifying is a circumstance we have met with. It will sometimes occur when intensifying, after fixing, in the light. When it occurs as you describe, after the fixed plate has stood a while in the light before intensifying, it may possibly, or may not, be due in some way to that cause; but we have seen it occur under these circumstances only when the plate has been imperfectly washed, and some traces of cyanide of potassium, and perhaps of cyanide of silver, have remained in the film. If the plate be thoroughly washed after fixing, and the intensifying be done in yellow or subdued light, this red deposit will not appear. The Almanac, "Manual of Colouring," and back numbers have been forwarded. Please state from whom your post-office order is made payable, whether with your full name or initials only.

J. Wilkinson.—The orange glass about which you enquire, regarding which we made a favourable report to Photos, was obtained, we are informed, of Messrs. Burfield and Rouch.

Chromo complains that he cannot learn colouring satisfactorily from a book. A good manual of instruction is an invaluable aid to the student, but how far it will be sufficient without the aid of a teacher, must largely depend upon natural capacity, &c. By all means, if you have opportunity, take lessons: you cannot have a more able or conscientious teacher than Mr. Wall. His own practice is chiefly in oil, but he is perfectly familiar with other methods. His address is 35, Westbourne Grove, Bayswater.

T. G. M.—You may add a bromide to your simply iodized collodion without difficulty. Bromide of cadmium, at the rate of from half a grain to a grain to each ounce. It may be either added to the collodion direct, or previously dissolved in a very small quantity of alcohol

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 203.—July 25, 1862.


## MODIFICATIONS IN THE TANNIN PROCESS.

The universal testimony to the excellence of the tannin process for dry plates, both in this country, on the Continent, and in the United States, seems to promise that if it be not in its original form *the* dry process which is required, at least some modification of it will be. We question whether, since its discovery, any other dry process has been half as much practised, or with half as much success.

We glean from time to time additional evidence as to the two modifications which have been recently brought prominently under public attention, the hot development, and the addition of honey or a similar substance to the tannin solution. Regarding both, the balance of evidence seems to be in their favour. Major Russell, the originator of the process, in a recent letter to us, says:—

"More than a year ago, however, I found out that tannin plates, unlike most other dry plates from which nitrate has been entirely removed, may be too dry; and in that case are less sensitive, less intense, and appear to solarize more readily. From this, I thought it probable that some substance which retained a moisture, might be advantageously mixed with the tannin, but tried no experiments in this direction, until I heard of Mr. England's use of honey, which I should think likely to answer well, if not used in sufficient quantity to render the surface sticky. I fancy, however, from theoretical considerations, that the same object may be obtained with still greater sensitiveness by other means, and several weeks ago prepared a number of plates to test the matter, but have not yet exposed them, on account of the unfavourable condition of the light, for it is quite useless to try experiments for sensitiveness in any but an uniform light; and this cannot be depended on, except when the sky is quite bright."

Lieut.-Col. Stuart Wortley, who has just returned from Italy, showed us the other day some very excellent pictures from tannin plates. He states, that he has found a similar advantage, as to sensitiveness, to that claimed for the addition of honey, when gum arabic has been added to the tannin solution. Some time ago the Rev. J Galloway Cowan related similar experience.

It is only right to add, however, that we have heard in some instances that these additions tended to destroy the keeping qualities of the plates. Mr. Hurst, an enthusiastic Yorkshire amateur, recently called upon and showed us some exceedingly fine tannin negatives. He stated that on the whole he preferred the original process to any of the modifications; as he was willing to give the long exposure, and obtained very perfect results. He had tried the honey and tannin with very satisfactory results. When the plates were freshly prepared they were decidedly considerably more sensitive than those with tannin alone. When they had been kept a few weeks however, this advantage was lost. At the end of a fortnight he found them no more sensitive than plain tannin plates, and he had a conviction that with longer keeping they would become even less so, as the film seemed to him to become, in the course of time, contrary to all expectations, even more completely hard than tannin alone. The fact, observed by all who have tried it, that honey and tannin give a hard dry film instead of a slightly sticky one, is somewhat unexpected; but that they should give a film which eventually becomes harder even than tannin alone, seems very singular, and deserves further examination, as does also the question of the keeping properties of honey and tannin plates generally.

The value of heat in developing, although still the subject of conflicting testimony, is obtaining increased recognition. Major Russell informs us that he has been experimenting in its use. He says—

"With regard to the use of heat in the development, my brother, Mr. Branfill, used it successfully; and I tried many experiments in that way long before hearing of Dr. Draper's experience. My experiments were not carried far enough to enable me to speak with much confidence, but the results were very promising, as I have succeeded by the aid of heat in bringing out a tolerably good picture after about $\frac{1}{25}$th of the exposure which would otherwise have been necessary. There are some difficulties in working in this way, which might probably be overcome; the picture is something like that brought out in the wet process by iron, and intensifies with difficulty. One circumstance, which I have not seen noticed is, that the image brought out by the aid of heat after very short exposure is quite superficial, and when dry can be entirely wiped off with the finger: this is probably the effect of the want of penetration of the light into the yellow iodide. After varnishing, however, the image would doubtless be firm enough to print from. Hot water is very apt to loosen the film, if on bare glass or on gelatine; but on a thin coating of india-rubber bears a boiling hot liquid with even less risk of moving than when a cold one is applied. I cannot as yet give any directions as to how the hot development should be managed; but it will probably be found that the heat should be proportioned to the length of the exposure, as the application of boiling water to a plate exposed about one quarter the usual time, will start the detail, but at the same time spoil the picture by fogging. The least trace of acid in the water destroys the invisible image. Pyrogallic solution is easily decomposed by heat, so it is better, if possible, to work with hot water, alternated with cool developer."

The thin feeble image, to which Major Russell here alludes as the frequent result of hot development, we have met with in our own experiments. The image is full of detail, but with no contrast, resembling in appearance the images produced by an over bromized collodion. The suggestion as to the relation between the amount of heat and the time of exposure, has, as Major Russell conjectures it would be, been found of the greatest importance. Some time ago Lieut.-Col. Stuart Wortley, in a communication which appeared in the News, pointed this out; and in a recent conversation he insisted strongly on the necessity of recognising this principle. The specimens he showed us of the results of hot development were exceedingly soft and full of detail.

Photographers on the Continent have recently been giving much attention to the tannin process, and Mr. Adolphe Martin, and M. Gaudin, endorse the value of hot development. We may mention that Mr. Sutton, who for some time maintained the pre-eminence of a simply iodized collodion for the tannin plates, has recently come to the conclusion that a bromide in dry plates materially accelerates; and with the honest straightforwardness which always distinguishes his writings, at once avows this change in his views on the subject, and explains the cause. We had hoped to relate the results of some further personal experience in this direction; but must delay it for the present. In the meantime, therefore, we lay before our readers these few brief notes on the subject. We shall be glad to learn from time to time the results of their experience.

## "OUR LIVERPOOL CONTEMPORARY."

We have to claim the indulgence of our readers for a few moments, whilst we make one or two explanations or comments upon a matter we should prefer to pass in silence, were it not for the fact, that silence would, probably, be misconstrued. We have been for some time past subjected, in the pages of a contemporary, to a series of petty innuendoes, and covert offensive allusions of various kinds. In accordance with a rule we had laid down for ourselves, we have steadily forborne to notice these puerilities. We now find a long leader making a general onslaught on the contemporary photographic press, in which onslaught, however, we are honoured with especial acrimony. As some of the statements made are false, as well as foolish, we feel it desirable to say one or two words on the subject. These few words of explanation over, we shall again resume our rule for unswerving observance.

Our primary offence appears to consist in the fact, that we sometimes refer to the journal in question as "Our Liverpool Contemporary," and, it is alleged, we quote its pages without due acknowledgment. In order to make clear the gravamen of this offence, it may be necessary, to some of our readers, to mention one or two facts. Some years ago, an enterprizing photographic society in a large provincial town established a journal to record its proceedings, and aid in the diffusion of photography. This happening at a period when the art was rapidly spreading and growing in importance, this little journal shortly afterwards became the organ of two or three other provincial societies. At this stage of affairs, the conductors of the journal in question, one fine morning, appropriated the title by which the organ of the London Photographic Society was best known to the world, and published their provincial paper as *The Photographic Journal.* Legal proceedings were at once initiated by the society to protect its property, and the issue was, that after the loss of a good round sum, it obtained again the sole use of the proper style and title of its journal.* The provincial journal in question did not, however, on being compelled to give up the title of *The Photographic Journal*, resume its old appellation, but, after some shuffling, dubbed itself, modestly, as *The British Journal of Photography.* Well, if it had assumed the title of "King of the Cannibal Islands," or "Brother to the Sun and Sister to the Moon," we don't know that any one had a right to find fault, beyond remarking, that the title was too long to be generally repeated. It has so happened, however, that those who have known the journal longest, and despise its frequent shortcomings in the matter of good taste, have respected it as, in its capacity of organ of the provincial societies, doing some good work, are now, as they have ever been, in the familiar habit of speaking of it as the *Liverpool Journal.* There is no disrespect in that title, but honour, as in using it they avoid recalling the act of "appropriation" to which we have referred. We are asked by our contemporary, however, in the article to which we have alluded, "Why Liverpool contemporary? Why not Manchester, or Birmingham, or Edinburgh, or, for that matter, London, unless it be to disguise the identity of the *British Journal of Photography*?" Why? Why for the commonsense reason that it *is* our Liverpool contemporary, that it was born in Liverpool, brought up in Liverpool, and is still printed and published, and, we hope, read there, and for the reason that being all this, there is nothing that we can conceive to be ashamed of in hailing from such a city.

We have used the phrase "Liverpool contemporary" amongst others, such as *Liverpool Journal, British Journal,* &c., whenever it happened to flow to our pen, to designate shortly the Journal in question, when we have chanced to refer to it, without the remotest thought of disrespect. As to disguising the identity of our contemporary, such an idea could never have given us a moment's concern. If that identity is so easily disguised, and our contemporary *must* know best, why we are sorry for it.

The especial article we are charged with quoting without due acknowledgement, was one by Mr. Dawson on bromides. Now weeks before that article was published our attention had been specially called to it in a private letter from Mr. Dawson, and we, in another letter, had promised to extract it when it appeared. We did so, as our readers will remember, distinctly accrediting Mr. Dawson as the writer, and our Liverpool contemporary as the Journal. This, then, stripped of its verbiage, and the "sound and fury signifying nothing" is the only special grievance our contemporary has to relate; the remainder of his allegations consist of vague generalities as false as this is foolish.

Our contemporary professes to be injured, and to apprehend loss of his identity, by our reference to him as "our Liverpool contemporary." As we have said, we have never dreamed of evasion, or meant anything like disrespect in the use of this term, although it may be, as he himself seems to think, that the photographic public are less familiar with his existence and history than we had even given him credit for. But had we intended anything offensive in this phrase, we must remind him that he initiated the practice of using an insulting alias some years ago. Before the advent to office of the present editor of the News, it used to be a favourite joke with our contemporary—and the pun was vastly funny!—to refer to this Journal as "our *weakly* contemporary!" We have never followed his bad example in the use of offensive epithets, and we can assure him that we should never dream of offence in his use of phrases to designate us analogous to those we use, such as "our London contemporary," or "our weekly contemporary," or any other reasonable variation he may choose.

Regarding the general charge of non-acknowledgment, we might with great propriety, if the allegations of our angry contemporary were correct, simply point to the well-known and universal practice in journalism by which any meeting held, speech made, paper read, &c., and appearing in the public prints, becomes, by universal agreement and understanding amongst journalists, common property. To illustrate: there are some hundreds of newspapers in Great Britain, who daily and weekly publish reports of the proceedings in parliament, &c. Of these hundreds there are not more than about half-a-dozen who send reporters to the house and obtain direct reports. The only advantage they secure over the press at large by this, is priority of publication. The custom to which we refer as recognized by common consent is further endorsed by law; the period of copyright permitted to newspapers, if we remember rightly, being just six hours! We could point, moreover, to the fact that our contemporary, when it suits his purpose, avails himself liberally of this custom without the slightest scruple!

But let us be understood, as regards our contemporary's alleged injury, we do not avail ourselves of the shelter of any such custom. We simply and entirely deny his charge. We know well the thin skinned irritability of our contemporary, we know well that during his career he has been a journalistic Ishmael, his hand, in turn, against every one of his *confrères*, and if every one's hand has not been against him, it has been simply due to forbearance or contempt. We resolved, when two years ago we assumed our duty as Editor of the News, we resolved then, if it were possible, to live at peace with him, and avoid deforming our pages with personal squabbles; and we are therefore most scrupulously in the habit of duly acknowledging any scrap of photographic information which in the interests of our readers we may quote from his pages. We do this with the utmost care: if it ever occur otherwise, and we think it does not, it is an accident. Very rarely, indeed, do we reprint at all from his journal; when we do so, it is, in the majority of instances, papers read at some provincial society of which he is the official organ. In such cases we always duly credit the writer of the paper, the society at which it is read, and the organ in which it appears.

We might add another reason for this care in acknowledgment, which is perhaps more important to our readers than our contemporary's feelings. It is this: that when a quotation is properly acknowledged, all responsibility for

* It may interest the members of the Photographic Society to know that this little experiment in "appropriation," "annexation," or whatever else it may be termed by the journal in question, cost the society nearly one hundred pounds!

its statements rests upon the original source; whilst quotation without acknowledgment transfers the responsibility to him who uses the quotation. Now we must confess we have no such profound faith in our contemporary as would lead us to accept the responsibility of affiliating his articles. If we had no other reason, we should refer to the source of such quotations, as indicative of the exact amount of authority they possess.

As we have said, we are attacked in a general onslaught, in which our American *confrères* come in for heavy punishments, and our contemporary the *Photographic Notes* for a timorous side-blow, which is, however, at the same time, accompanied by an impertinent and patronizing attempt to palliate its force or deprecate rejoinder, in which we detect some uneasy recollection of our friend Sutton's hard hitting on former occasions. Both he and our American friends can take care of themselves, and the bickerings of the Liverpool journal with them is no concern of ours. Nor have we ever meddled in the matter. Since, however, we are thus mixed up in the attack in question, we may make one or two remarks. The two American journals, in addition to the valuable original matter they publish, extract largely and with much discrimination from European journals. This is done, we have pleasure in adding, as a general rule, in a fair and honourable manner. with proper acknowledgment of the source. They have their own method of doing this, either at the beginning or end of a continued article, so as to avoid repetition. Inadvertent omission may also occur with them as with others. For some of these fancied or accidental omissions, these journals have been the object of of repeated querulous attacks in the pages of our contemporary. Our pages have been laid under contribution in American and other journals, to at least an equal extent; but it has never occurred to us to make this a grievance. Whether the source were acknowledged, or by inadvertence omitted, we have given our contemporaries credit for the best intentions, and have felt glad to know that information calculated to aid the progress of the art was obtaining wider circulation. In the very last number of one of our contemporaries in this country, an article is reproduced without acknowledgment, which had been contributed, to use our contemporary's phrase, "exclusively" to our pages; but we should feel somewhat ashamed of ourselves to cry out about it as an intentional evasion or slight. It is one of those cases in which "giving impoverishes not, neither does withholding enrich." If our contemporaries gather matter from us, we at times glean from them, and thus increased circulation is given to all photographic information of value, and the public are the gainers. We believe we are generally duly accredited, and we know we always aim at accrediting others; and if on either side it be at times omitted, it is probably through oversight, by which we do not know that anybody is much injured.

With our Liverpool contemporary all this is different. We rarely quote from his pages at all, and when we do so, as we have before said, we scrupulously acknowledge the source. But there is one other circumstance in connection with this, to which we must allude. It so happens that at one of the photographic societies the editor of our contemporary is the constant chairman: in this capacity he takes charge of, and systematically refuses to ourselves the permission to copy or make abstracts of the papers read at its meetings. It generally happens that we receive copies of such papers from the gentlemen who read them; it has occasionally happened, however, where we have not had opportunity of communication with the writers, that we have had to wait to reproduce them until our contemporary has published. If the paper has happened to be one of interest to our readers, we have then inserted it. In regard to such papers, which have been read to a society of which we are a member, and at a meeting at which we are present, which we forbear publishing from reporters' notes, simply to do the fullest justice to the writers and our readers; in regard to such papers our contemporary has the audacity to demand from us that we quote them as from his pages! This, in the one or two instances in which it has occurred, we have declined to do: this we shall decline to do, as by doing it, we should be but offering a premium for narrowness and discourtesy. We have had a tolerably lengthy experience in journalism: we had in early life a somewhat extended experience in reporting meetings of all kinds, and we can unhesitatingly aver that we never met with a similar discourtesy and similar claim to this on the part of our contemporary.

Let us add, that in cases where at any meeting the copy of a paper has first fallen into our hands, we have always hastened to furnish our contemporary with copy without any delay. Let us also state that our contemporary seeks and obtains, in common with ourselves, from the *Journal of the Photographic Society*, copy of the papers read at its meetings, for publication contemporaneously with that journal. The editor of the *Photographic Journal*, with unfailing courtesy, supplies to his contemporaries, copy of papers, to which he could assert a sole claim, his journal being the property of the Society; and our Liverpool contemporary eagerly profits by a courtesy which he is altogether unwilling to extend to others. We hold the conviction that photographic journals, as well as photographic societies, should exist for the advancement and diffusion of the art, and that so soon as they lose sight of that as their primary aim, so soon will they deserve to lose what should be their secondary object, individual advantage and trade profit; and, what is more, we believe *they will get what they deserve.*

To eke out his case, our contemporary talks about our quoting from foreign journals without permission or acknowledgment. To this, as we have before said, we might very properly answer with a *tu quoque.* We might also, for the satisfaction of our readers, if these explanations and denials had not extended to such a length, enter into more explanations or denials. But, so far as our contemporary is concerned, we simply bid him mind his own business. If he did that properly, he would probably have his hands full. Of our arrangements with our contemporaries, he simply knows nothing whatever, nor does the matter concern him.

We have already far exceeded the space of which the matter is worthy, simply because we wish to avoid the necessity of further reference to it. We must add one word, however, before we conclude. The question will naturally arise, What are our contemporary's motives for all this? It is difficult to determine. It may be from the preverted idea held by some that they raise themselves when they try to pull others down. It may be from motives which it might seem egotistic in us to express. It may be that our contemporary has eaten of the insane root, and believes in his own charges; it is possible to nurse a delusion until it seems true. It may be that a journal having, like a corporation, "neither a body to be kicked, nor a soul to be saved," will perpetrate things individuals would shrink from—for personally, and apart from journalistic rivalry, we have received many courtesies from all connected with the *British Journal.* However all this may be, we can simply assure our readers that we shall omit no opportunity of bringing under their notice everything, from every source, which can interest them and promote the art; and that in doing so we shall always endeavour to deserve, not their esteem only, but also to preserve our own self-respect and secure the goodwill of our fellow-labourers in photographic literature.

## MR. BEDFORD'S PHOTOGRAPHS OF THE EAST.

Mr. Francis Bedford invited his friends, on Tuesday last, to a private view, at the German Gallery, Bond Street, of his Photographs taken during the tour in the East, in which, by command, he accompanied His Royal Highness the Prince of Wales. These pictures are one hundred and seventy-two in number, chiefly on 12 by 10 plates. The entire series will be published in twenty-one parts, each containing eight or more pictures, the cost of the entire series being forty-three guineas. They will also be divided into sections, consisting severally of the Holy Land and Syria, of Egypt, and of Constantinople and the Mediterranean.

The occupation of a gallery, and formation of a complete exhibition with the works of one photographer, is a novel thing in this country, but we have rarely been more delighted by a visit to any exhibition than we were on Tuesday, and we left, after a few hours of close examination of these pictures, feeling very proud of photography; proud of its capabilities, of its progress, and of the recognition it was beginning to receive. If it had been necessary to offer any plea in mitigation of judgment, Mr. Bedford would have been furnished with the most cogent. A hasty summons, with little time for preparation; vicissitudes and transitions of climate the most unfavourable to photographic operations, rapid travel permitting no opportunity for the examination and selection of localities, points of view, or conditions of light. Mr. Bedford informs us that he never had a single opportunity of going twice to the same view, such selection as he could make at once, under such conditions of light as might then exist, was alone possible. Of the trials of climate, &c., some idea may be formed when it is stated that it was not unusual for swarms of small flies to fill the camera during exposure, and sometimes cover the plate! With all the drawbacks which existed, however, we have never seen a more magnificent collection of photographs, even of scenes and subjects affording the best facilities for successful operation. Apart from all other associations which give value and interest the photography is, in the majority of instances, perfect. Unlike so may eastern pictures, these are entirely free from hardness, and that spotty, cut-out effect and entire absence of atmosphere, which many have regarded us the inevitable characteristic of photographs taken under the glare of an eastern sun: these are full of gradation of tone, delicate, yet vigorous, and full of relief. There is no white-paper sky in the whole series, everywhere a satisfactory atmospheric tint is present, and in many instances exquisitely-managed clouds are introduced by skilful "dodging." We know this will be condemned by some photographic purists as not legitimate. We have ever held that success is the touchstone of legitimacy. These are so successful, in many instances, as to deceive even a technical eye into the conviction of their genuineness. The method employed is, we believe, simply painting on the back of the negative, in which the sky is in all cases sufficiently thin to print through; the old-fashioned sky, "as black as your hat," once regarded as such an excellence in a negative, has no existence here. Only the skilled artist could, however, produce such results by painting on the negative, as these; and this success will be no justification to the bungler who shall attempt a similar process. Mr. Bedford's object has been to make his photographs pictures, and he has succeeded to admiration.

This is, unquestionably, out of all proportion the finest series of eastern photographers which has ever been produced. Many new pictures not brought home by former operators are here; and subjects before done are here presented from new aspects. Notwithstanding the necessity of prompt action, and the lack of time for carefully studied choice of position and light, it is surprising in how many instances both seem all that could be desired, the practised eye of the artist having, almost intuitively, at once selected the position which would yield a picture.

Our space precludes the possibility of entering into detailed criticism or description of the pictures, otherwise, perhaps, no subjects could be more alluring. The scenes here depicted are fraught with associations of the deepest possible interest in relation to sacred or profane history; here are relics, indeed, of a period, in regard to which the most venerable antiquity of recorded facts are but as yesterday. Here, amongst the ruins of Baalbec, are still standing, notwithstanding the ravages of time, and the still more ruthless ravages of man, titanic columns, in regard to which much of the architecture of modern days seems child's play. These were ruins even before the dawn of history, and are monuments of the state of the arts at a period we are in the habit of regarding as the night of time! Here, too, are the scenes so sacred to the student of Biblical history; Bethlehem, Bethany, and Jerusalem; here is the Mount of Olives, and the Garden of Gethsamene; and here the Lake of Gennesareth, whose face seems to wear an eternal calm in memory of the feet which once trod it. But the series abounds with associations of every kind which are full of interest, to which we have not space even to refer.

We merely call the attention of our readers to the photographic interest of the series, and earnestly recommend all who can to visit the German Gallery where they are now exhibited. To photographers they are full of value in an educational point of view, as illustrating the result of excellent judgment, fine taste, and unsurpassed photographic skill when working under difficulties. Notwithstanding the picturesque nature of the subjects and the associations by which they are surrounded, we have seen many views of eastern scenes, which from their hard, dry, spotty character, even these associations have failed to make interesting. These photographs are, however, valuable as pictures: some few are a trifle under-exposed, one or two may not be well lighted, and in one or two more the architecture may be a trifle distorted, but, as a whole, they are perfectly harmonious, with a singular uniformity of excellence, well worthy of study and imitation.

As we have before stated, those pictures were produced by the wet collodion process, the operator working in a tent. In the majority a bromo-iodized collodion and pyrogallic acid development were used. The lenses were single landscape lenses, about thirty seconds being an average exposure. Development was in all cases stopped before entire density of the sky was obtained, a circumstance to which much of the harmonious and atmospheric character of the pictures is doubtless due.

## THE INUNDATIONS IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

In a short time we reached the broken sluice, the sad cause of all the dire mishaps which had visited this unfortunate district; and certainly a most melancholy spectacle presented itself to the eye. Only one arch of this magnificent structure remained in anything like a state of completeness, but it had a zigzag fissure descending to the keystone of the arch. Of the other buttresses all had disappeared but one, and it had laid itself over as though resting a moment before taking the final plunge into the eager water.

The day was now gloriously fine; compact masses of cumulous clouds were driving rapidly across the sky. With eager hands, therefore, we prepared to make our first venture, We had scarcely got our dark box into workable trim, before a native, who had been watching our movements with an astonished expression very visibly apparent on his face, and who had hitherto kept at a safe distance, now cautiously approached, and after walking all round, ventured to look through the yellow glass. The moment he found he was enabled to see through it, he rushed to a group of companions at a distance, and presently I was surrounded. They were, however, doomed to disappointment, for my black hood was now over all, and nothing was to be seen. The fortunate beholder, however, tried to lessen their disappointment by a vivid description, and certainly his inventive faculties were of no mean order, for in a few minutes he had completely crammed them with an account very considerably removed from the truth. Lots of wonderful moving figures were to be seen inside the box, all *wonderfully* magnified. "It was a more wonderfuller *penny rummer* than he had ever see'd at a fair."

We exposed two plates, and both were tolerably successful.

* Continued from p. 342.

Indeed, they proved more interesting, as pictures, than we had hoped originally to secure, for the tide was rushing through the unguarded portal of the Middle Level with resistless impetuosity, and as the exposure of the plate was instantaneous, all this was crisply rendered in the picture. We therefore contentedly packed up, and moved on to a spot about a quarter of a mile distant on the banks of the drain, which was now the centre of attraction for all the surrounding county.

As we walked on the banks, we saw sad traces of the eager useless efforts first made to prevent the calamity. Here, heaps of chalk, thrown in to prevent the banks from falling further into the stream; a little further on, and hundreds of sacks filled with clay, thrown in for the same purpose; but in vain. A few steps brought us to the site of St. Mary's Bridge, and here we found a more determined stand had been made against the intrusion of the victorious waters; but made, alas! too late. Lighters had here been sunk, weighted with clay and gravel; but the water, like an infuriated bull let loose, had tossed them up, bottom upward, and emptied and sent them spinning along quite giddy, and they in turn became unmanageable, and knocked down several bridges in their mad career. One of them lay bottom upward on the muddy shore, and close to it a lot of basket-work, made by some of the Dutchmen engaged in shutting out the sea in the estuary near Lyme. This kind of defence, so successfully employed in Holland, was quite useless here. The sea was in no mood to be *cradled*, and washed it indignantly away. In a few minutes, we came to a scene of the most animated description, and we saw at once that at least something was being done, that in the end promised to be successful. Hundreds of navvies were here busily employed in all kinds of labour; some filling sacks with clay, others bracing together large masses of timber, another gang was directing the efforts of a dozen pile-driving engines, whilst an immense number were filling railway trucks with gravel. A tramway had been laid down on either side to facilitate operations, and it was clear that in spite of the hubbub and noise attendant upon the efforts of a thousand men, all was so admirably arranged, and there was so little of confusion, that things were progressing as rapidly as possible towards a successful conclusion.

At this point our progress was barred by a strange looking being, whom at a distance we had taken for a rat-catcher, for he had a paper band round his hat, and also a belt of the same material. These badges informed us, however, on a nearer inspection, that he was a police assistant. He informed us we could proceed no further; but on informing him that we wished to see the contractor, we were conducted to his office. We found in him an old friend, who was an enthusiastic photographic amateur, as well as an accomplished musician, and with whom we had spent many pleasant hours. After the first congratulations, scarcely a moment's breathing time was allowed, for our unexpected arrival was most opportune, a number of pictures being particularly wanted, to show the works in various stages of progress. It is true that the tall gaunt-looking pile-engines were rather unmanageable objects in the picture; but still, the ceaseless activity of the workers, and above all the furious roar of the waters against the piles, which would so soon bar their further progress, furnished materials which, if caught instantaneously, would be interesting to all who had witnessed the strange scene; we were, therefore, soon earnestly at work. Unfortunately, however, it had now gathered up dark overhead, and the general aspect of the sky led us to expect a tempest. A smart shower now followed; but as we had a plate ready, we determined to use it. It turned out to be an amusing picture, but was useless from under-exposure. All the overlookers in various parts of the works were to be seen with umbrellas over their heads. After waiting patiently until the shower was passed, we ventured another plate, which proved tolerably successful. The picture was a singular one. The sky at the back of the picture was very dark, broken only by one or two small openings of a lighter colour; all the busy foreground was, in consequence, thrown into very prominent relief, which appeared very strange and unusual, and the foaming water, though full of detail, appeared of unusual whiteness. Two more pictures, and we had done all that was necessary for that day; and as we were anxious to still go further, for the wide waste of waters had still to be visited, we were soon packed, and were once more on our way.

The prospect of a fine evening was not a bright one, for though by this time the wind had freshened into a stiff breeze, the clouds were low and heavy, and were coursing each other at a rapid rate; but *nil desperandum* is pre-eminently the photographer's motto, and we determined to go to the end.

Our journey lay through country the exact counterpart of that now inundated, and separated from it only by the banks of the Middle Level drain. It is a district of singular fertility, and there is something of solemn grandeur about its vast monotony, that in some measure compensates for the want of variety so abundant in hilly districts. As far as the eye can reach, the view is unbroken, and the sky line is as straight as at sea. Field after field meets the eye, separated from its neighbour by a deep dyke filled with water. The effect is not unlike a vast chess-board; the cultivated squares are laid out with such regularity, and at this season the alteration of colour is so marked. Now a field of wheat with its intense green, and now one of mustard or coll seed, with its brilliant yellow, shines out with dazzling brightness. The hawthorn hedge is scarcely to be seen in this part. The willow pollard may be regarded the king of the fens, for his reign is undisputed here.

V. B.

## Scientific Gossip.

There are few words which are capable of giving rise to more thought and abstruse enquiry than "force." The subject is one which cannot fail to be of interest to the photographic experimentalist, working, as he does, with tangible and ponderable effects, produced apparently without adequate material cause. The present state of our knowledge, or rather, of our ideas in respect to this subject, has been recently summarised by Professor Tyndall in a lecture before the Royal Institution, and as some attention has been excited by the ideas therein propounded, we give our readers an abstract of it. As giving a general idea of the meaning of the word force, a pound weight of lead was allowed to fall on to the floor of the theatre, from a height of sixteen feet. It required exactly a second to fall, and the instant before it touched the earth it had acquired a velocity sufficient to carry it forward at the uniform rate of thirty-two feet a second, if the attraction of the earth could have been annihilated at that instant. If the pound weight had then to be thrown upwards in opposition to gravity, the velocity with which it must start from the earth's surface in order to reach a height of sixteen feet, would have to be thirty-two feet a second. If double this speed were imparted to it, it would not only rise to twice the height, but to four times the height. The mechanical effect, or, in other words, the work done by a projectile increases as the square of the velocity, and this holds good whether the weight be cast upwards in opposition to the resistance of gravity, or if the projectile be sent into water, mud, earth, timber, or other resisting material. When the pound weight falls to the earth from a height of sixteen feet the motion is suddenly arrested on contact with the ground, and the mechanical force changes into heat, the exact amount due to its suddenly arrested motion being sufficient to raise the temperature of it own mass three-fifths of a degree Fahrenheit. This heat increases according to a remarkable law. If we double the mass which falls, other things being equal, we double the amount of heat;

but if we double the velocity, we quadruple the heat. The heat developed, therefore, is exactly in proportion to the mechanical effect, or the mass of the body multiplied by the square of its velocity. In the experiments at Shoeburyness it is a common thing to see a flash of light even in broad daylight when the ball strikes the target; and a rifle bullet developes an amount of heat on collision with the target, sufficient, if wholly concentrated in the lead, to raise its temperature 960°, or above its melting point. But we can convert heat back again into mechanical motion, and it has been found both by theory and experiment that an amount of heat equal to three-fifths of a degree Fahrenheit may be so expended as to raise a pound weight to the height of sixteen feet. The combustion of coal is a familiar instance of the production of mechanical effect by the expenditure of heat, and in this agent we possess an enormous store of mechanical power. A pound weight of coal produces when burnt an amount of heat sufficient to raise a weight of one hundred pounds to a height of twenty miles above the earth's surface, and conversely 100 lbs. falling from a height of twenty miles would generate, on striking against the earth an amount of heat equal to that developed by the combustion of a pound of coal. Wherever work is done by heat, heat disappears. A gun which fires a ball gets less heated than one which fires blank cartridge. Although the amount of heat developed by ordinary gravity appears insignificant in comparison to that developed by combustion, if we permit gravity to act throughout its entire range the disproportion ceases. Place a pound weight at such a distance from the earth that the attraction of gravitation is barely sensible, and let it fall to the earth from this distance. It would reach the earth with a final velocity of 86,747 feet in a second, and on collision with the earth the body would generate twice the amount of heat evolved by the combustion its own weight of coal.

Turning our attention from the earth to the sun, it has been found that the whole heat emitted by this orb in a minute is competent to boil 12,000 millions of cubic miles of ice cold water. Whence then, is the sun's heat derived, and by what means is it maintained? No combustion, with which we are acquainted, would be able to produce a temperature like this; besides which, even supposing the sun to be a solid globe of coal, it would burn itself out in 4,600 years. What agency can then produce the temperature and maintain the outlay? We must seek for such a cause in the heat which is developed by mechanical motion. We have seen that a body falling from space into the earth, would generate twice the amount of heat evolved by the combustion of its own weight of coal. The maximum velocity with which such a body could strike the earth, is about seven miles in a second; whilst the maximum velocity with which it could strike the sun, is 390 miles in a second, when it would generate 10,000 times the heat of combustion of an equal weight of coal. It is almost certain that an infinite number of small bodies—planetary dust—exist in space; the showers of meteoric stones so common on different parts of the earth's surface, are part of these. The zodiacal light has been almost proved to consist of an assemblage of asteroids revolving round the sun; and moving as they do in a resisting medium, they continually approach the sun and fall into it, producing the heat observed and constituting a source from which the annual loss of heat would be made good. The sun according to this hypothesis would be continually growing larger; but how much larger? Were our moon to fall into the sun it would develope an amount of heat sufficient to cover one or two years' loss; and were our earth to fall into the sun a century's loss would be made good. Still, our moon and our earth, if distributed over the surface of the sun, would utterly vanish from perception. Indeed the quantity of matter competent to produce the necessary effect would, during the range of history, produce no appreciable augmentation in the sun's magnitude. The augmentation of the sun's attractive force would be more appreciable. However this hypothesis may fare as a representant of what is going on in nature, it certainly shows how a sun might be formed and maintained by the application of known thermo-dynamic principles.

## TANNIN AND HONEY PROCESS.

After sensitizing the plate, attach the holder, and pour over the film a solution of one part honey to three parts water; let it flow three times round the surface, and then off. Place on a levelling stand, or level board, till next plate has been similarly treated, or until half a dozen or more have been thus prepared. Wash off the honey solution thoroughly under a tap, or with water from a jug. Stand to drain for one minute, then apply the tannin solution (5, 8, or 10 grains to the ounce), and dry.

This plan of applying the diluted honey before washing off the free nitrate, is applicable to all dry processes. Caramel may answer as well. In this process, it is preferable to mixing the honey with the tannin, as you get a cleaner plate, with less liability to stains, if the washing have been properly performed.

In preparing dry plates, it is a matter of great importance to use soft water for washing them. Hard water coagulates the pyroxyline, and produces mottled films. Spring or pump water may often be soft enough, but where that is not the case, boiled and filtered rain water should be used.

R.

# The International Exhibition.

## BRITISH PHOTOGRAPHIC DEPARTMENT.

The landscape photographs in the British Department is, as we have before intimated, out of all proportion the best in the Exhibition. It is not, however, illustrated by many novelties, the majority of the pictures having been exhibited before. The exquisite examples of Bedford, and Heath, and Mudd, have all before come under our notice. Wilson's charming little views, 7 by 4 in., including a wide angle, by the triple lens, are novelties, and are universally admired. Here are Sidebotham's "Chepstow Castle" and "Tintern Abbey," by the collodio-albumen process, which we have noticed on a former occasion, and which we now think, notwithstanding the extensive collection in which they appear, are as fine pictures as ever have been produced by the art. Dixon Piper's "Old Curiosity Shop," "Lock Gates," &c., have before been seen and admired; a large instantaneous picture entitled, "Early Morning," is, we think, new; it contains a magnificent study of clouds. The photographs of Sir A. K. Macdonald, Bart., we have already noticed at the Crystal Palace: all the specimens we have seen, both in the Exhibition and elsewhere, are among the finest examples of picturesque photography we have seen.

Mr. Rouch exhibits a frame of the small landscapes of the same sort and style as those to which we have referred of Wilson's. The subjects, which are all in the Isle of Wight, and include some instantaneous pictures, are well chosen and picturesque, and the photography delicate and brilliant, and the pictures altogether exceedingly good. Lieut.-Col. S. Wortley exhibits a series of views of Vesuvius in a state of eruption. These are, in our estimation, amongst the most charming photographs in the Exhibition: each picture includes some view of the noble Bay of Naples, with Vesuvius belching forth smoke in volumes; this, together with the exquisite natural clouds, are most perfectly rendered, indicating that the exposure has been instantaneous. There are some interesting views of the effects of the earthquake in the town of Torre del Greco. The majority of the pictures are on 12 by 10 plates, and were taken, we are informed, with the 8½ by 6½ triple lens. We regret that these prints were amongst the severe sufferers by the damp walls, and are at present removed for the purpose of being replaced by fresh prints. Mr. Henry White exhibits a series of very beautiful and well-selected views in North Wales, in which the photography and the art are alike good. The contributions from the Amateur Photographic Association include many specimens of great excellence. Mr. Lynden Smyth exhibits several of his most artistic pictures. Mr. D. Campbell sends his fine picture, the "Auld Brig o' Doon," and several others. Dr. Hemphill's photographs of Irish antiquities attract attention, not only from the interest of the subjects, but the excellence of the photography. W. L. Noverre's photographs of Indian subjects are full of interest. Mr. W. J. C. Moens sends a capital series of fine pictures taken at various places full of classic memories, during a yacht voyage up the Mediterranean. Roger Fenton sends many of his old favourites. Mr. Wardley contributes a number of his very excellent pictures by the collodio-albumen process. Mr. R. Keene contributes a good number of very fine specimens. B. B. Turner sends some of his fine calotypes. Amongst other very meritorious contributors of landscapes we find the names of John Burton, and Robert Pateson, T. Carr, W. Mayland, Baynham Jones, Stoven and Co., Major Russell Mauners Gordon, Major R. Gordon, J. Cade, Stephen Thompson, Dr. Holden, J. Spode, S. Bourne, F. Frith, Lord Caithness, and some others. As we have before said, however, so many of the landscape photographs have been exhibited before that they do not call for lengthened notice here.

The *Daily Telegraph* has the following remarks on the display of British photography :—

"The stairs that lead from the middle vestibule of the picture galleries to the photographic department are three score and ten. Sated and dazed. With acres of glowing colour, the visitor to the Louvre of Old Brompton will hesitate about ascending to that height where sun-pictures are displayed in their uniform sameness of hue, relieved here and there by tinted specimens. Truth to tell, the photographs have proved the least attractive branch of the show; and the contributors of these productions must now perceive that they gained little by refusing to be classed with exhibitors of machinery. Still, for those who take any interest in an art which is one of the poetical commonplaces of our day, and whose history is quite a fairy tale of science, the 'sky-chamber' in the south central tower of the Exhibition Building will, assuredly, have charms enough. We ask our readers to accompany us thither in our notice to-day. The first thing to strike them is the ominous fact, that many frames are being removed, leaving great blank gaps on the bare walls. Damp is the unfortunate cause of this proceeding. Signs of warping, and of mildew, are apparent on many of the photographs which remain. Another very striking peculiarity about some of these works—we will not say of all, or half, or a quarter of the number exhibited, but certainly of a large proportion—is their faded appearance. Evidently there has been haste on the part of several photographers; and if their pictures continue this growth of indistinctness, they will, before the close of the Exhibition, be little else than strips of yellow paper. It is not a pleasant indication of the quality of photographs, on the permanence of which we depend for reminiscences in future years of scenes and faces which are present, and which are dear to us. Every practitioner should be able to assure his patrons that each portrait is sufficiently washed to stand exposure to light for any duration of time. That this precaution is efficacious, we may see in the pictures taken of the 1851 Exhibition by Mr. Mayall. The date of these works is established beyond dispute. We know that they were produced exactly eleven years since, and they are as clear and deep in tone as if they had been printed yesterday. The fact speaks for itself, and must prove an additional recommendation of Mr. Mayall to the confidence of the public. Of his portraits we need only say that they are worthy his reputation."

Without any wish whatever to lessen the weight of this recommendation, we must point out the absurdity of the deduction. The pictures of the Exhibition of 1851, here referred to, are very fine Daguerreotypes, worthy of all praise, but their permanency and that of paper pictures have nothing in common, the causes of permanency in the former having no analogy or relation to the amount or mode of washing employed in the latter. The writer proceeds :—

"Others who follow in the same beaten track of portrait-photography deserve praise as great for the good focussing and tone of their specimens. Messrs. John and Charles Watkins are specially to be commended; and Mr. H. N. King has a great variety of likenesses, which readily strike the beholder. In coloured photographs—a very nice and somewhat dangerous ground—we see nothing to rival the pure, though rich and brilliant, miniatures of Messrs. Loch and Whitfield. Their table includes quite a little gallery of aristocratic beauty. Mr. A. Claudet, who takes a bold stand as a life-size delineator, has a portrait of a lady which might almost pass for an original painting from the walls of the Royal Academy; and his likeness of Sir Charles Wentworth Dilke, taken by the enlarged solar camera, is a most characteristic and vivid piece of portraiture.

"The branches into which the practice of photography has lately struck are fairly, though not abundantly, illustrated in this collection. The photo-galvanographic process, which is a species of engraving by the combined aid of photography and the electrotype, is exemplified by Mr. Paul Pretsch. The kindred method of phototyping in carbon, claimed as a French invention, is also shown in the fac-similes of old prints and title-pages exhibited by Mr. John Pouncy. Another system of reproduction by photographic agency, is that of Col. Sir Henry James, director of the Ordnance Survey, whose plan of photozincography has the credit of saving the country many thousands a year. For maps, engravings, and printed objects, this method is eminently efficient and serviceable. We must conclude our present remarks with a reference to the transparent albuminous pictures for the stereoscope, and other interesting productions shown by Messrs. Negretti and Zambra. In these stereoscopic views, principally from Siam, Java, Sumatra, China, and Japan, the only specimens of albumen transparencies to cope with the works of M. Ferrier of Paris, are here afforded. There is in the stand of the above-named firm a work of high merit and interest. It is in the form of a printed volume, published by Messrs. Smith and Elder, but chiefly noticeable as a wonder of photography. The book is a recollection of Egypt, Nubia, and Ethiopia, principally from the pen of Mr. Joseph Bonomi, the great Eastern traveller, with controversial notes by Mr. Sharpe, of Egyptian celebrity. It is illustrated with stereoscopic scenes; and a folding instrument accompanies the work, to enable the reader, as he proceeds, to realise each description.

"The London Stereoscopic Company, as may be supposed, is not behindhand in contributing to the display. Among their noteworthy objects are some American views, including an excellent photograph of the Virginia Falls, and several good examples of the instantaneous process. Messrs. Cundall and Downes have a show of unexceptionable specimens. They manifest quite a speciality for picture copying—another and a far more difficult operation than photographing a print in black and white. Mr. L. Caldesi reproduces cartoons and other works of art with wonderful skill, and also displays great capability in rendering all the fine qualities of highly-finished and delicate miniatures. The albumen photographs from Palestine, by Messrs. Cramb Brothers, are praiseworthy for their clearness and precision; but, as pictures, they are deficient in half-tones and nice gradations. That deservedly-famed artist, Mr. James Mudd, adheres principally to the collodio-albumen process, and wite a result which justifies his preference. Indeed, we are of opinion that this is the only known operation of photography by which justice can ever be done to scenes of external nature. Ordinary collodion photographs are best for portraiture, simply because they do not require so much time; but for landscapes, despite the almost perfect works of such experienced and able men as Mr. Bedford and Mr. Wilson, the true method of bringing out every *nuance*, and of assimilating shadows with high lights, seems to involve the slower operations of collodio-albumen."

Photographers will smile to learn that the exquisite delicacy, softness, atmosphere, half-tone, and gradation of Mr. Mudd's pictures are due to his use of a dry process, and that in regard to such qualities wet collodion is inferior!

"We have mentioned Mr. Bedford, and it would be a difficult task to do him full justice, were this column free for a descriptive account of his labours at the International Exhibition. We need scarcely say that they do not comprise the pictures taken by him in the Holy Land, while accompanying the Prince of Wales, inasmuch as the return of his Royal Highness and suite took place after the Exhibition had long been open.

They are, in fact, mostly English and Welsh scenes. "Cheddar Cliffs" and a "Study of Nature" are gems which no visitors to the gallery should miss. The simple truthfulness of these and kindred works is worth a hundred feats of artistic arrangement, such as photography, undervaluing its true mission, sometimes aspires to. A very ingenious manufacturer of subjects is Mr. Robinson, whose "Holiday in the Woods" made quite a sensation at one of the annual shows of the Photographic Society. Almost as much trouble must have been expended on the building up of this scene, and on the bringing together of all its constituent parts, on the drilling its actors, on the subordination of its accessories, and on the careful eliminating of all petty "accidentals," which, though likely to pass unobserved in a *tableau vivant*, are apt to grow painfully obtrusive in a permanent picture—almost as much trouble, we say, is apparent in the mere posing and scene-setting, and arrangement of properties, in this composition, as a practised draughtsman would have found in placing the whole group on paper or canvas. There is something almost absurd in all this preparation for a mechanical and instantaneous operation. It is an anti-climax —a reversal of the order of things. Mr. Robinson's subject-photograph, "The Lady of Shalott," is quite an artistic *bouleversement*. We not learn from Mr. Tennyson that this interesting damsel, before she floated down to Camelot, had her hair nicely crimped and spread out as we see it in the picture; but this may or may not have been the case. What we would specially remark is the disproportion in this work between the model's part and the artist's. The whole merit lies in the cleverness of a *pose plastique*. The printing from several negatives may be adduced as a feat of photographic skill, but such a system of legerdemain is radically vicious, and cannot help photography on to higher things."

It is somewhat amusing to remember that the "set scenes" and "properties" which the critic declaims against in the "Holiday in the Woods" are simply the noble woods of Kenilworth. His other strictures here are of equal worth. For instance, the real beauty of the "Lady of Shalott" consists far more in the mystic twilight effect which pervades the meadow trees overhanging the river, than in anything else; the faults chiefly belong to the boat and figure; and yet we are told the "whole merit lies in the clearness of a *pose plastique!*" The question of composition printing is one upon which competent authorities differ; but the mode in which the critic discusses the matter shows that he understands nothing whatever about it, either as regards its failings, difficulties, or merits.

"Mr. Frith exhibits some of those wonderfully sunny Eastern views for which he is celebrated; and Messrs. Dolamore and Bullock have some neatly vignetted landscapes. The *cartes de visite* of Mr. Kilburn must not be passed over; they are very sharp and well defined. Colonel Verschoyle contributes several valuable illustrations of different processes. His favourite method seems to be the employment of collodio-albumen, but he is also very successful with tannin. We spoke yesterday of the effective results of printing in carbon, instead of nitrate of silver; and we may refer to the specimens exhibited by Messrs. C. Walker and Son as admirably demonstrating the immediately good results of the operation. Its lasting qualities, however, are its great speciality. The prints may be submitted to acid, which will destroy the paper, but leave the carbon uninjured. The perishable nature of photography is the worst charge that can be brought against it. Let this character of evanescence and frailty be removed, and photographic portraits will be preferred to all others. We have had to speak of the faded appearance of many pictures in the present exhibition, and we have ventured to attribute the defect to want of care in fixing the image. It is urged as a plea in extenuation that the damp on the walls has partly caused the blemish; but this excuse will only serve the photographs on the walls, not those on either of the screens."

And we may add, although the critic implies the contrary, that it is on the walls alone, and not on the screens that the palpably fading pictures are found. Some few old pictures on the screens, have a somewhat yellow tinge; but it is unquestionably the damp walls which has proved the grand *crux* of exhibitors. We trust, as we have before said, that the annoyance will be turned to good account.

## PHOTOGRAPHIC CHEMICALS.

Considering the immense development of the trade in photographic chemicals which has taken place of late years, and the number of articles which have to be specially prepared or purified for photographic purposes, it seems strange that we have so few exhibitors of photographic chemicals in the department set aside for this art. There is, indeed, only one case exhibited containing chemicals alone, and not more than two or three other cases in which the chemical agents are shown in conjunction with apparatus. This seems the more remarkable, as there are few photographic dealers of any eminence who do not, at all events, profess to prepare some chemicals in a state of photographic purity. Amateurs have thus got into the habit of considering that certain houses make a speciality of certain photographic chemicals, so that if a complete chemical outfit were required, in order to obtain the various materials in the greatest state of purity, they must be purchased at half-a-dozen different establishments. We do not know whether we are justified in assuming that there are really very few special manufacturers of photographic chemicals, but an observer would be warranted in drawing this inference by an inspection of the very limited display of chemicals in Class XIV. The solitary case of chemicals alluded to above is contributed by Messrs. Hopkin and Williams (3,099). Although some of the articles exhibited have been injured by the intense light and heat to which they have been subjected during the last two months, the whole collection is, perhaps, unsurpassed in the whole building for completeness and beauty. Some of their exhibits have been alluded to before, as they are shown in duplicate in the Eastern Annexe, but the greater number are only exhibited here. The beauty of their bromide of cadmium has already been spoken of. Near this is a very fine sample of recrystallized nitrate of silver, which, judging from the excellent manner in which it has kept its colour, must be, at all events, free from that bug-bear of photographers—organic matter. A sample of iodide of ammonium has not stood the searching ordeal of light and heat so well as its neighbour; the crystals are very fine, and when they were first exposed were quite white, but they have now assumed that orange brown colour, from the separation of iodine, so well known to all who make their own collodion. Of course, we need hardly say, that this colouration says nothing against its original purity, but is a natural consequence of its exposed position. A tray full of very white pyrogallic acid deserves notice, and also some fine crystals of hyposulphite of soda. These are of some interest, as they show photographers what the pure salt is like, it being by no means so easy to obtain in commerce as is sometimes imagined. A specimen of pure tannin is especially worthy of notice at the present time, owing to the beautiful dry process which owes its name to this organic body. A few words on the chemistry of this body may be acceptable to our readers. There are several varieties of tannin, or tannic acid, as it is also called. They are astringent principles, very extensively diffused throughout the vegetable kingdom. The bark and leaves of most forest trees, such as the oak, the elm, the willow, the horse-chesnut, and the pine; and many fruit trees, such as the pear and plum, contain tannin in notable quantity. The wood, bark, and roots of many shrubs also contain one of the forms of tannin. These varieties are named according to the source from which they are derived; thus, tannin from the gall nut is called gallo-tannic acid, that of the oak is called querci-tannic acid, that of the fustic, mori-tannic acid; the tannin of the cinchona is called quino-tannic acid, whilst the name, mimo-tannic acid is applied to the tannin of the catechu. Besides these, there are several other distinct varieties of tannin which are yet unnamed. We may remark, in parentheses, what a fine field is here open for new process-mongers; there is very little doubt that any of these varieties of tannin will answer the desired photographic end, so an ingenious experimentalist has only to make use of a hitherto unused variety of tannin, when he can appear in print as the discoverer of a new dry process. We may, perhaps, save much future discussion as to priority of discovery, if we state that the tannin in general use is derived from the gall-nut, and is, therefore, known as gallo-tannic acid. It is a pale, yellow crystalline body, soluble in water and dilute alcohol, but sparingly so in ether, it has decided acid reactions, reddening litmus paper, and dissolving carbonates with effervescence. Its diluted aqueous solution slowly absorbs oxygen from the air, and is converted into gallic acid. Many salts, such as chloride of potassium and others, coagulate an aqueous solution of tannic acid. When subjected to a temperature of about 620°, it is decomposed into pyrogallic acid. The remaining chemicals in this case do not need detailed notice. They include a very nice sample of gallic acid, some sodio-chloride of platinum, ammonio-nitrate of silver in crystals, which have a suspiciously dark and fulminating appearance, the rather rare salt—chloride of lithium, and numerous other ordinary photographic chemicals.

## AWARDS OF JURORS IN CLASS XIII.

[WE here merely make such a selection of names in the class devoted to philosophical instruments as we think may be interesting to photographers, from having some connection, intimate or remote, with photography.]

MEDAL.

UNITED KINGDOM.

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Beckly ... ... ... ... | For his registering anemometer; and for the skilful execution of his photographs of the sun. |
| Butters, T. E. ... ... ... | For great excellence of workmanship of parallel glass for optical instruments. |
| Casella, L. P. | For his mercurial minimum thermometer and accuracy and excellence of construction of thermometers, &c. |
| Chance, Brothers ... ... | For improvements in dioptric lights and great excellence in optical glass. |
| Dallmeyer, J. H. ... ... | Equatorial telescopes. For his excellent object glasses and equatorial mountings. |
| Dancer, J. B. ... ... ... | For the general excellence of his microscopes and microscopic photographs. |
| De la Rue, W. ... ... ... | For the general excellence of his astronomical photographs. |
| Grubb, T. ... ... ... | Large equatorial telescope. For general excellence; with regard to his object glass no means of testing it has been afforded to the Jury. |
| Highley, S. ... ... ... | For students' microscopes, combining cheapness and good workmanship, and for excellence in other optical instruments. |
| Horne and Thornthwaite ... | Herapathites, and polarising apparatus. For general excellence. |
| Negretti and Zambra ... | Meteorological instruments. For many important inventions and improvements, together with accuracy and excellence in objects exhibited. |
| Ross, T.... ... ... ... | Microscopes and hand telescopes of large aperture. For great excellence of construction. |
| Silver, S. W., and Co. ... | Conductors insulated with caoutchouc. For general excellence of manufacture. |
| Smith, Beck, and Beck ... | Microscopes and other optical instruments. For economy in the production of students' binocular microscopes, and the excellence of their instruments generally. |
| Wenham, F. H. ... ... | For improvements in his binocular microscope. |
| | AUSTRIA. |
| Voigtländer and Son ... ... | For general excellence in optical instruments. |
| | FRANCE. |
| Duboscq, L. J. ... ... | Optical instruments for scientific researches. For great excellence. |
| Serrin, V. ... ... ... | Self-regulating electric light. For novelty of construction and general excellence. |
| | PRUSSIA. |
| Nobert, F. ... ... ... | For the great skill displayed in the execution of his microscopic test lines. |

HONOURABLE MENTION.

UNITED KINGDOM.

| *Name of Exhibitor.* | *Objects Awarded and Reasons for the Award.* |
|---|---|
| Ackland, W. ... ... | For the accurate construction of his straight line dividing engine. |
| Buss, T. O. ... ... ... | For the accurate construction of his hydrometers. |
| Murray and Heath ... ... | For good workmanship in his philosophical instruments. |
| Reade, Rev. J. B. ... ... | For novelty of construction in his hemispherical condenser for microscopes.. |

## STUDY OF THE WET COLLODION PROCESS.

BY E. REYNAUD.*

I NOW proceed to study the cause of the failures that most frequently occur to the inexperienced operator, and by analyzing each in succession, determine their source, and the means of avoiding them. These failures may be classed as follows:—

1. Non-adherence of the collodion film, and cracking and scaling off while drying.
2. The formation of streaks, specks, &c.
3. Spots in the film produced during sensitizing.
4. The negative riddled with small holes produced during development, and also after intensifying and fixing.
5. A complete fogging of the picture.

I will now proceed to examine each of these failures in succession, and determine as completely as possible their causes and remedy.

### 1. *Non-adherence of the collodion film, and cracking and scaling off while drying.*

These two accidents often occur together, and are generally caused by imperfect cleaning of the glass plate; but they may be produced by another cause. Too large a proportion of iodine, for example, will destroy the adherence of a collodion film. Examination of the negative will show whether it is to this excess of iodine, or to a bad cleaning of the plate, that this accident must be attributed. For, if the reverse of the image, that is, the side touching the glass plate is spotted with brilliant reductions of metallic silver, visible after the negative is fixed, we must attribute it to imperfect cleaning of the plate.

The complete absence of these reductions, and the transparency of the darkest portion of the picture viewed *positively*, indicate, on the contrary, sufficient cleanliness in the glass, and if, notwithstanding, the film does not adhere, if it allows the solutions to penetrate through it to the glass, this non-adherence must be attributed to the proportion of iodine in the collodion being too strong.

It must be remarked in this place, that the quantity of iodine which the latter can contain with impunity depends on the thickness of the film, and, consequently, on the proportion of pyroxyline: the thinner the film, the less quantity of iodine: it must be kept within the following limits:—

| | |
|---|---|
| Pyroxyline ... ... ... | 1·5 to 2 grains. |
| Iodine... ... ... ... | 1·0 to 1·5 „ |
| Mixture of ether and alcohol ... | 100 „ |

The iodide of ammonium being that which, in equal weight, contains most iodine, must be employed in less proportion.—1 grain to 100 of collodion is quite sufficient.

The rapidity with which the collodion plate becomes tinted at the moment of immersion in the sensitizing bath, and the degree of opacity the film exhibits when the sensitizing reaction is completed, appears, *à priori*, a certain means of recognizing the greater or lesser proportion of iodides contained in the collodion; but these different phenomena being intimately allied to the state of the silver bath, and the nature of the iodides, we must examine these several questions, in order to arrive at a rational conclusion.

The degree of concentration of the bath has a considerable influence upon the phenomenon of double decomposition, which, as we know, forms iodide of silver in the film; thus, at the moment of the immersion of the plate, a certain

* From the *Moniteur*. Continued from p. 332.

quantity of iodide is dissolved by the water of the bath, before the nitrate has decomposed any: thus, we may understand, that the proportion of iodide remaining in the film becomes changed more or less; now, when a weak bath is employed, this solution subtracts a larger proportion of iodide. If the strength of the bath be 4 per 100 only, the water would have the effect of dissolving out almost all the iodide contained in the film, before the latter became attacked by the nitrate, which would cause the production of a layer of iodide of silver superimposed on the collodion film, and so little adherent that it would become detached under the slightest motion of the liquid. We perceive, therefore, that the same proportion of liquid may give very different results, according to the strength of the silver bath.

The use that has already been made of this is now to be considered: we know that the iodide of silver, being soluble in the nitrate of that metal, the first plates sensitized in the bath furnish it with a certain quantity of this substance, and that, consequently, the proportion remaining is diminished. But when a certain number of plates have been sensitized, the nitrate of silver becomes saturated with iodide, and can no longer dissolve any of the latter, as it is formed upon the plates subsequently immersed. From all that has been said, it is clear that, in order to operate under constantly identical conditions, the collodion must always be iodized in the same proportions, the sensitizing bath maintained at the same degree of concentration, and saturated at first with iodide of silver, in order that it may never dissolve that on the sensitized plates.

In operating under these conditions, we may always avoid the accidents now under consideration, and the non-adherence of the film can be due only to the bad quality of the pyroxyline, or to imperfect cleaning of the glass plate.

(*To be continued.*)

## ABOUT TONING BATHS.

BY J. MILTON SANDERS, LL.D.*

In the fourth volume of the *American Journal of Photography*, p. 457, there is an able article from the pen of Mr. Sutton, on the "Alkaline Toning Bath." Mr. Sutton has no doubt given us the rationale by which "mealiness" is produced, and he has, doubtless, indicated the chemical changes involved in the reaction. Mr. Sutton has arrived at the conclusion that soda must be used, in combination with gold, there being not the least doubt but that there exists in the toning bath a double chloride of gold and sodium, whether we make use of the acetate, phosphate, or carbonate, of that base. Thereupon Mr. Sutton concludes that it is "better to use carbonate of soda at once, than to proceed to the inelegant and roundabout way of substituting phosphate, or acetate of soda, for it." Now, it is politic, before we shall have arrived at a conclusion, that we should take rigid cognizance of all the phenomena observable in the reaction investigated.

We all know that the toning bath made with the carbonate of soda is very unstable. With each new batch of prints the bath requires to be made anew, otherwise mealiness, and other disasters, will occur. If the toning bath, according to Mr. Sutton, requires simply a soda salt, no matter what kind it may be, in order that the requisite amount of this base shall be furnished to form a double salt with the gold, does it mean whether we use either the phosphate, acetic, or carbonate, indiscriminately? Mr. Sutton, it would appear, thinks not. Then, wherefore, does the bath made of the phosphate of soda possess such stable qualities, while that made of the carbonate of this base is so prone to decomposition? yet such is the case. A bath made of the phosphate of soda, by the formula given below, will never deteriorate, but really appears to improve with age. We have tried pretty much all the recipes given in the journals devoted to photography (at least a score of them), but have found none of them to surpass the phosphate bath in depth, clearness, and beauty of tone. With this bath you can tone from a light brown, or chocolate, through all the intermediate shades to a deep, rich brown, to blue-black, without incurring the risk of mealiness, or failure of any kind. The merest tyro can prepare and use this bath for months, nay, indefinitely, without the fear of its deterioration, only observing to replace with fresh fluid that obstructed by use and evaporation. In this bath we have for the last ten months toned indiscriminately ammonia-nitrate and albumen prints, and we have found the result in every case perfectly satisfactory. The formula for this bath has, if we are not mistaken, been published in this journal. It is the discovery of Mr. Maxwell Lyte. We have tried several variations from it, but with no better results. It is prepared as follows:—In sixteen ounces of pure water, dissolve three drachms of phosphate of soda, and then add one fluid ounce of solution of gold, made by dissolving fifteen grains of that salt in one pint (sixteen ounces) of pure water, and neutralizing with carbonate of soda, if it is required. Perhaps the addition of a little sesqui-nitrate of uranium might improve the tone, if that be possible. At all events it might modify it, but whether there would result an improvement is only to be determined by experiment.

In our daily working of this bath, we proceed as follows:—We first make the bath, according to the formula above; we keep by the bath a bottle of solution of phosphate of soda, three drachms to the pint, and by the side of this another bottle containing the gold solution, made as given above. To keep up the stock of fluid we occasionally add a little of the phosphate fluid, and if the toning proceeds too slowly, we add a little of the gold solution. Our prints, or *cartes de visite*, we are willing to compare with the best taken in New York, or elsewhere, for upon their appearance we are willing to rest the virtues of Mr. Maxwell Lyte's toning bath.

Now, there has been an immense amount of twaddle written about toning albumen prints. Every photographer who can write a lucid sentence, has inflicted upon the public his essay upon this subject, but nowhere have we found any of these gladiatorial gentlemen advocating a toning bath that performs equally as well as the best carbonate of soda ones, and which never requires to be made anew, nor deteriorates with age. Will not some of these chivalrous gentlemen take up the lance in defence of the poor old neglected hyposulphite bath, and shiver it against the shaft of those who are so loud in praise of the carbonate of soda bath? With all due deference then, to so mighty an authority as Mr. Sutton, we must dissent from his views regarding the indiscriminate use of the soda salts, but place our favour decidedly in favour of that made exclusively of the *phosphate* of soda.

We should state in conclusion, that it is absolutely necessary that the prints should be thoroughly washed before and after toning. We do not use chloride of sodium previous to toning, as has been recommended by some, for the reason that we have imagined it interfered with the clearness of the prints; but we soak the prints an hour in the first water (which of course we save for the silver it contains), when we transfer them into fresh running water and give them another hour's soaking there. We then turn them and soak them again for another hour, previous to fixing them in hypo.

The albumen paper we use in combination with this bath we make ourself. It is made as follows:—Pour the whites of six large hen's eggs into a bottle holding at least a quart, having previously taken out the germs. Add to this six ounces of water, in which is dissolved two drachms of chloride of ammonium. Shake the bottle vigourously for about ten minutes, or until the fluid flows out devoid of glutinosity, when it is ready. The paper is laid upon this albumen, taking the usual precaution to prevent the adherence of air-bubbles, and allowed to remain in it not over one minute and a-half. It is then hung up and dried.

The silver solution on which this paper is laid consists of one ounce of pure nitrate of silver dissolved in six ounces of distilled water, to which add a few drops of aqua ammonia. The paper is allowed to remain on this solution from four to five minutes, and then hung up and dried.

* From the *American Journal of Photography*.

## Correspondence.

### PHOTOGRAPHY IN AMERICA.

Dear Sir,—I owe you, as well as numerous friends, a sincere apology for my neglect of duty in the photographic world. I have only to inform you of my various occupations for you to excuse me willingly. In this country a man must turn is hand to everything, so I am a banker from necessity, a soldier from duty, and a photographer from pleasure.

Holding a captaincy, I was called suddenly to the wars, and am in New York on furlough, at present to look to business. I returned a few days since, and found a stack of "News" in the office for me. Accept my thanks for the copies you send me by mail, I receive them ahead of your agent here, who supplies me with my subscription copy.

During the war my letters may be interrupted very frequently, in which case please pardon short-comings, for I have discovered lately that war and photography are not akin, that collodion and gunpowder will not mix, that nitrate of silver and blood make different colored stains, and that the photographic tent and the mess tent are, *in fact*, as different as black is from white.

Now for a short talk on peaceful subjects. You see by the last number of the *American Journal*, that the dry process has come out ahead, in a trial between Mr. Coleman Sellers and myself. But Mr. Sellers was not well that day, and his pictures were far from his usual excellence, so the "duel" was hardly a fair one, for I never was in finer trim in my life. A word about tannin plates. Some correspondent of yours says the picture fades out after exposure and before development. He bases this assertion only on his own experience. If he fails to get good pictures on a plate exposed two weeks or so before development, he says it cannot be done. I have been in the habit of taking trips of several weeks in the country, carrying my camera, plate box, and plates only, developing the negatives after my return home. My pictures suit my friends pretty well, and therefore I am satisfied. I enclose two prints from different negatives of the same subject. You will see by the labels, that both were exposed the same timo and place; but only one was developed the same day, while the other (No. 307) laid two weeks before development. It is very difficult to tell which is the best. I have some negatives equally well developed three weeks after exposure, and I see no reason to expect failures under six weeks keeping. I wash my plates *thoroughly*, by using six vertical baths of water, and changing the plate from the silver bath to each one in succession, and finally immersing in a vertical bath of tannin solution, to which at least 5 per cent. of alcohol has been added. In this way I can prepare twelve to fifteen plates per hour with ease, and in case of hurry, more than that number. I cannot explain your correspondent's failure, except on the ground of lack of uniformity in preparing the surface of the plate.

I suppose you know our Photographical Society has adjourned its meetings to the second Monday in September. This was principally on account of the absence of some of its prominent members, and its secretary, in the army. This will explain the absence of your copy of the proceedings; but I hope in a few weeks we will be "right side up with care" on this side of the ocean. In the meantime, I will write as often as I can.—Yours repectfully,

F. F. Thompson.

2, *Wall Street, New York, July* 7, 1862.

[The specimens enclosed are two views of exactly the same spot, in the Central Park, New York, the only difference being that one negative was developed within 12 hours and the other in 15 days. They are both excellent photographs, and charming pictures, and there is scarcely the slightest perceptible difference between the two: perhaps that developed within 12 hours is a little more transparent and detailed in the shadows. The experience of different persons as to the result of keeping before development is conflicting. The subject certainly requires further investigation, so as to determine, if possible, the causes which at any time cause deterioration; the correspondent, who wrote to us as to his experience in the evils of keeping after exposure, was Mr. Penny, of Cheltenham, unquestionably one of the most able dry plate amateur photographers in the country. We hope this sad war will soon be over, and enable our correspondent to lay aside the sword and resume the camera, and shall be glad in the mean time to receive such hasty notes as he can find time to send us.—Ed.]

## INSTANTANEOUS PICTURES IN AUSTRALIA.

Sir,—I have been engaged for some time past in a series of experimental researches in photography, having the object in view of discovering some certain process by which the clouds could be photographed in landscapes; and I think I have succeeded in a great measure in solving that difficult problem (*vide* enclosed stereograms). According to my experience, the most beautiful photographic clouds are to be obtained towards the sun, and by selecting some light coloured object for the foreground (the church for instance), such clouds as you see in specimens marked (1) can be easily obtained by the process I adopt. I cannot manage to get satisfactory pictures with foliage in the foreground, when pointing my camera towards the sun.

The enclosed specimens I obtained with Ross's View Lenses —exposure from 30 to 40 seconds in a bright light. My process is therefore applicable to plates of any size, and differs very considerably from any of the processes now used by photographers, and which I hope considerably to improve upon in time.

Will you please to acknowledge the receipt of this in your Journal?—Your obedient servant, Jenner Plomley.

*River View, Hunter's Hill, Sydney, New South Wales, May* 20*th*, 1862.

[The letter is accompanied by a series of interesting stereoscopic pictures of Australian scenery, many of which possess very fine clouds. We insert this letter as an interesting illustration of what is going on, in this direction, at the antipodes. We shall have pleasure in hearing further from our correspondent.—Ed.]

## THE MISSING NAME IN THE JURY AWARDS.

Dear Sir,—I was sorry to see a blank in the list of Jury Awards published in your last, where should have been the name of my talented friend, Mr. John Savage, of Kingston, Jamaica, the photographer of the series of fish of that island. He is an old-established artist, and an excellent portraitist. I cannot imagine how his name was omitted, as he informed me in January what he intended to do.

Begging the insertion of this note in your valuable space, I am, dear sir, yours, &c., J. Davis Burton.

*Harborne, Birmingham, July* 19, 1862.

## MORPHINE DRY PROCESS.

Dear Sir,—In reply to your correspondent's questions on the morphine process, I believe the particular age of the collodion (provided it is a good sample and bromo-iodized) to be of small consequence, and its age may probably range from a few days to a year or two. The plates must be perfectly washed, too much water cannot be applied.

I have adopted the proportion of 1 grain of muriate morphine in 8 ounces of bath, but see no reason why 1 grain in 10 ounces should not be equally effective.

The edges and corners of the plates have never shown a diminution in sensitiveness in my hands, unless one has inadvertently become too dry before immersion.

The bath deposits a minute quantity of matter, but as every manipulator filters his bath before preparing a batch of dry plates, and the bath remaining perfectly unimpaired, I look on this as of little moment. Nitric acid, in the place of acetic acid in the bath, will exert a more decided action in preventing this, but I prefer acetic acid and filtering a little oftener; in procuring muriate of morphine it is within the bounds of possibility that you may receive acetate of morphine, and this will much increase the deposit in rapidity and quantity.

There appears to me to be a deep-rooted feeling against the use of organic matter in the bath, whether it is introduced in the collodion or applied directly to the silver solution, and if the organic matter referred to for such uses in photographic works is meant, why, the objection is well founded, for such substances as rosin, gum guaiacum, amber, oil of cloves, glycyrrhizin, &c., quickly disorders a bath; but morphine being what is styled an alkaloid, *i.e.*, a substance derived from organic matter (opium), and possessing very similar properties to an alkali, combining with, and neutralizing strong acids; forming crystallizable salts, with muriatic acid, a muriate; and with nitric acid, a nitrate of morphine; I think that there is a wide distinction to be drawn between this organic matter, and the term as usually applied in such cases. The bath I have now I prepared in January or February last, and it is in no way deteriorated, certain evidence of the harmless nature of nitrate of morphine in the silver solution.—I am, dear sir, yours faithfully,

Wm. Bartholomew.

## Talk in the Studio.

Copyright (Works of Art) Bill.—We have pleasure in announcing that this Bill, after some further amendment, has been read a third time, and passed the House of Lords. It now only waits the royal assent before it passes into law. We shall shortly lay such of the provisions as relate to photography before our readers in their present form.

The Glasgow Photographic Society.—We have pleasure in stating that there is every probability of this society being re-constituted under better auspices than it has existed for the last year or two. Indeed, it was dissolved for the purpose of getting rid of a small dictatorship under which it had for some time languished.

Mr. Bedford's Tour.—History informs us that in all memorable journeys the functions of the secretary have not been least important. Even the Japanese, on their late entrance into society, were everywhere accompanied by this indispensable functionary. The works of Mr. Bedford go far to prove that another state officer must shortly be created. While Court dignitaries in different countries are defining the duties of the Court photographer, the public at large cannot do better than admire the very admirable memoranda of the latest Royal progress which have been penned by the industry and skill of the artist who took part in it.—*The Times.*

Jury Awards.—The *Telegraph* says:—"It now appears to be more than likely that there will be some revision of the jurors' awards. The difficulty is not a slight one; for, in the first place, the value of the honour consists greatly in its being final and without appeal; while there is already a pretty general impression that medals, having been nearly as plentiful as blackberries, are not as precious as pearls, and the giving more will cheapen these distinctions yet farther. As for taking any away that have already been given, that is out of the question; so that the amendment, if any be attempted, can only amount to an imperfect patching-up of an unsatisfactory business. The discontent of exhibitors is by no means confined to those who have missed their expected award. Some are heard to protest against the loose and incorrect terms in which their articles are described; and others deem that they have been slighted by the reticence or the lukewarmness of the praise. Others, again, declare that they set no store whatever by a prize which few could manage to miss. It is a fact that, in one of the classes, out of the small number of six different forms of a useful domestic apparatus, four are rewarded with medals, while the other two are honourably mentioned. The distinction here would be in getting left out. However, it seems exceedingly probable that there will be an overhauling of the decisions, and that at least some disappointed inventors and manufacturers have yet a chance of obtaining a recognition commensurate with the value they place upon their works." Should any such revision take place in the photographic department, we would venture to suggest this question in addition to what we have before said: Is it not by some oversight that a man who has done so much to advance the artistic character of photography as Rejlander, has not got a medal?

## To Correspondents.

E. C. L.—Your question as to the best mode of developing negatives is a somewhat vague one, and cannot be answered in a short and decisive manner. The best developer depends much upon the collodion employed. Some good operators still prefer pyrogallic acid; but, in portraiture at least, iron is now almost universally used. If your collodion be strongly bromized you may use a very strong solution of iron, if slightly a weak solution. A good average formula is 15 grains of iron, and 15 minims of glacial acetic acid to an ounce of water. Some operators, as you will have seen, if you read our pages regularly, recommend various additions, such as formic acid, acetate of soda, &c. Whatever iron solution you may use it will often happen that you require, after continuing the iron as long as any additional detail is to be obtained, some additional density. This may be secured before or after fixing. A simple plan is to wash the film well after the iron has done its work, and apply a two-grain solution of pyrogallic acid, with citric acid one grain, and a few drops of 20-grain solution of silver until the right intensity is obtained, and then fix. Mr. Mudd's dry process is described on page 386 of our fifth volume, No. 154. You will find an epitome of the dry processes in the Photographic News Almanac for 1862.

J. H. C.—Samples of tannin vary somewhat. In mixing 15 grains of tannin and 15 grains of honey in one ounce of distilled water, we have not experienced much difficulty, nearly the whole dissolving, and leaving a very slight filtrate. We have heard, however, of cases similar to that you describe, in which a large undissolved residue remained. One correspondent stated that with a sample of tannin which dissolved readily alone, he had a large residue the moment he added honey, as though some insoluble compound were formed by the combination. We see no reason why this should be so: if it occur we can only recommend you to filter it carefully to get rid of insoluble particles. It should be ready for use as soon as it is mixed. 2. The majority of the back numbers of the News can be had, a few are out of print.

M. B. Y.—Both the prints enclosed are examples of virulent measles, arising from imperfect fixation. The hypo was too weak, it had been too long used, the prints had been immersed for too short a period, or they had been stuck together, so that the solution never acted properly upon them. Whichever of these causes has been in operation, the yellowness and spots arise from decomposed hyposulphite of silver, which having been formed in the print, was never dissolved, as it should have been, by strong hyposulphite of soda. We have heard many complaints of late of bad hyposulphite of soda, and from the large number of imperfectly fixed prints we receive, we conceive this complaint must be only too well grounded.

Photos.—We have no certain information, but we conceive that it is very likely the usual Exhibition of the Photographic Society will be held in the coming winter as usual; and we should imagine that any novelty in chemicals or apparatus would be admissible. 2. Your question as to the construction of "a glass-house to produce perfect pictures" is somewhat too general for a very definite answer; much depends on circumstances. Sufficient top and side light are required, but the top light should not be vertical, but should fall upon the model at an angle of about 45°. A convenient arrangement of blinds is desirable, so as to be able readily to get any amount of shadow. 3. In a short room the camera may be moved outside as you suggest, but it will be necessary to have around the lens a box or black cone, to cut off the mass of diffused light which will surround it. Diffused light entering through the lens is a fertile source of flat, feeble, imperfectly defined pictures.

W. W.—It is somewhat difficult to name any single book which will "post you up" in all that has been done in photography for the past five years. The more recent instruction books will help you, such as Hardwich's last edition and Mr. Hughes' Manual, as they contain processes as now practised. For a complete and progressive view of all that has been done in the art recently, you cannot do better than refer to our pages. The present and the last volume of the Photographic News contain an immense mass of information as to every detail of the present practice of the art, practical as well as theoretical. You will find an excellent epitome of progress in the last two Photographic News Almanacs issued.

Formic.—Your suggestion received attention.

Cassandra.—The white spot in the print now enclosed arises from the removal of the albumen from some cause. As you state that it appeared immediately after toning, it may arise from the toning bath being too alkaline. Thank you for the description of a plate holder. We shall have pleasure in receiving your further communication.

F. Vincent.—You do not state whether it is in intensifying before or after fixing that the deposit on the shadows to which you refer occurs. In hot weather it is apt to occur in both cases, but the remedy is different in each. Please state which, definitely. In any case, the use of silver from the bath is very apt to cause it. Use fresh silver solution made for the purpose. See answers to C. A. R. and New Subscriber in our last. Where the defect exists, the best remedy is to give the negative a hasty wash with a solution of bichloride of mercury, which will change the red deposit to a bluish white, which, in printing, will scarcely be observed.

Phos.—The difficulty in getting the developer to flow evenly over the plate, to which you refer, and describe it as running off "like water off a duck's back," will arise from several causes, and sometimes from a combination of them. A great accumulation of ether and alcohol in the bath, from immersion of many plates in succession, will cause it, and it may in a few days, as you describe, disappear, simply from some evaporation of the ether and alcohol from the bath. A very common and little suspected cause exists in some collodion. If the pyroxyline give a tough skinny film, and if there be a large proportion of alcohol in the collodion, it will yield this repellant film, which it seems almost impossible to wet evenly. This will sometimes disappear in a few days of damp weather, the collodion having absorbed moisture from the atmosphere, which has slightly altered its physical properties. When this is the cause, and it is most frequently so, a drop or two of distilled water to each ounce of collodion will cure it. In such a case adding alcohol to the developer is quite useless.

G. W. Hale.—The card portraits had been omitted from your envelope, as they have not come to hand. We shall be glad to give you our opinion when we receive them, and also to receive your further communication of particulars.

Received, and will be noticed shortly: A series of cabinet pictures, by G. W. Wilson; a series of instantaneous stereographs, by Mr. Alfred Harman; a composition group from Mr. Brothers, and card pictures from several correspondents.

P. Henderson.—Mr. Fitzgerald's description of a powerful and economical battery has been in type some weeks, but has been omitted through the pressure on our pages. It will appear in a week or two.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 204.—*August* 1, 1862.

## RED DEPOSIT ON SHADOWS FROM INTENSIFYING.

The elevation of temperature during summer is very frequently accompanied by the presence, in the dark room, of one very annoying evil, amongst other minor troubles. From a number of communications recently received, we suspect the evil to be very rife at the present time. We refer to the prevalence of a form of fogging, or abnormal reduction, on the shadows of the negative. Everything appears to be working satisfactorily up to a certain point; the image develops perfectly, and is brilliant and clean: during the process of intensifying, however, the deepest shadows suddenly show some signs of deposit, and before it is possible to stop operations, and wash the plate, a decided deposit of a red or coppery hue has taken place.

This occurs chiefly when developing with iron and strengthening by means of pyrogallic acid and silver. It occurs both when the process of intensifying is applied before fixing, and after fixing. It differs from general or universal fog in occurring, not all over the plate, but in patches, on the deepest shadows first. We are not now about to inquire into the theory of the matter, which is somewhat perplexing, but rather to point to some of the causes which induce the trouble, and to suggest some remedies which we have found generally efficient for preventing the recurrence of the evil.

We may observe at the outset, that the occurrence of this deposit is generally much more common with a collodion giving a somewhat spongy or absorbent film, than with one giving a horny film, and that the deposit appears to be caused by the spongy film retaining, whilst intensifying, some traces of the preceding solutions which had been applied.

It occurs, as we have said, not unfrequently after development with iron, whilst intensifying before fixing. We are uncertain of all the causes which produce this; but we can mention some of them, and we can point out a remedy. Great heat is a common cause, and it is for that, as well as other reasons, desirable to keep the dark room as cool as possible during hot weather. The use of an old bath, or one containing organic matter, aids in causing this trouble. It is sometimes induced by the film having been imperfectly washed after developing with iron, before applying the pyro and silver: the remedy in that case is simple and obvious—a more thorough washing before commencing to intensify. It is very often caused by the use of the bath solution for the purpose of adding to the pyro. This, especially when the bath is an old one, is a very common cause. We have always found that a twenty-grain solution of the purest nitrate of silver was the best for intensifying, and gave much more satisfactory results than when a few drops from the bath were added. Prolonged application of the pyro and silver, when density appears tardily, especially if there be any trace of chemical light in the room, will also cause this trouble.

Besides the remedies suggested in this brief enumeration of causes, there are one or two more. The first is not a universal remedy, but is, nevertheless, often largely preventive; it consists in the free use of citric acid in the intensifying solution of pyro and silver, instead of acetic acid. The usual proportion of citric acid used, is one grain to two of pyro. For this purpose the proportion may, in hot weather, be largely increased with advantage, in some cases to equal proportions of each. This will frequently remove or reduce the tendency to this copper-coloured deposit. The remedy which has in our hands, however, been unfailing, consists in the application to the film, after developing with iron and washing, of a solution of iodine. This may consist of an alcoholic tincture of iodine added to water, until it is the colour of brown sherry, or iodine with an equal proportion of iodide of potassium dissolved in water, say one grain of each to an ounce of water. This solution is poured over the film, and in a few seconds washed off; the solution of pyro and silver is then applied, and in our hands, and in the hands of all whom we know to have tried the plan, it is found that the intensification proceeds satisfactorily without any tendency to the red deposit on the shadows, or any other form of fogging. The exact theory of this remedy we do not undertake to determine: we might hazard some conjectures, but we content ourselves at present by stating the fact.

This red deposit on the shadows also occurs whilst intensifying after fixing, and here we believe we can point more definitely to the cause. The evil occurs, as we have already stated, most frequently with a spongy and absorbent film, and we may add that when it occurs after fixing, it is generally, if not universally, when cyanide of potassium has been used for that purpose. It also generally happens when the intensifying is conducted in the light, or when the plate has stood in the light after fixing and before intensifying. From a careful consideration of our own experience, and the records of that of many others, we are convinced that this deposit, in many cases, arises from the retention in the absorbent film of some unsuspected traces of cyanide of potassium holding in solution cyanide of silver, which have been acted upon by light, and form the nuclei for reduction of what Mr. Malone would call "ruby silver," when the intensifying solution of pyro and silver is applied. We know that it will be urged by some that all their plates have been well washed, and yet this deposit has occurred; but the amount of washing required by an absorbent porous film may be very easily under-estimated. We have known a negative which had been apparently thoroughly washed, after fixing, with cyanide, manifest the presence of the latter salt in a curious and annoying manner. A solution of iodine has been applied as a preparatory step to intensifying with pyro and silver, and in a short time the half tones of the image have disappeared, indicating that the image was being gradually dissolved. Some traces of cyanide had remained in the film, but not sufficiently energetic to act upon the image of reduced silver, but so soon as any portion of it was converted into iodide of silver, the cyanide manifested its presence by dissolving the iodide so formed.

Cyanide of silver is very readily acted upon by light, and any traces remaining in the porous film, as we have described, and being acted upon by light, will readily become a source upon which abnormal reduction readily takes place. The preventive in this case, in addition to other precautions already named, is a very perfect washing after fixing, before applying the intensifying solution. An additional aid will be found, when this thorough washing has been given, in an application to the film, before intensifying, of the solution of iodine we have already referred to.

When the first trace of this deposit appears, the plate should be quickly washed, and by the judicious use of cyanide the deposit may be removed. If it be necessary to proceed further with the intensifying, it is important that a most thorough rinsing, and sometimes an application of the iodine solution, should be given before proceeding further with the pyro and silver, as the tendency, once evinced, is very persistent, and will probably occur again at once on attempting to intensify further.

Perhaps the best remedy which can be applied, when once the evil is in existence, and cannot be removed by cyanide without endangering the picture, is to treat the plate with a dilute solution of bichloride of mercury, which will not affect, in any appreciable degree, the general image, but will convert the red deposit, which is very non-actinic, and a serious detriment in printing, into a thin one of bluish white, through which the light can easily pass, and will therefore render the defect of comparatively small importance in printing. Prevention is best; but when the time for prevention is past, this remedy will be found valuable.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Potassium Salts.—Permanganate of Potash* (continued).—Mr. Robert Hunt, to whom photography owes so much, has shown that the metallic acid contained in this salt is possessed of photographic properties; for instance, if two bottles are filled with this solution, and one of them be placed in the sunshine, whilst the other is carefully preserved in darkness, it will be found that the solution exposed to the sun will very rapidly throw down a deep brown precipitate, whereas the one in the dark remains for some time quite clear. This experiment, if cautiously made in weak diffused daylight, will exhibit the same change, although more slowly; showing in a very remarkable manner the influence of the solar rays in determining the tendency to precipitation. If a dilute solution of permanganate of potash is washed over paper, it imparts to it a brown colour, owing to the reduction of the acid by the organic matter, and precipitation of binoxide of manganese. The sun's rays have a tendency to discharge this colour, and thus give a positive image. The addition of a small quantity of nitrate of silver to paper prepared with this salt of manganese renders it brown, and causes it to assume a very intense black colour upon exposure to light.

*Arseniate of Potash.*—Arsenic and arsenious acids have frequently been employed in photography; and, indeed, some experimenters have succeeded in obtaining very excellent photographic pictures by using the *liquor arsenicalis* of the pharmacœpia. Mr. Hunt says that paper washed with this solution, and then with nitrate of silver, changes with tolerable readiness, and darkens to a perfectly jet black: the photographs resulting from this process are very decided in their contrasts of black and white. The salt may be formed by powdering together equal weights of arsenious acid and nitre, and throwing the mixture gradually into a red-hot crucible, the mass is then allowed to cool, when it is dissolved in water, the solution filtered and left to crystallize. It may also be formed by mixing carbonate of potash and arsenic acid together in proper proportion, and evaporating, the mono-salt crystallizes out. The crystals are permanent in the air, and taste somewhat like nitre; this experiment, however, is very dangerous, as the salt is terribly poisonous. It dissolves in about five parts of water, at the ordinary temperature, and in a much smaller quantity of hot water; it is insoluble in alcohol. The crystals are exactly similar in appearance and crystalline form as the monophosphate of potash.

*Arsenite of Potash.*—This combination is not known in very definite form. Three salts are supposed to exist, but they are difficult to crystallize. Pasteur succeeded in obtaining a compound in the crystalline form, by digesting arsenious acid in excess in a cold solution of potash; upon adding alcohol to the resulting oily, alkaline, liquid, it became thick and turbid, and after a few days deposited beautiful crystals on the sides of the vessel, having the form of rectangular prisms. When nitrate of silver is added to this solution, the yellow neutral arsenite of silver is precipitated, mixed with free arsenious acid, while the supernatant liquid acquires an acid reaction. In some photographic experiments it may be advisable to avoid this acidity. This may be effected by digesting the crystallized salt with excess of potash, and precipitating with alcohol. In this manner a salt is formed which gives, with nitrate of silver, a yellow precipitate, containing no free arsenious acid, whilst the supernatant solution becomes neutral.

*Carbazotate of Potash.*—Carbazotic acid is so frequently used as a test for potash, and is now becoming an article of such importance, that a short notice of this salt may not be out of place here. Carbazotic acid is prepared by acting upon numerous complex organic substances with fuming nitric acid. At present it is made in enormous quantities from some of the products of the distillation of coal, the hot solution obtained by acting upon this mixture with nitric acid must be decanted from the undissolved portion, when the carbazotic acid will be deposited as the liquid cools; it may be purified by washing with cold water, and converting it into the potash salt. Carbazotate of potash forms orange yellow, needle-shaped crystals, freely soluble in boiling water, but requiring 260 parts of cold water for solution. By dissolving it in boiling water, and adding dilute nitric acid, it is decomposed, and crystals of carbazotic acid will be deposited as the liquid cools, nitrate of potash remaining in solution. This acid crystallizes in long pale yellow brilliant rectangular plates which are readily soluble in alcohol and ether. It requires between 80 and 90 parts of cold water for its solution, forming a liquid of a bright yellow colour, and stains the skin yellow. It has an intensely bitter taste, on which account it is reported to be used by some persons as a fraudulent substitute for a portion of the hops in beer. The great use of carbazotic acid is, however, for dyeing purposes, as it communicates to silk and wool a brilliant yellow colour. Cloth dyed in this manner might be advantageously employed as an adjunct to the yellow glass in photographic laboratories.

*Silico-fluoride of Potassium.*—Another useful test for potash is the hydro-fluo-silicic acid. This is formed by a rather difficult process, by the decomposition of fluoride of silicium by water, or by dissolving silica in dilute hydrofluoric acid. When the acid is added to a soluble potash salt silico-fluoride of potassium is thrown down; the precipitate forms in a very characteristic manner, at first it separates very slowly and is scarcely visible, afterwards it produces prismatic colours in the liquid, and is finally deposited as a transparent gelatinous iridescent mass, which dries upon the filter to a soft white powder. It is very sparingly soluble in water, but more freely so when the water is hot.

*Sulpho-cyanide of Potassium.*—This is rather an important salt, and is much used as a test for iron. It is prepared on the large scale by mixing 46 parts of dried ferrocyanide of potassium, 17 parts of carbonate of potash, and 32 parts of sulphur, powdering them well together, and heating until the mixture attains a state of clear and tranquil fusion; the heat is then raised to low redness to decompose the hyposulphite of potash; it is afterwards left to cool, boiled with alcohol, and filtered. On the filter there remain bisulphide of iron and sulphate of potash, whilst the transparent and colourless filtrate yields crystals of pure sulpho-cyanide of potassium. This is a very advantageous process devised by Liebig, the product is yielded in large quantity and very pure. The salt forms long, transparent, colourless striated prisms and needles; at a temperature considerably below redness they fuse to a transparent and colourless liquid, which solidifies to a crystalline mass on cooling. It deliquesces in the air and dissolves abundantly in water, producing a considerable degree of cold. It likewise dissolves in alcohol, especially when hot, it has a saline and cooling taste like nitre, and is a narcotic poison like hydrocyanic acid. When in aqueous solution it suffers gradual decomposition, even when kept in a well-stoppered bottle, attended with formation of ammonia. Its alcoholic solution is much more stable.

*Nitro-prusside of Potassium.*—This salt is prepared by acting upon ferro-cyanide of potassium with dilute nitric acid. The mixture first assumes a milky appearance, but after a little while the salt dissolves, forming a coffee-coloured solution, with evolution of various gases such as cyanogen, hydro-cyanic acid, &c. When the salt is completely dissolved, the solution is to be decanted into a large flask, and heated over the water bath. After a while it is removed and left to crystallize, a large quantity of nitre separates at first; the decanted liquid is neutralized with carbonate of potash, and the solution is boiled, whereupon it gradually deposits a green or brown precipitate, which must be separated by filtration. The liquid then contains nothing but nitro-prusside of potassium and nitrate of potash. The latter being the least soluble crystallizes out first, and the remaining liquid, on further evaporation, yields crystals of nitro-prusside of potassium: it may be purified by recrystallization. The crystals form ruby-coloured prisms very soluble in water. The great use of nitro-prusside of potassium (or of sodium) is as a test for sulphur; an addition of a soluble sulphide to its solution, in even very small quantity, immediately produces a magnificent blue or purple colour, affording a highly characteristic test for the least trace of a soluble sulphide. It is of the greatest importance that many salts used by photographers should be absolutely free from a sulphide; hence, the value of so delicate a test for this impurity will be readily appreciated.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.

Reproduction is not largely represented in the British Photographic Department of the Exhibition, but there are, nevertheless, some very fine examples. Amongst the most prominent are the large copies of Raffaelle's cartoons; both Signor Caldesi and Mr. Thurston Thompson exhibit very fine specimens of these noble reproductions. Both these gentlemen, also, exhibit other excellent reproductions. The Elgin marbles by the former—which, although not strictly reproductions, are analagous in their character and purpose—are magnificent specimens, very valuable as works of art, and possessing importance in an educational point of view not easily to be overrated. Mr. Thompson's reproductions from Turner's paintings have before been noticed in our pages; we regard them as decided triumphs in this line. Very few paintings could be found presenting greater difficulties to the photographer, from the prevalence of the most brilliant and anti-photogenic colours on the pallette of the painter; yet few paintings that we have seen have received fuller justice from the photographer.

Dollamore and Bullock have several fine reproductions. Here is one of that much-abused-by-artists, but much-admired-by-the-public painting, "The Blind Beggar," left a few years ago to the National Gallery by a milliner. Perhaps few reproductions of paintings have had a greater sale than this, and as photographs of the pictures in the National Gallery are not permitted to be taken, it may be interesting to refer to the method by which rumour states this copy was obtained, without, however, vouching for the truth of the statement. We have been informed that a very skilful artist was employed to make a copy of the painting in monochrome, from which might be produced with ease an excellent photograph. This done, and several negatives obtained, the artist's copy, it is said, sold for more than it originally cost. Whether the story be true or not, it is well found, and the photograph referred to is an excellent copy of a very popular picture.

Mr. J. B. Pyne has some very fine copies of paintings and carvings. We may call especial attention to an exquisite photograph of a *bas relief*, entitled, "The Tomb Revisited," sculptured by Foley, the delicacy, softness, and roundness, and the low tone in keeping with the sentiment of the subject, are all worthy of high praise. Messrs. Cundall and Downes have also some very fine reproductions from paintings and sculpture; a copy of a *bas relief* in bronze, a material presenting serious difficulties, is admirably executed, doing full justice to the metallic texture of surface. Specimens are exhibited by the same firm of their fine copies of Raffaelle's drawings, executed for the late Prince Consort. Some good copies of engravings are contributed by the Amateur Photographic Association. Mr. Stephen Thompson also sends some fine reproductions. Mr. Ramage's reproductions of engravings, by means of photography, are as perfect as anything of the kind exhibited. Mr. Victor Prout has some very fine reproductions. Mr. Ponting has some good copies of pictures: "Making a Hayrick," an enlargement from a small negative of an engraving, is a very successful picture indeed. It is, we presume, a developed print, and the peculiar tone and extreme softness give it much the effect of a chalk drawing. The reference to development printing reminds us, that we omitted before to notice some prints by Mr. Lamb, of Aberdeen, which we had marked for mention. Some of these are developed prints, and are well worthy of the attention of visitors, as illustrating the softness, vigour, and excellence of tone which may be obtained by that method of printing.

A stand of stereoscopes with M. Claudet's exquisite coloured Daguerreotypes, receives much attention. Mr. Breese's two tables of stereoscopes with instantaneous and other transparencies, as we have before stated, monopolize a large share of the attention and interest of visitors. Apart from the curiosity excited by the moon-light pictures, it is impossible to conceive anything more beautiful than the mass of these slides even as ordinary illustrations of photography; the rare and poetic beauty of many of the cloud and atmospheric effects and breaking water, the fine composition as pictures, the perfect instantaneity, and the wonderful rendering of difficult texture, all combine to complete the charms of these pictures. Many of them are printed from several negatives, although they present no suggestion of such a process. An effect is produced in two or three of the specimens which is very beautiful and appears very marvellous: we refer to the flood of red or golden light which streams from behind masses of cloud, irradiating the horizon and sea with the glowing hues of sunset. This effect is not produced by the hand of the painter, but is due to the skilful adaptation of photographic appliances. We hope at some time to have Mr. Breese's permission to explain the *modus operandi*. We may add here, for the information of various enquirers, that Mr. Breese has been induced to publish some of his slides, and is now completing arrangements for the purpose. Amongst other stereoscopic contributions are Negretti and Zambra's very fine transparencies; Mr. England's instantaneous pictures, chiefly of street scenes; Mr. Blanchard's instantaneous marine pictures; and a few others.

Mr. Swan's novel form of stereoscope is worthy of examination. The novelty consists in exhibiting a single photograph about 12 by 10 in such a manner as to render it stereoscopic. This is effected by placing in the right position a small box, containing a small photograph, forming the stereoscopic complement of the large one, and an eye-piece, which shall magnify this small picture to the size of the large one: when one eye is placed to the eye-piece the large picture is opposite the other eye, and the two images combining produce a large stereoscopic picture.

We may here call the attention of those interested in enlarging, to one of the pictures exhibited by Mr. Swan "The First Cradle," as from an enlarged negative by Mr. Samuel Fry, produced by the same method described recently by Mr. Vernon Heath; some excellent specimens by the same process are also exhibited by Mr. Warner in this department.

M. Joubert exhibits some fine specimens, in colours and in monochrome, of his fine photographic enamels on glass: also of his phototype printing process, both of which have been so strangely overlooked by the Jurors. M. Joubert blames himself, and with apparent good reason, that he did not exhibit in his own national department, where recognition of all kinds of claims appears to have been much more generously accorded. But is it not a circumstance for deep regret, or something more, that a gentleman having resided long in this country, and merging his nationality to do the English Department such honour as he could, should in doing so become an absolute sufferer in the matter of awards? We trust, as we have before said, that this with some others have been the result of some oversight, yet to be remedied in the promised revision of awards.

Mr. Skaife has a handsome revolving stand, for the purpose of exhibiting his minature camera, or "pistolgraph," and its varied products. These consist of a very charming selection of the minute glass positives, suitable for lockets, brooches, &c., hermetically sealed, and backed up with coloured glass. They are chiefly of portraits of babies; the exuberance of infantine mirth, which is stamped on many of the faces, showing the facility and rapidity of the process. There are also some enlarged copies on paper from similar pictures. The whole are very pleasing and satisfactory.

We have now noticed the chief pictorial contributions to this department. We shall shortly refer to the apparatus, and also to the photographs and apparatus from other countries.

## PHOTOGRAPHIC CHEMICALS.

The remaining exhibitors of chemical products in the Photographic Department are very few. Mr. Rouch (3150) has some good specimens of all the chemical agents in general use, the series being very complete and well arranged. Gun-cotton seems to be a branch of manufacture to which Mr. Rouch has devoted special attention, a beautifully clean specimen of purified cotton forms the starting point, and near this is shown a nice sample of pyroxyline, of the ordinary variety, we suppose, and another specimen of powdery pyroxyline of special value for dry processes.

Messrs. Horne and Thornthwaite (3100) also exhibit chemicals in connection with apparatus. Their chloride of gold is in magnificent crystals, and is, without exception, the finest specimen of the salt we have ever seen. They also exhibit nitrate of silver, a salt which this firm professes to manufacture specially for photographic purposes. The fused cakes which they show are, however, not quite so white as they might be.

Messrs. Hockin and Wilson (3097) exhibit a contrivance for preserving collodion, ether, and other volatile liquids from change. A glass tube is hermetically sealed up at one end, the other extremity being drawn out to a fine point; it is then filled with the liquid by drawing some of the air out by heat, and then dipping the beak under the surface of the liquid. The contraction on cooling sucks some of this up into the tube, and by a repetition of this process the latter is at length filled. The flame of a blowpipe is now applied to the capillary point with the proper precautions adopted in chemical laboratories, and the opening is instantly closed. In this way no atmospheric agency can affect the contents of the tube in the slightest degree. If they are carefully packed in bran or saw dust they may be exported to any part of the world, and be subjected to the greatest natural extremes of heat and cold, without undergoing loss from evaporation, or deterioration from the absorption of oxygen. There may, possibly, be room for deterioration in the case of collodion, even when isolated in this perfect manner from all external agencies, as this highly complicated organic mixture is prone to undergo molecular change upon keeping; but we think it most probable, that even this unstable liquid would be found to preserve its qualities pretty well; with the other chemicals employed by the photographer, alcohol, acetic acid, ether, nitrate of silver, as well as the other less changeable materials, we think the plan is admirable, and should be invariably adapted when chemicals have to be exported. A few chemicals are likewise exhibited by Mr. Solomon (3158), these appear to be of good quality, but do not demand a more special notice.

There is one article exhibited in the chemical department to which we have not yet drawn the attention it deserves, this is the purified wood naphtha exhibited by Mr. Eschwege (513). This article is likely to become of considerable use in photography. Wood naphtha, chemically known as methylic alcohol, is at present only used for the purpose of mixing with ordinary alcohol to prevent its being used as an intoxicating beverage. The unpleasant taste and smell which is thereby communicated to the spirit, being inseparable by distillation or other ready means. Mr. Eschwege has now shown that this smell and taste are not due to the wood spirit, but to impurities which he has succeeded in separating. The specimens of purified methylic alcohol here exhibited have scarcely any of the ordinary taste and flavour which have hitherto characterized this body. The taste is almost identical with that of pure alcohol, and leaves none of the disagreeable flavour in the mouth given by methylated spirit, the smell is also strongly alcoholic, whilst it is much more volatile (boiling at 151°, alcohol boiling at 173° F.) Although methylated spirit is generally banished from photographic laboratories, we see no reason why this purified wood spirit should not be applied to a variety of useful purposes.

## ON THE PRODUCTION OF THE ELECTRIC LIGHT FOR PHOTOGRAPHIC PURPOSES.

Sir,—A few details relating to the conditions for producing an artificial sunlight, which may occasionally replace the agency by which the heliograph is usually obtained, will perhaps be of interest to many of your readers, in whom are combined the acquirements both of the artist and the chemist. The question—"which is the best form of battery for our use in producing the electric light?"—has doubtless often been put by the photographer, but would appear hitherto not to have received a definite and satisfactory answer. Nor is it a question that can be readily met; for the advantages and disadvantages of different battery arrangements are so various, that it is only recently that telegraphists in Europe have arrived at unanimity in the adoption of the Daniell's battery, or in some few cases that of Marié-Davy, which is based upon the same principles, for their particular purposes. For the economic production of a constant and continuous supply of electricity, the Daniell battery, requiring but little attention for a period of many weeks or months, is possessed of great advantages. But by other arrangements, a powerful current, lasting for a comparatively short period, is far more readily obtained. Before attempting to answer the above question, I should therefore require to know whether a battery, cheap in construction and working, occupying but little space, easily charged, emptied, and taken to pieces, and maintaining during *several hours* the necessary power for the production of the electric light, would generally answer the purposes of the photographer.

The fact of this battery requiring attention in the renewal of the existing fluid every few hours, is sufficient to unfit it for use in telegraphy, or in the electro-deposition of metals, but even when constructed of very moderate dimensions, it is capable of furnishing a *quantity* of electricity far greater than would be required for the transmission of telegraphic signals, and therefore appears particularly adapted for the production of the electric light, in which great quantity has to be combined with considerable force or *intensity* in the current—in cases where the light is not required uninterruptedly for a lengthened period of time.

The elements in the batteries I would propose for use by photographers, are the same as those employed by Callan in his single fluid arrangement—viz: amalgamated zinc for the positive, and cast iron for the negative elements. The exciting fluid is a mixture of sulphuric acid with a solution of common salt, to which I add a small quantity of the black oxide of manganese or of the chlorate of potash, for the purpose of absorbing the hydrogen generated on the negative plate; the oxide of manganese evolving chlorine in presence of the salt and sulphuric acid, and the chlorate acting, like the chlorine, as an oxydizing agent. The mechanical arrangement of the battery in a very convenient form, has been contrived by Mr. John Cliff of Lambeth, and will be described on a future occasion.

The following brief comparison of the various forms of battery, will enable many of your readers to arrive at some conclusions respecting their adaptability, on economical grounds, for the purpose now in view. Equal surfaces are taken in each case; and it should be borne in mind that increased quantity may be obtained by augmenting these surfaces, and increased intensity by augmenting the number of cells arranged in series.

*Groves's Battery.*—Positive element, amalgamated zinc in dilute sulphuric acid; negative element, platinum in pure nitric acid. A porous cell is necessary to separate the two exciting fluids. *Quantity* high. *Intensity* high. Duration of action moderate.

*Bunsen's Battery.*—The same as that of Grove, with the exception of a negative element of graphite or gas carbon. Quantity and intensity the same as in Grove's arrangement.

N.B.—The employment of nitric acid is objectionable on the grounds of expense and the liberation of nitrous fumes.

*Daniell's Battery arranged for Quantity.*—Positive element, amalgamated zinc in dilute sulphuric acid; negative element, copper in sulphate of copper. A porous vessel is necessary, and requires to be occasionally renewed. *Quantity* moderate. *Intensity* moderate. Duration of action moderate as regards the continuance of the quantity effects. Very constant, *i.e.*, little or no variation in the current while the exciting fluids are maintained of normal strength, or nearly so.

*Daniell's Battery as arranged for Line Batteries in Telegraphic Service.*—The same as the preceding, with the exception of the exciting fluid for the positive element, which may be pure water, or a solution of the sulphate of zinc. The positive element may also be used without amalgamation. Quantity very small, intensity moderate, duration of action very great. Constancy of action very great.

N.B.—Surfaces of enormous extent would be required in producing the electric light.

*Double Fluid Cast-iron Battery.*—Positive element, amalgamated zinc; negative, cast-iron. Exciting fluid for zinc, dilute sulphuric acid; for iron, pure nitric acid. *Quantity* very great, *intensity* low. Duration of action comparatively small. A porous vessel is necessary to preserve the solutions separate.

N.B.—This battery was supplied by the Electric Light Company, the cost of 48 cells being, if I remember rightly, £20. Besides the original expense, the cost of working was very great, owing to the use of the nitric acid, which moreover possessed the disadvantage of liberating nitrous fumes when the battery was in action.

*Single-fluid Cast-iron Battery as now Proposed.*—Positive element amalgamated zinc; negative element a plate of cast iron. One exciting fluid. *Quantity* very great, *intensity* low.

N.B.—In the absence of the porous cells or partitions, 60 couples may be arranged in much less space than would be occupied by 48 of the preceding.

To those of your readers who may be interested in the present question, I shall be happy to afford any further details which may be required; and I hope shortly to be able to give full data as to the original cost and expense in working of the battery arrangement I suggest for the production of the electric light for photographic purposes. I may also, perhaps, at some future time, have an opportunity of showing to you the battery in action when producing the splendid arc of light between charcoal points. —I am, &c.,

Desmond G. Fitzgerald.

## RAPID DRY PROCESS, WITH BROMO-IODIZED COLLODION, AND WITHOUT FREE NITRATE.

BY THOMAS SUTTON.

We have now been engaged for some months in experiments on the action of a bromide in wet collodion, and also on its effect in the dry processes. Our results have been stated from time to time in this journal, as the experiments proceeded, and we have now arrived at definite conclusions on the subject, and have constructed a theory of the action of light on the sensitive salts of silver, which appears to explain satisfactorily all the known phenomena of photography, and to establish the true proportions which should exist between the iodine and bromine in the various processes, so as to obtain the most exalted sensitiveness and the best results. This theory we will, in the next number, lay fully before our readers, and submit to their approval, and in the meantime will describe an application of it which yields rapid dry plates.

There are two methods of preparing rapid dry plates; one with iodide and free nitrate of silver, the other with iodide and bromide of silver. It is needless to observe that with iodide or bromide of silver alone, it is impossible to make a plate highly sensitive, either wet or dry. The secret of sensitiveness consists in the presence of iodide of silver, along with some other sensitive salt of silver; and our theory is, that the iodide of silver is not itself sensitive to light, but acts by its presence in exalting the sensitiveness of the other silver salt which is exposed in contact with it; and that by an action which is called in chemistry "Catalysis," and of which numerous examples might be cited, but the following will suffice:—

Put chlorate of potass into a retort, and heat it, and you evolve slowly oxygen gas. But add black oxide of manganese to the chlorate of potass, and mix them well together, and the heat will drive off the oxygen much more abundantly than before. Now, on examining the contents of the retort it is found that the black oxide of manganese remains unchanged, so that it has acted by its mere presence in assisting the liberation of oxygen from the other salt. In a similar way iodide of silver acts by its mere presence in assisting the decomposition by light of the other silver salt which is placed in contact with it. Moreover, in order that this action may be the most complete, and the combination the most sensitive possible, it is necessary that there should be in the film an atom of iodide of silver for every atom of the other salt of silver, so that the two may be distributed together in pairs throughout the film; for it is evident that if either salt be in excess, the sensitiveness of the film must be impaired.

This is our new theory of the action of light upon iodide of silver, and we can explain by means of it all the known phenomena of the Daguerreotype, Calotype, and collodion processes, and deduce from it some important practical results, which are true as far as they have been tried. And now, after this brief hint as to the nature of the theory, and with a promise to return to the subject and discuss it more fully in the next number, and show how it can be made to explain all known facts in photography, from the insensitiveness of calotype papers and Taupenot plates, to the exalted sensitiveness of dry bromo-iodized collodion films, we will return to the particulars of the rapid dry process.

The first method consists in preparing an iodized plate with free nitrate in excess. This can best be done by the Taupenot process, in which the plate, after its excitation in the bath of aceto-nitrate is not thoroughly washed, but ex-

* From *Photographic Notes.*

posed with some free nitrate in it. Plates prepared in this way are not quite so rapid as those with bromo-iodized collodion, and no plates which contain free nitrate in combination with organic matter can be relied on for good keeping properties.

The second method consists in preparing the plates with bromo-iodized collodion, in the way which we will now minutely describe—the process appearing to be the same, in all essential particulars, as that which Dr. Hill Norris employs.

Clean the plate in the usual way, and coat it with gelatine, about two grains to the ounce of water. The object of this gelatine coating is to prevent the film from blistering, or leaving the glass in the after operations.

Use collodion of a rather powdery kind, and made according to such proportions that the film shall contain, when excited, an equal number of atoms of iodide and bromide of silver. It seems to be an advantage to use a small quantity of free iodine in the collodion, and when this is done, you may make an iodizing solution, containing equal parts of iodide and bromide of cadmium, and about the one-eighth part of the whole of free iodine. This iodizer will impart a dark colour to the collodion. Its effects are these: it gives a very even, clear, and perfect film, and by liberating a small quantity of free nitric acid, it keeps the picture clean, without affecting the sensitiveness, because a trace of nitric acid is not a retarding cause when bromide is used. In other ways, the effect of free iodine in the collodion is remarkable. It seems to render the film harder and more contractile, and also to diminish its creamy appearance on leaving the nitrate bath; but it greatly facilitates the decomposition of the bromide of cadmium. When collodion contains free iodine, it should not be left so long as usual in the nitrate bath, because the bath then more freely reduces the creamy appearance of the film. On the whole, it seems that the addition of a small quantity of free iodine is advantageous.

The nitrate bath should be about 35 grains to the ounce. It should be slightly acid when there is no free iodine in the collodion.

On removal from the nitrate bath, wash the plate thoroughly in distilled, or clean rain water, and then pour over it a preservative, consisting of about 6 grains of gum arabic dissolved in an ounce of water. Set it up to dry. When dry it is ready for use, and may be developed in the usual way with cold pyro and silver, after receiving about the same exposure as a wet collodion plate. The principal object of the preservative is to give density to the thin and delicate image which would be obtained without it. If a slight trace of nitrate of silver is added to the solution of gum, the sensitiveness is increased, but the plates are rendered liable to fog. If meta-gelatine is used instead of gum, the image has a redder tint.

If, instead of using gum as a preservative, you pour over the plate the ordinary solution of tannin, viz., 15 grains to the ounce, the films are nearly as sensitive as before, and we have obtained excellent tannin negatives with an exposure very little more than was required for wet collodion.

The films prepared in the manner described have a deep greenish-yellow tinge, and they become more creamy when wetted, having in these respects exactly the same appearance as Dr. Norris's rapid dry plates.

The grand secret in the process described lies in the exact determination of the proportions between the iodide and bromide in the film. Mr. Heisch has said that the proportions should be two of iodide to one of bromide, while others have recommended equal parts. It is generally agreed that the extra sensitiveness produced by adding bromide increases up to a certain point, and then diminishes, and the difficulty has hitherto been to fix that particular point. This we have now done, by laying down the new principle of the equal number of atoms of iodine and bromine in the iodizer. Suppose, for instance, that the iodide and bromide of cadmium were used, then the ratio of the quantity of that iodide to that bromide would be by weight as 182 : 134, or nearly as three of the iodide to two of the bromide.

Of all the salts of silver which have been examined singly under exposure to light, that which darkens the most rapidly is the bromide. It has been impossible hitherto to obtain pure iodide of silver uncontaminated either with nitrate or oxide of silver on the one hand, or with an alkaline or other metallic iodide on the other hand, but it is found that the nearer we can arrive at a pure sample of iodide of silver the less sensitive it becomes—and it is altogether insensitive when there is the smallest trace of iodide of potassium or cadmium in excess. We may reasonably conclude, therefore, that pure iodide of silver is of itself perfectly insensitive to light. Whenever the contrary is stated it is assumed that some other salt of silver is in contact with it. In the Daguerreotype process the iodized film contains oxide of silver in excess, and it is this oxide which is reduced under the action of light. The surface of the plate is oxydized in the operation of polishing. Bromide of silver (as well as chloride) retains its sensitiveness under a weak solution of iodide of potassium, and those who prepare Taupenot plates should never use bromo-iodized collodion, but add the bromide to the albumen.

It is only since we have used bromide in the right proportion in the Tannin process, that we have discovered its accelerating action, and it is with pleasure that we can now endorse Major Russell's remarks, and admit our former error.

In saying that free nitrate is an essential element of rapidity with iodized collodion, we were perfectly correct.

Most of the discrepancies which occur in the results published by various experimentalists proceed from their not carefully noting the composition of their collodion, and the state of their nitrate bath.

In order to meet the wishes of those who may like to try this very simple and elegant dry process, we have arranged with Mr. Bailey to sell the proper collodion, with the iodizer, made according to our proportions.

## TRANSPARENT GLASS POSITIVES ON COLLODION.

BY DR. SABATIER.

Towards the end of the year 1860, I published in various journals a photographic process, by the aid of which it is possible, after exposure in the camera, to obtain a direct positive without quitting the operating room. It was not by the aid of black varnish, coloured paper, &c., that a negative was backed up into a positive; on the contrary, it was to replace pseudo-positives by true positives; that is, those obtained wholly by heliographic means. It also enabled, I do not say professional photographers, but mere amateurs, who are inexperienced in the albumen process, to produce stereoscopic views on collodion, which they had been compelled to take upon paper, and then impart to them that transparency which constitutes their principal charm.

But, notwithstanding its unquestionable utility, the process I described met with no favour, at least, so far as I can ascertain, it is not much practised: transparent pictures are still produced by tedious and very difficult manipulations upon albumen, and no attempt is made to produce them upon collodion, which would be so much more expeditious. Thus a source of profit is allowed to pass by unheeded. Amateurs deprive themselves of the most vivid pleasure photography can afford them. And for what reason?

If I am not mistaken, the reason lies in a very serious and almost insurmountable practical difficulty, in the process I published.

When only a negative is sought to be produced, and the exposure has been too long or too short, the negative is spoiled, it is necessarily imperfect, for to produce a good negative it is necessary to hit the exact moment in covering up the lens. Still a little more or a little less exposure than that exactly required, gives negatives which, if not exactly perfect, are at least still tolerable.

But it is quite different when we seek to obtain a direct or transparent positive. Beside the constant uncertainty in the time of exposure, we have to contend with a still greater difficulty, that of hitting the exact moment when we must stop the formation of the negative to convert it into a positive. If we stop too soon, the fine details are checked, and disappear in the shadows; if we stop too late they pass immediately under the influence of the pyrogallic acid to the state of perfect negatives, and then it is impossible to convert them into positives. The "too much" and the "too little" are equally formidable, and Scylla and Charybdis are so near to each other, that it is almost impossible to sail between them without incurring shipwreck.

I have thought that I could render a service to photography if I smoothed this difficulty, or if I caused this double peril to vanish. I have attempted it, and I think succeeded. By means of a very simple modification in the composition of my collodion, I believe I have arrived as near to it as possible, and it is to make known this modification to photographers that I now recur to publication. Before, however, showing what this modification consists of, and stating in what manner it removes all difficulty, I will, for the benefit of those readers who have not perused my former account, give a clear and succinct description of what the process itself consists of.

In the first place, let me remark, that those who say and believe, they have made a direct or latent positive, in the operating-room, after exposure in the camera, that they deceived themselves, and involuntarily deceived others. Apart from all experience, reasoning alone demonstrates, that without a previous latent or apparent sketch of the negative, the positive is absolutely impossible. To be convinced of this, it is sufficient to consider that the positive must be most intense in colour in the very places where the light has acted the least, and weaker, on the contrary, in the places where its action has been most marked. To produce a direct positive at once, we must, then, find a substance acting exactly contrary to the luminous principle which acts upon it, a substance of the existence of which we at present know nothing.

But if it be impossible after exposure to produce a direct positive, it becomes, on the contrary, easy to produce it when the development of the negative has begun, and while it remains in a latent state upon the plate. It is sufficient to that end—

1st. To stop the formation of the negative at a given moment, so as to have, instead of a perfect negative, only a simple sketch of one.

2nd. To form, with all the iodide acted upon by light—which has been employed in the formation of the sketch, and with the latter only—a combination of uniform colour, but which will be more intense in the places where the impressed and free iodide exists in the greatest quantity.

Now, to stop the formation of the negative after developing the sketch, it suffices to wash the plate with distilled water, or simply, with rain-water, before the negative becomes completely developed. When no more pyrogallic acid remains on the plate the formation of the negative must necessarily be interrupted, and to form a colour different from the first with the exposed iodide which has not yet been employed, it suffices to substitute for the electric current which prevailed at the first combination, an electric current of the opposite nature.

Many substances poured in solution upon a negative, the formation of which has been interrupted, possess the power of inverting the electric current previously developed, and causing the positive combination to succeed the negative. Such are most of the alkalies, lime-water, ammoniacal solution, and especially nitrate of silver, which alone will be regarded in this place, because it is always at hand in every photographic operating-room, and as its manipulation is the easiest. M. l'Abbé Despratz has proved, by experiment, that nitrate of silver solution, poured upon iodide of potassium, causes the production of an electro-positive current. So also do gallic acid, pyrogallic acid, perfectly neutral protosulphate of iron, poured upon nitrate of silver in presence of the iodide of that metal, and with nitrate of silver, poured upon developing solutions in presence of exposed iodide of silver. Not only is the electric current inverted, but the chemical combination at which it presides also changes in aspect. It is this change of current and of combination which explains why it is not a matter of indifference whether to pour solution of chloride of gold into hyposulphite of soda, or the hyposulphite into the solution of chloride of gold; it is this change of current which explains why some nitrate of silver poured upon a sketch of a negative is powerless to strengthen it, and that the negative is transformed into a positive when pyrogallic acid is superadded to it.

This phenomenon of change in the electric current, or rather, this transformation of negative into positive, manifests itself invariably with all kinds of developing agents, on the sole condition that none of the substances employed contain an energetic acid in a free state, and by energetic acid I understand particularly sulphuric, nitric, and even citric acid. I have not experimented with tartaric and formic acids, which are, however, much used, nor can I offer any opinion with regard to them; but what I can affirm is that acetic acid does not oppose the transformation in question. Those who wish to try the process I describe, should, therefore, first satisfy themselves that their sensitizing bath is perfectly neutral; and as we seldom or never meet with commercial sulphate of iron which does not contain free sulphuric acid, and as this salt, even when it is neutral, turns litmus paper red, which renders it difficult to ascertain its quality, preference should be given to pyrogallic acid as a developing agent, and that no acid beside acetic acid should be mixed with it, for experiment has shown me that upon the addition of another acid it is no longer anti-positive.

I cannot claim the merit of this discovery of the transformation of a negative into a positive. In most countries, long ago, photographers desiring, by the aid of pyrogallic acid, to strengthen a negative before it was completely developed, have seen, with great surprise, an imperfect positive appear in the place of the faint negative, and this fact would have been much more general if the sulphate of iron employed had contained no traces of free sulphuric acid. But a fact so general ought not merely to excite surprise; it should fix the attention, and stimulate enquiry. I have thought it would not be an idle task to study these circumstances, and trace their causes, and I shall have good reason to congratulate myself, if I perceive the process resulting from my researches become generally practised.

It is based upon this fact, henceforth indisputable, that a solution of nitrate of silver of 3 or 4 per cent., poured upon a weak negative previously washed with distilled water, or with rain-water merely, inverts the electric current previously developed, and causes the positive combination to succeed the negative as soon as pyrogallic acid is added. All the exposed iodide of silver remaining out of the first combination, enters into the second, and when the various manipulations are well performed, the two combinations unite so as to form a perfect whole.

Nothing, therefore, can be simpler than to make a perfect positive, and nothing easier when we have the means of knowing the precise moment when to stop the further progress of the sketch negative. But in following my process, a few seconds more or less may in the hands of the most skilful operator, render the result imperfect; the image is either too positive or too negative; it is composed of two unequal parts, when it ought to have been the combination of two similar and exact halves. In the impossibility of actually surmounting this difficulty, I have done my best to avert it, and by introducing a new element into the collodion I make use of, I have succeeded so well, that I venture to say, that the precise moment for stopping the progress of development involves no greater uncertainty than that of replacing the cap on the lens of the camera in exposure, and a few hours of experiment will suffice, henceforth, to place the merest amateur in a position to obtain transparent positives, both portraits and stereoscopic views of every description, at pleasure.

Formerly I added only one iodide to my collodion—the iodide of cadmium. At present I add two, those of cadmium and potassium. Taken singly, the iodide of cadmium is the most rapid, and the iodide of potassium the slowest of the iodides used in photography. Exposure in the camera, and development proceed quickly with the cadmium, but slowly with the potassium. With the first alone, the development proceeds so rapidly that the negative has to be stopped almost as soon as it becomes visible. The addition of iodide of potassium has caused this source of innumerable failures to disappear. If it does not check the luminous action during exposure, or if, on the contrary, it appears to accelerate it, it at least gives to the development an entirely different character. Under the influence of pyrogallic acid, the negative continues to develop rapidly; it appears in all its most delicate details almost immediately; but there is no necessity for hurrying the manipulation, there is time to look at it well, to examine it, and when the negative appears to have arrived at the culminating point of perfection, there still remains in the collodion film sufficient excited iodide to form an excellent positive. This idea also presents itself forcibly to the mind—that the negative, the development of which is so rapid, is formed at the expense of the iodide of cadmium only, and the positive at the expense of the iodide of potassium.

These preliminary and theoretical considerations certainly admit of further very important development; but they appear to me sufficient to render comprehensible the manipulations I now proceed to give in detail.—*Moniteur.*

(*To be continued.*)

## ENGRAVING BY PHOTOGRAPHY.

[We have pleasure in making the following extract from an article headed "Engraving by Photography," in the *Gentleman's Magazine*, as illustrating that the oldest of the monthlies, and devoted chiefly to matters antiquarian, as Sylvanus Urban generally has been, takes a foremost position in recognizing the value and progress of a new and wonderful art.]

Comparing tho productions of the present International Exhibition with those of its predecessor, the progress is most strikingly visible in photography; in fact, in 1851 photography not being sufficiently advanced to be placed in a separate class, it was, with the apparatus used, included among philosophical instruments; now, however, it has a class of itself, namely Class XIV.

Many people interested in photography may recollect having seen some photographs, done from paper negatives, obtained by the ordinary wet process, and exhibited in 1851, under the head of tho Imperial Printing Office at Vienna, executed by the manager of it, Mr. Paul Pretsch, for which he was rewarded with tho prize medal. But they may have asked themselves, What has the the printer to do with photography?

In the present year we have received an answer to such questions. There aro to be seen in Class XIV. of the English Department eighteen frames, filled with impressions, printed with ordinary printing-ink by the ordinary printing-presses, from plates and blocks engraved by nature's mysterious hand only, viz.. by photography and electro-metallurgy. Photography and its sister art are made subject to the printing-press, and for this reason the manager of tho Vienna Printing Office became a photographer.

These frames are headed by printed inscriptions, "Engraving by Photography." The blocks, from which these copies have been printed with tho ordinary press, are all absolutely untouched by the graver; and the plates, whose printed copies exhibited in a considerablo number, are of various descriptions. Some of them are, like the blocks, absolutely untouched by the graver, but some have been assisted, cleaned, and improved by the engraver, and a few show tho process of naturo in combination with the work of the human hand, producing a result not attainablo by the latter alone. In many instances this capability proves to be of great advantage. They are distinguished by printed labels on the specimens, and two frames of them contain the photographed original sido by side with tho printed copy.

But not satisfied with this clear definition, Mr. Pretsch has exhibited on a counter in glass cases the plates and blocks themselves for examination by connoisseurs. There aro to bo seen seven blocks entirely untouched with tho graver; tho photographic originals of them being partly taken from naturo and partly from works of art. There is also a large engraved printing-plate of copper, absolutely untouched, and a second plate, which has been assisted by the graver, and afterwards coated with a very thin film of steel, by which means the copper-plates have been made almost as durablo as engraved steel-plates.

Therefore we see here the specimens of two processes, viz.,—

1. Producing engraved printing-plates of copper, coated with steel, for the copper-plate printing-press.

2. Producing engraved printing blocks (surface copper, backed with typo metal, mounted on wood, like the cast of a wood engraving), to bo printed by tho ordinary printing-press, with or without types; and by this last process the specimen before our readers is executed.

Both processes preserve the true finger of nature, or the real touch of the artist. Tho first process is for the best works of the fine arts, and for hundreds of people; the second process, however, is for the million. Photographs in our present time are still perishable, but printer's-ink and paper stand the test of centuries. The influence of light is used in theso two processes only for the production of the first engraved surface; having obtained tho engraving in the desired effect, the subsequent portion of the processes is mere mechanical skill, however great tho number of copies. Our ancestors had only written books, but sinco the invention of typography, religion, wisdom, and knowledge became universal goods of mankind. Tho rapidity and cheapness of production by the ordinary printing-press, aro as well known as the spread of its productions over the whole globe. And what typography has been for the spread of thought, that is photography for the reproduction of authentic illustrations, if they can be printed with ordinary printer's-ink, and by the common cheap process.

To enablo our readers to obtain a correct idea of these processes, we introduce a brief explanation of them. An ordinary glass plate is coated with a certain mixture sensitive to the influence of light, and this coating is dried. The photographic *negative* is placed on the surface of the coated glass plate, both of them are fixed in an ordinary photographic copying frame, and exposed to the influence of light. After sufficient exposuro they are taken out of the frame, separated, and the picture now appears in a faint coloured copy on tho flat surface of the coated glass plate, which is to be immersed in a bath of powerful chemical action. By this treatment some portions of the picture become more or less raised, and some remain sunk, according to the previous action of light, and exactly corresponding to the lights and shadows of the picture. In fact, this picturo is the main portion of the process; it forms the engraved surface, and therefore must be obtained so as to answer the requirements of the printing-press. A picture can bo obtained without much difficulty, but not so easily tho picture which will suit a certain purpose. It is marvellous how nature can accomplish this result, but it does so only under certain conditions; she demands great attention, experience, and study of her laws, because they are not easily discovered.

Having obtained in this manner the engraving as it ought to be, though tho material is perishable and transient, a cast or mould is made from it; the coating of the glass plate, having served its purpose, is removed, the plate cleaned, and may be used over and over again. The above-mentioned mould, having been made conductive, is used for tho purpose of inducing, by means of voltaic electricity, a deposit of copper thereon, forming the matrix from which the printing surface of copper is obtained by repeating tho process of electrotyping.

## PHOTOGRAPHIC STUDIES.

BY DR. SCHNAUSS.

*Examination of various formulæ.*

There is a general complaint, and a just one, that the photographic journals overwhelm us with numerous formulæ and recipes, which frequently contradict each other. "We cannot," say the photographers, "try all these methods; our time is too limited, and yet there is no other way of separating the good from the bad." This is very true, and greatly to be regretted; and is the cause of many valuable formulæ being neglected, or rejected among others of no value.

*Experientia est mater studiorum*, say the Latins, and we photographers know very well that knowledge can only be bought by experience. But a sure guide is always valuable, and on this account we employ a portion of our leisure in carefully testing the formulæ recommended in different journals, and communicate the results to our readers.

There are three principal points which most of the formulæ published now-a-days tend to improve.

1st.—The process for taking permanent pictures without the salts of gold or of silver.

2nd.—A good dry process.

3rd.—The improvement of present processes with collodion, and in toning chloride of silver, either to render the collodion more sensitive, or better tone proofs upon albumenized paper.

The last processes are doubtless the most important in practical photography; for during the fashion for *carte de visite* portraits, a very sensitive collodion and a good toning bath for proofs upon albumenized paper, are valuable to know. We therefore commence with a study of them.

We know that in a good collodion process, it is the silver bath and the iron developing agent that are of the first consideration. As to the first, the suggestion of M. Laborde, to add free iodine, has been found a very good one; only a certain limit must not be surpassed, so as not to liberate too much nitric acid, which would injure the dark portions of the negative. In this case, the addition of a few drops of acetate of ammonia, or of a solution of soda, may be recommended, because, by their aid the free nitric acid is retained, and a little acetic acid (which by its organic constitution favours the vigour of the dark portions) is set at liberty. If we add much of these salts, some acetate of silver is formed, which must be removed from the bath by careful filtration, because it tends to separate in microscopic crystals, and spot the negative. To avoid an excess of iodine, I like better to add some drops of tincture of iodine to the recently prepared silver bath, with some nitrate of silver which has an alkaline reaction, and with the necessary quantity of iodide of silver, known to every photographer. It is essential to prepare the silver bath in the *daylight*, in the sunshine if possible. It seems to me that by these means the principle of the formation of veils, or fogging, may be removed. The iodo-nitrate of silver which is formed, and which is extremely sensitive, is partially decomposed, and a little iodine and nitric acid disengaged. And also all useless matters present, and which may cause fogging, are decomposed, and put out of the way of causing injury. We immediately perceive that the iodide of silver (which at first must be in excess in the bath) blackens, which it never does so energetically or so rapidly if it is not in contact with nitrate of silver.

The addition of formic acid to the silver bath is of no value, as the negatives are completely fogged by it. We can always add this acid to the iron developing solution, taking care to add also some acetic acid.—*Moniteur.*

(*To be continued.*)

## DRY COLLODION.

BY M. L'ABBE' DELEAGE.

Collodion prepared with iodide and bromide of cadmium may be employed in the dry state. It gives results identically the same as those given by wet collodion. We can even employ it for portraiture: it will keep in good condition for at least a week, and even longer. This fact anyone may easily verify for himself. I shall, however, add some details which may serve to guard the photographer from the errors and failures into which I was led by prejudice, and the general directions given in most photographic treatises.

The necessity I have been under of operating quickly had always led me to avoid the tedious manipulations and slow development indicated for working with dry collodion; for this reason, when some months ago I read Mr. Saunders Van Loo's communication on dry collodion, I hastened to try afresh the resin formulæ of M. l'Abbé Despratz, which I had previously tried without success. I also employed collodion without resin, and the satisfactory results I obtained on many occasions satisfied me that even with ordinary collodion we may obtain successful results.

But I was ignorant of the composition of the collodion I employed: it was a mixture of all the residues of previous operations with collodions of different formulæ. This was the first point to be elucidated.

I tried various formulæ in succession; collodion with excess of alcohol; collodion with excess of ether; excess of iodide of cadmium; excess of bromide; various quantities of pyroxyline; alcohol more or less anhydrous, &c. Finally, I became convinced that the best collodion to operate with in the dry state, was also the best for the wet. How is it then that every photographic treatise has gone on repeating that ordinary collodion does not give good results in the dry state. (I speak of such treatises as I have studied). And why have amateurs taken so much trouble to modify it. I believe that I have discovered the reason in the fact that there are certain difficulties peculiar to dry collodion, and which I have often encountered.

Numerous transparent round spots, having a black point in the centre, often cover the finest negatives at the moment of development. These spots have been described in treatises on wet collodion; they are easily avoided by careful filtering. But it is not the same with dry collodion. These spots are produced whenever the sensitizing is performed in a shallow dish. As we are consequently compelled to agitate the dish to make the liquid cover the plate, particles in the atmosphere, deposited on the surface of the bath, are brought into contact with the humid collodion, and adhere to it. If we operate with wet collodion these particles have not time to decompose the iodide of the collodion film; but with dry collodion this effect is invariably produced. It is therefore necessary to sensitize in an ample bath. I use a bath containing 16 or 18 ounces of nitrate solution for half plate negatives, and I never am troubled with these spots.

On the other hand, a black veil generally covers at least one of the corners of the plate, and sometimes spreads very far into the film. These changes in the sensitive film, which become manifest only at the time of developing, can very easily be avoided by concluding the washings of the sensitized plates by a last washing with water, to which acetic acid has been added, in quantity that will be greater in proportion as the temperature is high, and when we desire to keep the dry plates a long time.

Still I have obtained the best results by adding acetic acid to the silver bath itself. The sensitized collodion keeps better. And while plates prepared with a neutral bath give bad negatives at the end of four or five days, I have succeeded in keeping them good eight days, after sensitizing them in an acid bath. To sum up:—

1. Employ ordinary collodion, with iodide and bromide of cadmium.

2. Sensitize in the ordinary nitrate of silver bath 7 per cent., which may be modified with 5 per cent. of acetic acid.

3. Wash freely under a fine stream of rain or river water, and conclude with a washing with distilled water, to which from 1 to 5 per cent. of acetic acid has been added. This washing with acidulated water is strictly necessary only when the nitrate bath is not acid.

These washings can be performed in successive dishes, by which the operation is accelerated.

I employ water for washing as pure as it can possibly be obtained.

4. Leave the plate to dry in the dark. Besides, the plates while wet, after being washed, yield the same results, and per-

haps more rapidly. And the drying taking place slowly, the operator can take his time, arrange his model, wait the favourable moment, &c., without having to fear any change in the condition of the sensitive film. But the plates must not be exposed while half dry, else the result will be inequalities in the tone of the picture and other defects.

5. The exposure need not be much longer than with wet collodion. I have obtained *cartes de visite* half-plate in 15 to 20 seconds; views in 1 to 2 seconds. For landscapes taken with a landscape lens, and with a diaphragm of 4-10ths of an inch, in fine weather a very good picture was obtained in a minute and a half.

6. Immerse the plate in the sensitizing bath immediately before developing, which may be postponed some hours after exposure. I have not yet ascertained if the development can be postponed until the following day. Instead of immersing the plate in the silver bath, we may content ourselves with moistening its surface with plain water, but in that case some silver solution must be added to the developing agent.

7. Lastly, develop with iron or pyrogallic acid. The developing takes place rather slowly, but effectually.

The success which for at least two months I have constantly obtained by the method indicated above, leads me to suppose that in more experienced hands dry collodion will give excellent results.—*Cosmos.*

## ON THE LIGHTING AND MANAGEMENT OF LIGHT IN PHOTOGRAPHIC GALLERIES.

BY LACHLAN MC'LACHLAN.*

The construction of galleries for the taking of portraits has never, in my humble opinion, received that attention which its great importance demands. Their present construction is to a great extent wrong, inasmuch as they do not answer the purpose for which they were originally intended, namely, the production of vigorous and truthful portraits, copies of statuary, &c., &c., at any hour of the day when there is sufficient light.

I may ask in what respect are galleries superior to the open air for the taking of portraits? They are superior in two respects:—First, they are not subservient to the weather; and, secondly, they give the light a certain direction, according to the slope of the roof. But in every other respect they are much inferior to the open air. Why? Because we have to deal with the refraction caused by the glass and the reflection from everything in the room, which makes it very painful to the sitter, who is placed in the midst of a blaze of light. Yet there are many worse evils than these to contend with. The reflected light is scattered in every nook and crevice in the room. It enters the lens, pervading every shadow, reflecting from the background upon the sitter, and quite overpowering all that beautiful gradation of light that gives rotundity to the figure. The picture depends more upon the combination of light than it does upon the manipulation or chemicals; in fact, the light with ordinary care makes the picture, and good chemicals, lenses, &c., are nearly valueless unless the sitter be properly *illuminated.*

We have searched into the chemistry of photography, and we have greatly improved the apparatus used in the art; but it is a notable fact that the portrait gallery remains stationary, no improvement whatever having been effected in it. I have most unceasingly endeavoured to point out to many of my professional friends the great defects of most of the present structures.

The great error in their present construction is, that the balance of side and top light is seldom, if ever, taken into consideration. In the majority of galleries which I have seen, whatever amount of side or front light there was, the roofs had nearly the same inclination, just as if there were no side light. This I have proved to be a great error, and a greater detriment than may at first appear; for if we do not screen off a large portion of our side light, the picture is sure to be flat; for it is only by a certain amount of top and side light that we round the figure. It is a nice calculation to balance the one against the other: and if we have too much of one or the other it is so much light thrown away.

I am willing to admit that under peculiar circumstances of light, chemicals, &c., results sometimes are obtained which seem to us nearly perfect; but how rarely is this the case! The exception is only found amongst a few professionals who have made the management of light their particular study. Under the present general system, a perfect combination of light will perhaps be lost in an hour, or less. We have done nothing special to bring about this unity, and, as a consequence, we can do nothing to retain it—to avail ourselves of its effect. This should not be so.

I will now endeavour to describe the means which I employ to relieve myself and the sitter, at once, of the intolerable nuisance of an oppressive and unmanageable light. We will suppose a gallery faces the south. The plan I adopt to keep out the sun's rays, and to govern the light at pleasure, is this:—I take pieces of thin wood: place them hanging from the roof, in a south-west direction; but, before doing so I obtain the highest altitude of the sun, and calculate the rake of roof, to ascertain the due distances to place them apart. Yet there is a simpler plan which can be adopted. First of all, decide how deep you would like these pieces or strips; then fix two or three of them in their places, and as near as you think will do; then watch if they arrest the rays of the sun; if they do not, place them nearer together till the sun is excluded (I allude to the direct rays). Do the same to the front or side light, provided you have sun there; you will then find that this method far surpasses the use of white blinds, brown paper, or other numerous contrivances—in fact, you will feel conscious of having overcome one of the greatest difficulties in your profession. If the sun cannot introduce itself directly, it will do so indirectly, and, consequently, scatter its rays in every direction. This is undesirable; certainly it is an improvement, but not a remedy.

What we want is a concentration of light, with power to give it any direction at will. I have accomplished this by means of placing pieces of thin wood fixed in grooved rods, which rods are placed across the long blinds, so as to form compartments. These divisions are made to move at pleasure, which is easily done by connecting rods that may be made to move in sections, and to any required angle: by this method I have absolute control over the light.

The plan is the result of many years' constant study and observation; and, from the practical application of it, I am enabled to say that I can accomplish the results here stated. Of course judgment must guide us in the particular application of it, as well as in the working. For instance: when the light is focussed upon the sitter on a very bright day, all the high lights are exaggerated. But the remedy is easy: by reversing the light the image will gradually change, and you may do so until you obtain an excess of half tone if desired.

It is absolutely essential that we should have perfect command over the light in our art—as much, at least, as the painter possesses over his brilliant and well-mixed colours; and before we can rival the painter in perspective, we must be able to delineate or paint with the light, exactly as a studious and artistic painter does with his brush.

In order to claim for the photograph a place amongst works of art, we must be able to command at will as complete control over the background, as we now can over the figure. Ask an artist to give you a delicate drawing of a statue upon a piece of soiled or smoked paper: he would naturally consider you a fool! And yet that is precisely what the photographer does. His back light is the smoke, and, until he can get rid of it, his pictures will appear as if

* Read at a meeting of the Manchester Photographic Society, May 7th, 1862, and reported in the organ of the Society.

they were sunk into what ought to be a background. In effect it is a palpable misnomer. Besides, it is lamentably deficient of the requisite light and shade which all artistic backgrounds ought to possess. Sometimes we see the light and shade (when there are any) quite reversed, thus clearly proving that the light is not under our control.

I will now endeavour to describe my plan of a background, which enables me to obtain any effect of light and shade I please, much easier than the painter can with his brush. I have four frames, made exactly as the one you stretch your present material upon, with which you require two other frames, about twenty inches wide. These must each have a piece framed in the middle, with a slot about half an inch wide. Take and secure firmly two of your large frames to the edges of your two smaller ones, and you will have a skeleton box; place the third and fourth frames inside, allowing them to be moveable, with a handle or knob, which works in the slot of the narrow frames, by which means you will be able to fix the moveable frames in any position or angle you please between the others; cover the back fixed frame with black velvet, and also the sides and top with the same material, to prevent the light entering from any source but the front. The two inner moveable frames must be covered with very open gauze or net. When you want to use this background, draw up and fix the front moveable frame forward to its full extent, and secure it there. The principle involved in the arrangement is this:—the background is partially transparent, and allows the light striking upon it to pass through its meshes, so as to become absorbed by the black velvet at the back, and thus that halo is avoided which is so often seen around the margin of the figure, and which, perhaps, as much as anything else, tends to flatten the picture, and give it the appearance of having been taken separately and placed upon the background. The object of the front moveable frame is to allow us to remove it out of harm's way when done with. The front or outer frame might have been used for the front gauze screen, but it would continually be liable to injury. This skeleton box also serves to hold a series of landscape and interior backgrounds for *cartes de visite:* of course it must be understood that these views roll up to admit of the other frames passing. I may state that this *box* moves on castors.

With regard to the amateur's gallery, it is made exactly on the same plan, and at a great saving in cost, besides effecting portability and greater efficiency than if glass were used. Calico can be adopted with strings, which are made to answer the place of rods. The whole may be fixed on four horizontal rods, and supported by four others fixed in the ground. The strips of calico can be made with eyelet holes in one end; the other end may have a piece of elastic webbing, so as to stretch and keep it tight. The top ends must be fixed on hooks placed at the proper distances; the lower ends must be left loose, and a piece of tape or cord sewed to every one, so that when we pull the one end of the cords we can give the pieces of calico any angle we please. The same process can be applied to the sides or front. Now you have only to attach a piece of calico on one side of your tent, which is intended to shade the face of the sitter on one side. Without it the face would be quite flat. If the amateur select some shady nook for a background he will have a *gallery* very much superior to that of the professional.

In conclusion, I may state that, having spent a considerable amount of time and money on this subject, I have thought it due to myself to patent the invention with a view to mere reimbursement; but I freely give it to all amateurs, and shall be happy to afford them any assistance they may require.

## Correspondence.

### M. CLAUDET'S ENLARGED PICTURES.

Sir,—My attention has been drawn to a paragraph in the Photographic News of the 18th inst., in which you make some remarks about me as the artist who painted Professor Faraday's portrait, which I feel bound to answer, and which has become necessary in consequence of the controversy between Mr. Macandrew and M. Claudet.

I regret the occurrence, though I have not been the cause of it, as the following plain facts will show.

When M. Claudet, for whom I must say, *en passant*, I entertain the greatest esteem, delivered to me the canvas, the drawing upon it was in a very unfinished state, the place for the hands, &c., being scarcely indicated; but even had the drawing been complete, it would have been of no use to me, as it was smaller than nature, the size M. Claudet wished the portrait painted; and every person knows that it is much more *difficult* to enlarge or lessen a drawing than to re-draw it entirely.

The controversy must have arisen through some parties who were present in my studio and saw me drawing the outlines on the canvas from a small photograph, and were very naturally surprised to see it exhibited and described as the drawing having been done by M. Claudet's apparatus.

You have stated that I have been imprudent in this matter, but I trust the foregoing is sufficient explanation; and as regards jealousy, I feel your remarks are made without knowing me, for no person can appreciate photography more than I do; and although I but seldom paint with its aid, the *Spanish Girl*, in the Crystal Palace Exhibition, of which you spoke in such eulogistic terms a few weeks ago, will prove the great benefit I have already derived from it; and, as a further proof, if you will favour me with your photograph and a *clean canvas* I shall be most happy to execute your portrait the same as Professor Faraday's, and assure you that there is not in my studio any magnifying apparatus.—Yours, &c., A. de Lafollie.

[We have pleasure in giving publicity to the explanation of M. de Lafollie, from which it appears that the controversy in question has arisen simply from a misconception. M. Claudet having furnished the artist with a canvas, upon which was traced an outline of the portrait required, very naturally regarded the exquisite painting he received from the artist as produced upon the drawing he had furnished, and exhibited it as an illustration of the process. The applicability of the method did not, however, in any way depend upon the picture in question, as M. Claudet practically demonstrated the facility and worth of his plan to the meeting, when he read his paper. We are glad to find that our suggestion as to artistic jealousy of photography was, in this instance, misplaced, and to learn that a painter of such great ability entertains the respect for our art of which it is worthy.—Ed.]

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Sir,—I have had my attention drawn to a paper read by M. Claudet at a meeting of the London Photographic Society on the 3rd of June.

In this paper is described a method of producing enlarged drawings, by means of reflecting the negative through a lens, by the agency of gas-light, and traced by hand upon canvas or paper.

I fully agree with all M. Claudet says of the value of this process, and of its being one likely to rise in estimation as it becomes more generally known.

When applied to portraiture, architectural subjects, and maps, where correct distance and dimensions are of so great importance. From a small negative very large reproductions can be faithfully traced.

Its utility is not in any degree a matter of doubt, and this I am justified in asserting, from my experience of the last three years, during which time I have been professionally engaged in applying the method, both publicly and privately, with considerable success.

In the greater portion, too, of this period, portraits enlarged in the manner described, and coloured in crayon, have been exhibited in my rooms, and given much satisfaction.—I am, Sir, yours obediently, W. Hall.

## Talk in the Studio.

South London Photographic Society.—The third outdoor meeting of this society takes place on Saturday, August 2, at Charlton Station, on the North Kent Railway, reached by train from London Bridge at one o'clock. The weather for the two previous appointments has proved very unpropitious; there is, however, now a fair prospect of fine weather, and we trust the meeting will be a large and pleasant one. Just on going to press we have received a note from Mr. Wall to say that the meeting will take place, by permission, in the private grounds of Sir T. Wilson, at Charlton. A dark room, for those who practise the wet process, will be kindly provided by Mr. Davis of Woolwich.

Royal Portraits.—We have just seen some of Mr. Jabez Hughes' charming portraits of their Royal Highnesses the Princesses Helena and Louise, which Her Majesty has graciously accorded permission to be published. The groups especially please us; they are amongst the most graceful and artistic photographs which have hitherto been published of the Royal Family.

The Royal Academy.—Lord Elcho has applied for a Commission to inquire into the present position of the Royal Academy in relation to the Fine Arts, and into the circumstances and conditions under which it occupies a portion of the National Gallery, and to suggest such measures as may be required to render it more useful in promoting art and in improving and developing public taste. There has been talk for some time of such an institution as a Ministry of Art, and it appears Lord Elcho recommends that some dictatorial power be vested in the Academy. Of this *The Times* says:—The remedy, so far as we could understand it, would be to give the Academy the direction of our public works, or at least a veto on the designs. If anything of the kind be contemplated by artistic reformers, we would say, 'Leave us the old Academy with all its defects—its exclusiveness, its alleged favouritism, its staff of sinecure professors, its inefficient schooling, its dinners, and all that move the indignation of the outsiders. Leave us with the Havelock and the Jenner of Trafalgar Square; leave us with the National Gallery and the International Exhibition, and the equestrian Wellington, and every other monstrosity of this capital, rather than turn King Log into King Stork, and subject the art of the country to the dictation of an Academy. However eminent and illustrious the members of such a body may be, the power it possesses is sure in the end to repress genius and originality. Such as we are in literature, art, and science, we have become without the aid of academies, and no intellectual evil could be greater than the foundation of these exotic institutions among us.

## To Correspondents.

Photographic News Almanac.—We have to inform several applicants that the Photographic News Almanacs for every year are now out of print. Agents having any clean copies on hand of the present year will oblige by communicating with the publisher. Agents will oblige also by notifying any stock of back numbers of the Photographic News for the present year, as several recent numbers are out of print.

Subscriber inquires, "If such articles as cloud plates exist, or in what manner clouds are introduced into views?" We presume, by "cloud plates," our correspondent means negatives of clouds. These certainly exist, and aid in one of the methods of introducing clouds into photographic landscapes; we are not aware that they exist at all as articles of commerce, each photographer who uses them producing his own, and getting such a selection, under such circumstances, as will best suit his pictures. Mr. Maxwell Lyte adopts this method; Mr. Annan, of Glasgow, and Mr. Samuel Fry, both, at times, adopt the same method. The latter gentleman described his plan of operating in our last volume. There are other methods of introducing clouds, either by using a very rapid process, or shading the sky so as to secure them on the same negative. This method is used by Mr. Wilson and others. Some secure cloud effects by painting carefully on the back of the negative; these effects may be seen in some of the pictures of Mudd, Bedford, and others. Whichever plan be used, taste, judgment, and care are imperatively necessary.

R. A. R.—The spots on your prints appear to be due to the albumenized paper, which is probably old, or the albumen possibly stale. Your prints would be improved by more judicious lighting, and a little longer exposure, as they are a little hard. The definition might also be improved. A little care in these respects, and your pictures will be better. 2. The best thing to prepare albumenized paper for water colours is a preparation sold for the purpose by Newman, of Soho Square. Some persons colour on the albumenized surface without preparation, merely using a little ox gall with the colours. But the article we have named answers admirably.

R. W. Jacob.—Photographic slides for the magic lantern are transparent positives, produced in printing from a negative on to a collodion film, either by super-position, as by printing on paper, or by what is termed camera printing. Various articles descriptive of the process of producing them have appeared in our pages; we may refer you especially to pp. 208, 220, 257, and 280 of our fifth volume; the numbers containing these pages are: Nos. 139, 140, 143, and 145. In these articles you will find full instructions on the manipulatory details.

D. W. T.—Your difficulty, most probably, arises from excess of iodide of silver in the bath, than from deficiency. Try the addition of a few ounces of fresh silver solution, without any iodide, to the bath, and the sandy effect after development, which results in pinholes after fixing the picture, will disappear. The white spots to which you refer, as occurring on glass positives, may arise from turbid collodion, or from using glass with a rough, imperfect surface. Using a thick collodion with more body will sometimes prove a remedy. A very thin collodion is always troublesome for working the positive process.

L. E W.—Similar spots to that you enclose will sometimes arise from some defect, or decomposition, in the albumen. They also arise from hypo touching the unfixed print, or nitrate of silver touching the fixed, but unwashed, print. We cannot say, certainly, the cause of this especial one.

Young Photo.—We have repeatedly stated that there is no method of turning a good positive into a good negative; for if it have been rightly exposed for the former, it will be under exposed for the latter. It is possible, however, to produce a moderate negative from some positives. The best plan is to wet the film thoroughly, and then apply a solution consisting of iodine one grain, and iodide of potassium two grains, in an ounce of water. After this has remained on for a few minutes, wash and apply a solution of pyrogallic acid two grains, and citric acid one grain, in an ounce of distilled water, adding a few drops of a 20-grain solution of silver. Continue this until the proper printing density is obtained.

Operator.—The stain of reduced silver to which you refer, if we rightly understand you, is the irregular line of white surface reduction which sometimes occurs. It generally arises from the free silver coming in contact with some organic matter at the corners of the inner frame of the dark slide. Having these well varnished, and frequently well washed and dried, will prevent the evil; or letting the plate rest on pieces of clean blotting-paper will often answer the same purpose. If these do not meet your case, write again explaining more fully.

John Beck.—The stain on the mounted print enclosed evidently proceeds from the back of the card-board, for, on examining, we find it larger there, passing through and slightly staining the surface of the print. There are several similar, but smaller, stains at the back of the card, which have not passed through. Whether it is from some impurity in the card-board, or accidental contact with some chemical, we cannot say.

No. 35.—We prefer the lenses of the best English makers at all times to French ones. The No. 1 of the maker you name first would most probably answer your purpose best. Those of the two French makers you name are, probably, pretty good, but we have no personal knowledge of their qualities. They will, probably, be of too long focus for stereoscopic work, giving you very little subject, except at a great distance. Amongst French makers, both the names stand well.

B. G. P.—The pinholes are, probably, caused by excess of iodide of silver in the bath. See answer to D. W. T., above. 2. A changing box is the neatest and simplest means of changing sensitive dry plates without a tent. You can get them made for any-size plates. It consists of a plate-box with facility for attaching the dark slide, and allowing the exposed plate to drop into its groove in the box, and then placing another in the slide, without admitting any light.

Actinic.—The report on your coloured glass in our next. 2. By all means the first mentioned maker. The superiority in quality is quite equal to the difference in price.

J. C. L.—The dirty brown tone which you describe is very difficult to avoid with some samples of paper, especially in printing weak thin negatives. The best mode of dealing with such a sample of paper, is to use it with vigorous negatives, use a neutral silver bath, and tone considerably deeper than seems necessary, to allow for the loss in the hypo. It is impossible to get fine prints on such a paper, but this treatment will make the best of it. The sour smell is doubtless due to the addition of acetic acid to the albumen, a custom practised by some manufacturers. It seems to be of doubtful utility, as we hear many complaints of its results, the paper generally discolouring rapidly after sensitizing.

T. N. W.—Negatives cannot be satisfactorily intensified after varnishing, except by first removing the varnish, a process which we have sometimes effected for the purpose of intensifying. Amber varnish, or crystal varnish, may be removed by benzole or chloroform. Spirit varnish is more difficult to remove; strong alcohol will sometimes do it. A negative varnished with spirit varnish may be intensified by using an alcoholic solution of bichloride of mercury, followed by a dilute tincture of iodine, but there is great risk of the intensity being irregular and unsatisfactory.

R. H.—A background to roll up may be made of a piece of unbleached sheeting calico, 6 or 7 feet wide, and about 8 feet high. This should be stretched on a frame, or against a wall for painting, and when dry may be attached to suitable rollers. The calico shou d be sized first with a good glue size, and may then be painted grey in oil flatting, or in distemper. If the latter be chosen, the method described by Mr. Gulliver on p. 165, Vol. V., Photographic News, should be used. For some purposes a cheap grey broadcloth, or merino may be obtained wide enough. A blanket if kept well out of focus makes a good background; and we have seen a good one improvised for occasional use out of the wide brown paper sold by upholsterers for under-lining carpets.

M. J.—It is somewhat difficult to advise you from the data given, as much will depend upon the actual condition of light, &c., at the time of operating. So far as we can judge, from your description, we should say place the camera in the corner, in preference to directly in front. If you require further aid please send a sample of the evil produced, or the difficulty to be overcome.

Honesty Good Policy.—The circumstance you mention, if it be as you describe, is somewhat inexplicable. We will enquire into the matter, and endeavour to obtain an explanation.

Dages.—The stereographs will be duly noticed as the productions of Dages and Harman. The reference in this column to one name only, arose out of a private note on other business arriving at the same time, and incidentally mentioning the slides.

F. Vincent.—We are glad you have overcome the difficulty. See first article in the present number.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 205.—August 8, 1862.

## REVISION OF AWARDS IN CLASS XIV.

We have pleasure in announcing that the revision of awards in Class XIV. of the International Exhibition, for which we have more than once expressed a hope, will absolutely be made. We are not at present in possession of the corrected list; but have reason to believe that the name of M. Joubert will be found in it, and we hope with a medal attached. Another revision, in reference to which we have received one or two letters, will be the withdrawal from the list of honourable mentions of the name of Mr. Beatty, whose products, we believe, never arrived at the Exhibition, and in his place the name of Sir A. K. Macdonald will be inserted. We have pleasure in expressing the conviction that his pictures well merit such a distinction. It would be premature to enter into further detail at present, but we hope to be able to publish full particulars in our next.

## OUR LIVERPOOL CONTEMPORARY ONCE MORE.

As past experience might have led us to anticipate, our Liverpool Contemporary, *more suo*, returns to the charge, and, like one of old, "breathing out threatenings." He now marshals all his forces for the assault—editor, publisher, and staff, down to the funny contributor, each making a separate attack. Even were we disposed to indulge our contemporary, who, like the traditional Irishman, seems to be "blue moulding for a bating," by entering into the arena with him, we should find very little to answer. "Tall talk," in Ercles' vein, and dreary facetiæ; reckless assertion and mis-assertion, and equally reckless denial; much angry epithet; insinuations as to the feebleness of an antagonist he brings out his whole forces to attack; wilful misrepresentation and sophistication—these are the weapons of his warfare. What good end is to be gained, then, by any one in such a contest? We may deny his mis-statements, and refute his calumnies, but that does not prevent his re-asserting them or framing fresh ones—

> "Destroy the web of sophistry in vain!
> The creature's at his dirty work again."

We do not, therefore, care to answer him in detail, nor to deface our pages further with a squabble which is, we believe, offensive to our readers, is distasteful to ourselves, and disgraceful to scientific journalism.

## COPYRIGHT IN PHOTOGRAPHS.

We congratulate our readers on the fact that an Act securing to photographers a property in the production of their skill and enterprize, their brains, hands, and capital, has now become law. On another page we reprint the Act *in extenso*, and shall here only refer briefly to one or two of its salient points. It will be seen from the Act that photographs are classed with paintings and drawings, neither of which, in common with photography, it is declared in the preamble, have hitherto had the protection of any copyright law. The Act now passed includes all three in a common protection. Many of our readers will be interested in this measure of justice to fine arts generally; but it is with that part of it especially relating to photographs that we are more immediately concerned.

We could have wished that the general wording of the Act in several places had been less obscure; but we are glad to observe that especial attention has given to the distinction between a photograph, or print, and the negative from which it has been produced—a point of technical importance which might easily have been overlooked in the framing of such a law. The first section of the Act gives to the photographer the exclusive right to reproduce, or permit to be reproduced, his own works, not simply by photography, but by engraving, or "by any means whatsoever and of any size." It is then provided, however, that an artist selling his productions, or executing them to order, shall not retain a copyright therein, except by especial agreement in writing, signed by the vendee, or person for whom the commission is executed. This, at first glance, would appear to involve a photographer taking portraits of public characters, with a view to publication, in the necessity for making a definite agreement in writing with each person so taken, securing to the photographer the copyright in the portrait, which would otherwise belong solely to the person for whom such portrait was taken. It might seem only strictly just to the public, that anyone sitting for a portrait and paying the charge made, should secure a copyright in his own likeness. Just as this may seem, it would have involved the portraitist in a great deal of trouble, in rendering necessary an agreement in writing in all cases, before he could sell a single copy of his pictures to any one but the person originally ordering the portrait. So far as we understand the Act, however, this arrangement is not intended, and it is avoided by referring in the clause in question, to the negative and not to the print. A person commissioning the production of a *negative* would, we apprehend, unless a written agreement existed to the contrary, become the owner of the copyright in such negative; but in simply ordering a portrait, he unquestionably means a print from a negative, and the copyright in the negative, it seems to us, remains in the hands of the artist. The wording of the Act is a little obscure, but we apprehend that this is meant, and that it is, moreover, a reasonable and legitimate conclusion; nor do we see any reason to fear that when the photographer has an absolute property in the copyright of the negative, he is any more likely than he has been hitherto, to publish and sell copies of portraits against the wish of the sitters. The public is saved from any risk of suffering annoyance in this way, by the simple fact that it is never the interest of the photographer to affront his patrons by selling their portraits without permission. The photographer is protected, by the possession of a copyright, in every negative he takes, unless the negative itself be ordered, and not simply prints from it, or unless he sells the negative without reserving any copyright in it. If it had been necessary to obtain an agreement in writing in order to secure a copyright in each negative taken, the issue would have been, that the trouble would have been generally neglected, and the mass of photographs would have still remained without any copyright.

It is important to remember, that no copyright is secured under this Act, until registration shall be made in the proper manner at Stationers' Hall. The provisions of a former Bill which rendered necessary a signature, or trade mark, or monogram, upon each picture, are not included in the present Act; the only step necessary is the registration prescribed. This, in the case of photographs, will be a simple transaction, inasmuch as a copy of the photograph, with the name of the artist, and date of production are all that will be necessary. In the case of valuable paintings a "sketch, outline, or photograph" is recommended, for entry in the register, as well as a description. The copyright to be acquired under this Act will be deemed personal estate; and any sale must be the subject of a written memorandum, written licences to use such copyright may be also given; but it is necessary that sale made, or license allowed, shall be duly registered at Stationers' Hall. For the various conditions governing the examination of such registry, of securing certified copies for reception in evidence, &c. &c., reference is made to the existing Act on literary copyright, which enacts that the register shall be, at all convenient times, open for inspection on payment of one shilling for every entry searched for; and that a stamped and certified copy of such entry, which shall be received as evidence in all courts, in case of legal proceedings, shall be furnished by the proper officer for the sum of five shillings.

As regards the penalties by which the protection is enforced, there is not much aubiguity. For every offence the pirate is liable to a penalty of ten pounds, and all "copies, repetitions, and imitations," and all negatives are to be forfeited and, together with the penalties, given up to the proprietor of the copyright. In England and Ireland the penalties are to be recovered by summary proceedings before two justices of the peace, having jurisdiction where the offending party resides. In Scotland they are to be recovered by action before the Court of Session, or by summary action before the sheriff of the county.

Provision is also made for seizing importations of piracies, and also for including in this Act, in relation to paintings, drawings, and photographs, the provisions of the International Copyright Act.

We again congratulate photographers that they have, though tardily, obtained this measure of justice, which will do much, we believe, to improve the productions of the art, by giving the artist exclusive property in the excellence of his works, and will contribute towards raising photography in the eyes of the public, by removing from the market the vile copies with which it has been recently increasingly inundated.

## Scientific Gossip.

Separation of Silver from its Alloys—New Iron Developing Salts—O'Neil's Dictionary, Advice to young Experimentalists—New and important Property of Carbolic Acid.

An improved method of separating pure silver from an alloy of silver and copper, has just come before our notice; it has been proposed by Berlandt. He dissolves the mixed metals in nitric acid, and evaporates the solution to dryness to get rid of excess of acid. He then dissolves an ounce of the salts in five ounces of water, filters the solution, adds fourteen ounces of a solution of protosulphate of iron (five and a half parts sulphate to eight and a half parts water), mixes and stirs well. The greyish white deposit, washed with very dilute sulphuric acid, and afterwards with water, is found to be pure silver. By dissolving this in nitric acid, taking the precautions mentioned in one of our early chapters on photographic chemicals, the photographer will be in possession of nitrate of silver pure enough for all ordinary purposes.

The employment of protosulphate of iron in developing solutions is becoming so general, that our readers may be glad to know an easy method of preventing the peroxidation of this salt in the atmosphere. The value of protosulphate of iron as a developing agent depends upon its rapid absorption of oxygen, and conversion into a per-salt of iron. If, however, this oxidation has partially taken place before it is used—if part of its reducing propensities have been gratified before it comes in contact with the latent negative image—it is evident that its action will be much weaker. Instead of using sulphate of iron alone we would suggest a trial of the double sulphate of iron and ammonia, $FeO.SO_3+NH_4O.SO_3+6HO$. This salt is easily obtained in crystals from a solution in which 139 parts of green vitriol, and 66 parts of sulphate of ammonia have been dissolved. The liquid is to be evaporated down, by preference over a water bath until it begins to show signs of crystallization; it is then allowed to remain at rest until it is perfectly cold, when the double salt will be found to have separated in the form of hard crystals: they preserve their transparency perfectly, even when kept in an imperfectly stoppered bottle, thereby showing that no alteration has taken place in their constitution. In using this salt, it must be remembered that its equivalent is greater than that of sulphate of iron, by the amount of sulphate of ammonia which it contains. On this account 196 parts, by weight, of the double sulphate will be required to effect the same amount of reduction as 139 parts of sulphate of iron. Whilst writing on this subject, it may not be out of place to mention a method frequently employed in chemical laboratories for preparing sulphate of iron in a form in which it does not readily peroxidize. A saturated aqueous solution of protosulphate of iron is prepared, and then mixed with twice its bulk of alcohol. The salt is immediately precipitated in a partially dehydrated form as a white powder; this is filtered off and drained from the adhering liquid (no washing is needed). When dry, it may be preserved for use in a stoppered bottle. Owing to its being in a fine state of division it is very convenient for weighing out definite quantities, and it also has the advantage of dissolving with great rapidity in water. Owing to its having lost part of the water of crystallization, it is slightly stronger in its reducing or developing powers, weight for weight, than the crystallized sulphate. We are not aware that either of these forms of sulphate of iron have been used, but from our own experiments, as well as from their more obvious valuable properties, we do not hesitate to recommend our readers to make trial of them as developing agents. We shall be glad to hear of their success.

A Dictionary of Dyeing and Calico Printing, by Charles O'Neill,* can scarce be expected to contain much that is of interest to photographers, although it is a work which will not fail to prove of the greatest value to those for whom it is specially written. Some of the author's remarks in the introduction are, however, so excellent, and are of such universal application, that, for the benefit of our younger readers, we transcribe a portion of them, which will apply quite as forcibly to photographers as to dyers. He writes:—"It is not necessary to say to practical and experienced colour-mixers and dyers what amateurs must be strongly reminded of, that receipts, in themselves, are valueless without preliminary experience. The failure of a receipt, in nine cases out of ten, is not necessarily a condemnation of its correctness, but is frequently a reflection upon the skill of the operator. The real use of receipts in a work of this nature, is to show how things have been done by some one in some particular circumstances, and with certain materials; and to suggest to another person in another place, with materials of a similar nature, but not exactly the same, how he may hope to obtain equal results. Receipts should be looked upon rather as valuable hints than as arbitrary prescriptions."

A very important property of carbolic acid has recently been described by Mr. J. E. Ashby. Our readers may, perhaps, be aware, that this is one of the products of the distillation of coal, and is now made in somewhat large quantities, on account of its most energetic deodorizing and disinfecting properties. When perfectly pure, it is a white crystalline solid, which by absorbing moisture soon changes into a colourless, refractive liquid having a faint odour of roses and tar. It is not an acid in the popular sense, not being either sour or corrosive, and should, therefore, perhaps, be generally designated by its other title of phenol. Crude carbolic acid may be now obtained in bulk for about a shilling per gallon; it is a dark, tarry liquid, containing, perhaps, from ten to twenty different substances in a state of mechanical admixture. This

* Part I., price 1s. London: Simpkin, Marshall, and Co.

crude acid is available for the purposes to which attention is now directed. Just as oil is an anti-frictional liquid, so is phenol pro-frictional: or, to state it more correctly, as oil appears to keep surfaces in motion asunder by interposing a thin film between them, so phenol appears to make them bite and bind by bringing them into absolute contact (after a manner of speaking) and removing even the finest film from between them. Mr. Ashby states that any one may convince himself of this by placing a little upon a perfectly clean and dry oil-stone, and then rubbing up the face of a broad chisel upon it. The sensation of the bite is very curious, and renders any further explanation unnecessary; it seems as if the stone and the steel had absolutely nothing between them, or even as if they were brought together by some attractive force. This property of carbolic acid has been applied to the operations of grinding, filing, boring, and sawing in metal with great apparent advantage. When dissolved in fifteen parts, by measure, of methylated alcohol, it forms a milk-white emulsion if poured into water, and it would be worth while to ascertain whether such carbolated water would facilitate the ordinary work of the grindstone. a point on which Mr. Ashby is not able to speak with certainty. This property of carbolic acid reminds us of an artifice which is of frequent employment in chemical, and, we presume, in other laboratories, where common spirits of turpentine are used for a somewhat similar purpose. A hole may readily be bored through a plate of glass with a common bradawl, if it is kept plentifully moistened with turpentine. The point must be sharp, and the movement must be somewhat similar to that adopted in boring a hole through hard wood, considerably less force being, however, used. With ordinary care there is no danger of cracking the glass, and the hole will be drilled through very neat and smooth. This plan of drilling glass is also of great use in extracting stoppers from bottles when the former are broken off short. By a judicious employment of the bradawl and turpentine, the broken stopper may be drilled through and through until it is readily removable from the neck, when the bottle may either have a fresh stopper ground into it, or be closed with a cork. From the above experiments of Mr. Ashby there is every reason to suppose that carbolic acid would answer this purpose very much better than turpentine.

Neither of the pieces of glass forwarded by "Actinic" are sufficiently opaque to the chemical rays to be of much value. The darkest of them, No. 2, admits some of the blue rays; whilst No. 1, is transparent even to the higher green. No. 2 might be used if no bromides were present, but we do not recommend it.

## Critical Notices.

A SERIES OF CABINET VIEWS, Size 6¾ by 4½. Photographed by G. W. Wilson. London: Marion & Co.

Mr. Wilson is not only one of the ablest artists in the profession, but he is in a pre-eminent sense an originator of certain styles in which he will find many, we will scarcely say imitators, but at least followers. Instantaneous stereographs had been taken for years, but it was not until Mr. Wilson issued a series of his exquisite sea and cloud pieces, in many of which he set the daring example of pointing his camera in the face of the sun, that such pictures began to have a recognized position amongst the staple productions of the art: and now several able artists are running a close race with the originator in the competition for excellence. We venture to intimate that the class of pictures Mr. Wilson has recently issued, as Cabinet Views, will become largely popular with the public, and with photographers, both professional and amateur, and that this series will, in fact, originate a style which will have many followers. It is quite certain that one barrier to the extensive circulation of photographs, as works of art, has arisen from a certain difficulty as to the proper mode of keeping them; they are scarcely well suited for framing, at any rate they have not a certainly recognized position in interior decoration; and an extensive collection, especially if the pictures be large, demands serious portfolio accommodation. Photographs of a size, then, capable of preservation in albums, especially if suitable albums be manufactured, are likely to become favorites with the public, and hence we conceive that Mr. Wilson in issuing this series will originate a style. Most of our readers know that these pictures are produced with the triple lens, and include a somewhat larger angle of view than is common with landscape photographs, thus often obtaining much in pictorial effect: the size, about 7 by 4½, is, moreover, exceedingly convenient for handling, and is not so small as to render objects insignificantly diminutive. We believe it is the intention of Messrs. Marion to prepare albums of a similar kind to those used for card portraits, especially suited to the reception of this size of photographs.

These views are characterized by the qualities which have hitherto distinguished Mr. Wilson's pictures: judicious and artistic selection of position and light, softness and brilliancy combined, and above all, the unmistakable presence of atmosphere. In many, which are not, however, instantaneous pictures, there are very fine natural clouds, and in others, the sky possesses a graduated or flat tint, but in no instance is it represented by a mass of white paper. Amongst the finest specimens of skies in the non-instantaneous pictures, we may mention that in a view of Aberdeen, with the Union Bridge in the foreground, which contains an exquisitely round yet soft and atmospheric bank of clouds. Two or three of the views of Balmoral Castle are charming pictures, and also contain fine clouds. Aberdeen University, and Castle Street, Aberdeen, are both very fine architectural pictures, and excellent illustrations of the value of a graduated atmospheric tint over the sky in making a picture, and preserving breadth. Braemar Castle, Mill on the Cluny, and Bridge on the Cluny, are three of the most charming pictures of the series, admirable examples of the soft rendering of running and broken water; foliage and rocks in the foreground do not lose their slightest detail, and distant hills are perfectly defined without, however, the cutting hardness which ignores aërial perspective. There are also some fine instantaneous pictures in the series, including shipping, water, and clouds We have not space to notice in detail every picture in the series, nor have we alluded to all their merits, our object being chiefly to draw attention to such points as possess technical interest in the eyes of our readers, to many of whom a selection from such a series will possess high educational value, as illustrating how the overcoming of merely technical and photographic difficulties becomes conducive to the attainment of pictorial excellence. As a whole we have rarely seen a series of photographs more pleasing; combining more of the artistic and photographic beauties necessary to a perfect result.

A PHOTOGRAPH OF SOME OF THE MEMBERS OF THE BRITISH ASSOCIATION. Designed and Photographed by A. Brothers. London: Day & Son; Manchester: A. Brothers.

Mr. Brothers has, on former occasions, earned high praise for the skill and taste with which he has designed and photographed composition portrait groups. The picture before us, however, is unquestionably one of the very best grouped pictures we have seen. The original photograph was a commission for Mr. Fairbairn, President of the British Association for the Advancement of Science last year, when the meetings were held at Manchester, and was intended to commemorate the occasion. The picture consists of twenty-two persons, assembled in Mr. Fairbairn's drawing-room; the assembly comprises some of the most eminent savans who took part in the proceedings of the Association, amongst whom we may name, in addition to the President himself, the Astronomer Royal, Sir Roderick Murchison, General Sabine, Sir David Brewster, Lord Wrottesley, Professor

Miller, and others. The figures are arranged in minor groups around three tables, but these three minor groups are united by standing figures so as to constitute one complete and admirably composed group, the individual positions being all so arranged as to aid in producing unity of idea and design, the whole being easy, natural, artistic, and harmonious.

The original photograph was about 33 inches by 20 inches. The number of negatives was thirty-two, twenty for the figures, and twelve for the background and accessories; the total number of printings was thirty-seven. The mere enumeration of these facts is suggestive enough of the care and skill required, and the difficulties to be overcome in producing a satisfactory result; but a little reflection suggests, how much greater are the difficulties than at first sight might appear. In a recent conversation we had with Mr. Brothers, he mentioned some of these difficulties. A painter in producing such a group, or even a photographer in producing a fancy composition group, has the whole of his material before him, and more or less under control. He can conceive his idea, arrange his composition, make his sketch beforehand, and work out his ideas in his own way; but the professional portraitist, when called upon to produce a composition like the one before us, rarely possesses any of these facilities: he has to form his design on the spur of the moment, in the absence of the component parts; often in ignorance even of their personal appearance, and sometimes in doubt as to the exact number to be included. The sittings are to be secured at such different times, and in such conditions of light, &c., as may suit the sitter, however ill it may suit the photographer. With all this, it is necessary to secure such accuracy of proportion, and such positions and relations of light and shade as shall constitute a satisfactory and harmonious completed picture. With such artistic difficulties, in addition to all the technical troubles which will at once flash to the mind of the reader, many shortcomings in the result, if they existed, might be pardoned. No such plea is, however, required by the group before us. The likenesses are striking; the positions easy, characteristic, and natural; the composition, grouping, and arrangement of accessories excellent.

The print now published is from one negative 16 by 10, taken from the original picture. In this copy, the photography is very excellent, round, vigorous, and brilliant, and speaking very highly for the perfect photography of the original picture. We have before us also a card picture, containing a copy of the same group, which is an admirable example of photographic reproduction.

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INSTANTANEOUS VIEWS OF THE INUNDATIONS IN THE FENS. Photographed by V. Blanchard. London: C. E. Elliot.

Few of our, readers before reading Mr. Blanchard's graphic description of a photographic trip to the recently inundated and desolated fen country, would be likely to conceive that anything interesting or picturesque for the camera could be found in such a scene—a dreary waste of waters, and "stretched wide and wild the waste enormous marsh." Mr. Blanchard has here proved, however, what painters have often proved, but what photographers have found much more difficult, that the trained eye and hand of the artist will secure a picture out of the most unpromising materials; and apart from their deep interest as an unerring record of a great calamity, this series contains many slides of very great pictorial excellence.

"Sunset after a Storm," No. 150, is an exceedingly charming picture, with fine clouds and sky; the light on the troubled water is very beautiful; a piece of partially submerged railing in the foreground, and a boat in the middle distance, give force and value to the picture. Another sunset view (No. 156) is also a very fine composition: the sun and clouds are calmly reflected in the water, which apparently covers a meadow, the taller grass of which occasionally merges beyond the surface. A forcible picture of the desolation is suggested by a boat with canvas set, sailing past a partially submerged haystack. In another slide, a boat, the same apparently, is approaching one of the drowned farm-houses, and is just passing over or through a hedgerow, the pliant top twigs of which just emerge from the surface of the water.

A view from the Middle Level Bank (No. 151) and one from the Gravel Bank, near Marshland Fen engine (157), are two very good slides, admirably illustrative of the subject, and presenting some fine pictorial effects besides. Here also are views of the broken sluice, and of the coffer dam, with a group of celebrated engineers present, and other views possessing historic interest, as illustrating different phases of, the inundation and the works connected therewith. The photography is in all instances good, the negatives manifestly being very perfect, and the printing excellent.

We may here take occasion to allude to a happy knack Mr. Blanchard possesses, of giving increased interest to his slides by excellent description and apt quotation. The inundation series are made valuable by having printed on the back a brief but very clear and succinct description of the position of the land now from the sea, of the draining embankments, and recent inundations. An admirable quotation from Tennyson beneath the title of the slide wonderfully helps the imagination whilst examining its subject. It runs—

> " ———— we see
> Stretched wide and wild the waste enormous marsh,
> Where from the frequent bridge,
> Like emblems of infinity,
> The trenched waters run from sky to sky."

This is as apt as the quotation from Cowper on Mr. Blanchard's instantaneous views of Loudon; running thus:

> " 'Tis pleasant, through the loopholes of retreat,
> To peep at such a world; to see the stir
> Of the great Babel, and not feel the crowd."

Surely Cowper must have had a stereoscope and a pile of instantaneous street scenes before him when he wrote this! Never mind the anachronism!

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INSTANTANEOUS MARINE VIEWS for the Stereoscope. By Dages and Harman.

Another series of instantaneous pictures of maritime subjects, chiefly sea, and shipping, and clouds, and comprising some very beautiful atmospheric effects indeed. Messrs. Dages and Harman have visited the east and south coast, and the views are chiefly off Yarmouth or Portland, those of the former place abounding with incident, the latter being chiefly confined to effects of water and cloud, some of which are, however, very fine. No. 197, "Sunset," and 199, "A Stormy Day," have magnificent clouds, but require some foreground object to give solidity and force to the whole; the finest atmospheric effect loses much of its value if there be not some fore-ground object, however simple. The Yarmouth views are not wanting in this respect, and some of them are very beautiful indeed. No. 229, A "Fishing Lugger just coming in to the Pier," is very fine. and sufficiently sharp for the figures, indicating the number of the vessel, to be read perfectly. No. 220, "A Steamer bringing in a Disabled Vessel," is also very fine, perfectly exposed, and yet with every line of cordage, both in the steamer and ship, perfectly defined. There are a great many other admirably selected views, full of incident, and many of them excellent photographs. Some of them are, however, slightly under-exposed, and some of them a little over-intensified, which gives some tendency to coarseness and hardness. They are all so nearly good, and many of them quite so, that we feel sure that, with a little more care in manipulating, Messrs. Dages and Harman will produce uniformly very perfect results.

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THE BRITISH HOUSES OF PARLIAMENT. London: Ashford, Brothers.

This will necessarily be a popular series of slides, as few subjects could well be more interesting for the stereoscope, than the interiors of the Upper and Lower senate houses of the British Empire. Those who are familiar with the buildings will know that they present greater difficulties to the photographer than many interiors; remembering these difficulties, it will be seen that many of these pictures are well done. We trust their circulation will be as large as they deserve.

## The International Exhibition.

### PHOTOGRAPHIC CHEMICALS.

The display of photographic chemicals in the Foreign Department of the Exhibition is not large. The French is particularly meagre in this respect. The firm of Rolloy exhibit some very nicely crystallized, and apparently pure, specimens of the chemicals in general use. M. Plessy also has a good show of chemicals; and a few manufacturers of apparatus and paper also display chemical products, but these, as a rule, are inferior to the English, and call for no special comment. Turning to Class II. in the French Department, we may notice, as specially worthy of remark, the beautiful salts of cadmium exhibited by A. Desespringalle, and the acetic acid shown by Raques and Bourgeois. Lefèvre exhibits a substance, which, although not, strictly speaking, photographic, is nevertheless of great interest at the present time, and is likely, before long, to be used in photography; we allude to the new alkali, fubidia.

Austria is well represented by Dr. John Lamatsch, who exhibits all the ordinary photographic chemicals, iodides, bromides, fluorides, &c., together with different kinds of collodion and gun-cotton. Classed with the photographic chemicals exhibited by this chemist is a specimen of "transmaticine," respecting the photographic qualifications of which we confess our utter ignorance. Some nice specimens of chloride and sulphate of rubidium are also exhibited along with the pure chemicals.

The Zollverein Department makes a very creditable show. The specimen of pyrogallic acid exhibited by E. Schering, of Berlin, is unrivalled in the whole building. It forms a mass of beautifully white feathery crystals, filling a bottle a yard high by a foot in diameter, which well merits the eulogium bestowed upon it by the manufacturer, "au acid pyrogallic, so fine as none of my competitors may equal it in any way." This exhibitor has a very admirable show of iodide of potassium, cyanide of potassium, and various bromides and iodides, to again quote the description given by M. Schering, "all other photographic preparations, such as cotton of collodion, lithion, gold, and argent salts, all fluors, &c., were brought forth with the greatest conscientiousness, in an equally pure and superior quality, so that, whenever indirectly, my preparations gained credit, not only throughout Germany, but also in all European, and a great deal of transatlantic countries; the demand of these articles being actually great, and, I dare say, daily increasing, I am obliged to think repeatedly of an adequate extent of my laboratories." In justice to this exhibitor we may state, that his products well deserve the good opinion with which he evidently regards them. The same exhibitor also shows photographic papers, prepared in various ways. With characteristic modesty, M. Schering suggests, that these papers would be useful to *grocers*; we, however, have no hesitation in strongly recommending them to photographers.

The manufacture of collodion has been entered into on a considerable scale by Hermann Kuntzmann. He employs the iodides and bromides of cadmium, lithium, sodium, and potassium, and by using several of these in various combinations, he has succeeded in producing about a dozen different collodions, varying considerably in name, and, possibly, having some slight differences of quality. Among the euphonious combinations, which the exhibitor offers for the delectation of photographers, we find cadmio-lithio-bromato-iodatum, cadmio-natrio-bromato-iodatum, cadmio-kalio-bromato-iodatum, cadmio-ammonio-bromato-iodatum, *et hoc genus omne*. There *may* be some occult properties in these various salts, which render such permutations advisable, but as chemists they seem to us simply ridiculous. This exhibitor fares better when he dismisses such permetative pen-and-ink photography, and becomes more practical; the papers which he exhibits, salted and otherwise prepared, for positive printing, are excellent, although the desire to embrace every possible compound in their preparation is evident here also.

G. F. Toussaint, of Fürth, in Bavaria, has some good cyanide of potassium in tubes, and also cast in sticks, similar to lunar caustic; this is a very convenient form, and we wish some English manufacturer would adopt this plan, for with the large hard lumps, in which it is at present met, there is great difficulty in using small portions without great waste.

We ought not to pass over without mentioning the magnificent show of shellac, exhibited by C. Mellinger and M. Abrecht, the latter also exhibits different kinds of varnish, some of which is well adapted for photographic purposes.

In concluding these brief notices of the photographic chemicals exhibited in the International Exhibition, we would by no means have it understood that we have exhausted the subject. Whilst we feel that we have left unnoticed many exhibitors of merit, we have endeavoured to give our readers a fair idea of the position occupied by photographic chemistry at home and abroad. Those who remember the almost unknown position of photography in 1851, and the meagre display which it made in that Exhibition, cannot but be struck with the vast importance which it has attained during the last decade. From a mere curiosity of applied chemistry it has become an important branch of science, and the arts and manufactures directly or indirectly connected with it now form no insignificant portion of the world's industry.

### PHOTOGRAPHY IN AMERICA.

2, *Wall Street, New York, July 15th*, 1862.

Dear Sir,—You have noticed by *Seeley's Journal*, that Coleman Sellers, the champion of wet photography in America, has gracefully "dried up," and ordered a dry-plate box on the same principle as my own. We have now but one "fossil" left in the club, Mr. Robert Shriver, and a very good "fossil" he is, too. Even he, however, is experimenting on dry plates, and sent me, the other day, a very good print, labelled "Tannin." Thus we are converting all to the pleasures of photography, with five pounds weight only. I say "we;" but I suspect the hot weather has done most of the converting, for the mercury has been like good alcohol for two weeks (*i.e.* 95°); and any amateur with a tent this weather, would also resemble the alcohol as far as evaporation. About dry plates generally, the tannin process is the favourite; but all are used among us. Mr. E. Borda has taken excellent pictures by the resin process, and expresses great faith in it. He uses but one quarter of a grain of resin to the ounce of collodion, and *dries* his plates spontaneously in a *damp cellar*. Curious way to prepare *dry* plates.

The problem of instantaneous dry plates is about solved, by H. T. Anthony, Esq., of this city. His discovery consists in subjecting a tannin dry plate to the fumes of weak ammonia for a few seconds, and exposing it within one day after fuming. These plates are exceedingly sensitive, two seconds exposure being sufficient with small diaphragm, and instantaneous with full opening of Harrison's stereo portrait lens. The development is conducted cold in the ordinary manner. Mr. Anthony is an irrepressible experimentalist, and the father of many discoveries not yet made public. The finest dry process I know of is due to his ideas and my manipulation: I refer to the "milk process," which I have used a year past, and always succeeded. In my hands it fully equals the wet in all respects, as you may see by some prints I will enclose in this letter. The plates are prepared with the usual collodion, and sensitized and washed thoroughly, after which they are flowed with a solution of "American solidified milk" (5 per cent. in bulk, dissolved in warm water); they are then thoroughly washed, and dried in a hot box. This milk powder is made by boiling down milk and sugar to dryness, and when packed in tin boxes, will keep for years in good condition: probably it can be procured in London. The trace of albumen in the milk acts in the film in such a way as to soften the whole picture. Negatives by this process are *yellow*, and so thin you can easily read through them. The skies look like church window glass. The plates keep equally well with tannin, as I have tested them on a two months' trip "out west," and developed my negatives after coming home with perfect success. They cannot be prepared so fast as tannin plates, hence lack of time compels me to work the latter the most, but when business allows me leisure to work, I infinitely prefer the "milk plates," or, as I labelled my first pictures before I told the secret, "modified albumen." I took the first picture by this method, and it is now confined to Mr. Anthony and myself. I would be pleased to have the opinion of yourself on the *comparative* merits of the too most perfect dry processes—"tannin," and "milk"—as shown by the enclosed prints. I hope some of your workers will take this up, for they cannot fail to like it. I would mention, in closing, that Professor Edwin Emerson, of the University of Troy, will visit Europe on pleasure in a few weeks, and besides being a thorough photographer, he is a *savant* of the first proof, and the scientific men of the mother-land will like him. He will tell you much about our blood-stained country at the present time.—Yours respectfully, F. F. Thompson.

[The prints enclosed are all admirable specimens of photography, as well as interesting pictures; we think, however, that in making a choice, we should give those by the milk process the preference. They have all the delicacy and softness of very fine pictures by the wet process, and are, withal, very brilliant. The foliage is full of detail, without any black patches of under-exposure, the distance well preserved, and a pleasant atmospheric tint on the sky. The exposure appears to be shorter with the milk plates than with the tannin; the former averaging one minute with a Ross's single stereo lens, $\frac{3}{16}$ stop, whilst the latter required nearly double that time. We shall look forward with pleasure to a call from Professor Emerson, with whose name photographers in this country are not unfamiliar.—Ed.]

## TRANSPARENT GLASS POSITIVES ON COLLODION.*

BY DR. SABATIER.

### Lighting the Operating-Room.

The formation of the negative will support an intensity of light quite inconsistent with the formation of a positive. My operating-room receives light from an adjoining room, through four panes of glass covered with yellow paper. To obtain a positive I have been obliged to suppress two of these panes, and to place a black curtain before the other two, by means of which I can diminish the quantity of light when it is too strong. When the yellow rays are too strong the entire plate becomes blackened, and the negative itself completely disappears upon the second addition of pyrogallic acid.

### Collodion.

My collodion, modified as above described, is composed as follows:—

| | | |
|---|---|---|
| Plain collodion ... ... ... | 120 | parts |
| Iodide of cadmium ... ... | 1 | part |
| Iodide of potassium ... ... | 0·50 | " |
| Bromide of cadmium ... ... | 0·40 | " |
| Bromide of potassium ... ... | 0·20 | " |
| Iodine ... ... ... ... | 0·05 | " |

* From *Moniteur de la Photographie*. Continued from p. 358.

The glass plate, when coated with collodion, is sensitized in the following

### Sensitizing Bath.

But as the slightest traces of nitric acid prevent the formation of the positive, I have been careful to replace crystallized nitrate of silver by fused nitrate—

| | | |
|---|---|---|
| Distilled water ... ... ... | 100 | parts |
| Fused nitrate of silver ... ... | 6 | " |

### Exposure in the Camera.

After draining the sensitized plate, and placing it in the slide, I expose it in the camera; this exposure, in consequence of the addition of iodide of potassium to the collodion, need be neither more nor less than the time required to take a good negative; only, it is necessary, as always, to take into consideration the intensity of the light and heat, as well as the colours of the object.

### Developing Solution.

My developing solution consists of—

| | | |
|---|---|---|
| Distilled water ... ... ... | 100 | parts |
| Pyrogallic acid ... ... ... | 0·1 | part |
| Crystallizable acetic acid ... | 1·0 | " |

When the atmospheric temperature is below 60° F., I increase the proportion of pyrogallic acid a little, in order to hasten the development.

As soon as the negative appears in its minuter details, without hurrying or delaying, I pour on the pyrogallic developer, and then immerse the plate in a dish of rain-water, less than half an inch in depth—this water must be employed for one plate only; then I give the dish a gentle rocking motion, so as to wash off all the acid collected upon it. After one or two minutes washing, I lift out the plate by means of a silver hook, drain it, and wipe the back, and holding it by one corner, cover it with a small quantity of a solution of nitrate of silver, of the strength of 4 per cent., and cause it to flow over the whole surface with the least possible delay. To this solution I have given the name of *substituting bath*, because it determines the substitution of the electric currents, and, consequently, the change of photographic combination. In general, the longer the substituting solution remains upon the collodion film, the sooner the positive appears when the pyrogallic acid is applied for the second time. Before proceeding to this second application of pyrogallic acid, I pour off by a corner, into a bottle, the nitrate solution with which the plate is covered; for this solution may be employed indefinitely, and it even improves by use.

It is the second application of pyrogallic acid, made subsequent to the substituting bath, that develops the positive. As I have stated, it is developed suddenly, if the substituting bath be prolonged; but slowly on the contrary, if it has been in it a quarter or half a minute only; still slower if the substituting bath is weaker than 4 per cent. It now only remains to fix the image in the usual manner, either with cyanide of potassium or hyposulphite of soda, and proceed to toning, if the colour of the positive be not agreeable. The usual colour of the positive is a chocolate, more or less intense; this is not an agreeable colour, but it is easy to tint them differently. This I effect without the aid of salt of gold, and by means of a method quite opposed to generally received notions on this subject. After the fixing I wash the glass plate thoroughly, then cover it with a solution of sulphide of potassium, of the strength of one-half per cent. My positive immediately assumes the most beautiful black tone imaginable. I quickly wash it, dry it, and varnish with picture varnish, diluted with five times its volume of spirits of turpentine.

What takes place in toning by sulphide of potassium? Is not the sulphuration of the positive image increased? I believe it to be possible, but up to the present time, although I have submitted my positives to many causes of destruction, I cannot perceive that they have lost anything of their original hue, and I continue to tone with sulphide of potassium without any fear of the consequences.

(*To be continued.*)

## THE INUNDATION IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

I learned from this old man, who informed me that he had been one of the anxious watchers for the breaking of the bank, that every precaution had been taken at all the weak points along the bank, but that it was evident to every one, long before the actual arrival of the catastrophe, that nothing short of a miracle could save the fens from inundation after the breaking of the sluice. It appears that the water found its way through, some feet below the top of the bank; and spurted out on the other side, like the stream from the hose of a fire engine, but that in almost less time than it takes to tell, there was an aperture, 20 feet across, which continues to widen at an alarming rate, the earth crumbling away on each side and disappearing in the most extraordinary manner. Various attempts to stop it were made, but all in vain. Barges were knocked to pieces by the force of the waters, and the fragments were carried miles away.

I did not attempt to unpack, for the weather unmistakably said, no photography to-day. As, however, much could be done in selecting spots for future operations, I left my companion in charge, and strolled on along the bank towards an unfortunate house, which the hanger-on informed me was an inn. A brisk walk of some ten minutes duration brought me to it, and truly it was a melancholy picture to look at. The house stood about 100 yards from the bank on which I stood, and was surrounded by several outbuildings, and the water was nearly up to the roof of some of them. A little nearer a gate peeped out just above the water, and evidently stood upon a higher piece of ground. The sign of the house had evidently been removed, for its announcement—"good entertainment for man and beast"—would have indeed been a bitter jest at the present moment. The waters were sullenly dashing against the closed door, as though angrily asserting that a public house should be open to all comers.

About a mile further on the bank I saw a large farm, with many outbuildings, and several cottages at a short distance from it, and therefore went still on. A strange feeling took possession of me as I wandered on alone. I looked out on the vast waste, and, far as the eye could reach, not a trace of human existence was visible—nothing but ruin and desolation. No sound came upon the ear but the howl of the wind, and the angry response of the waves. The clouds were wild and strong, and were coursing after each other rapidly, as though eager to get away from so dismal a spot. It seemed no great stretch of the imagination to fancy the deluge once more here, and I the last man left.

When I came up to the farm I found that it would be the best point for photographic operations. I therefore determined that on the following day, weather permitting, it should be my first point, for without carrying the camera far several very interesting pictures could be made.

(*To be continued.*)

* Continued from p. 363.

## WATER-PROOF VARNISHES AND CEMENTS FOR PHOTOGRAPHIC PURPOSES.

BY H. R. NICHOLLS.

Dear Sir,—The wants of the ardent student of photography being many, I forward you, as a contribution to the supply of some of them, the quantities for the compounds, to which I referred in a recent communication, of caoutchouc and gutta-percha with pitch, their uses and application. They are great favourites with me, as I have used them successfully for photographic purposes now twenty-four years, and for some four or five years previously for chemical, domestic, and building purposes. The first purpose to which I applied such a compound was for lining a tank to supply my laboratory with water. Being at the time a very bad plumber, necessity compelled me to resort to other means than the soldering irons. I then used :—

| | |
|---|---|
| Caoutchouc ... ... ... ... | $1\frac{3}{4}$ pound |
| Stockholm pitch ... ... ... | 1 " |

Cut the caoutchouc in small pieces, and melt in an iron ladle, stirring with an iron rod, add the pitch in small portions at a time, stirring it until the compound is perfectly smooth. For convenience in use, mould it in the form of a stick, in a stout paper tray. This compound is adapted for metal joints of tanks or pipes, above or below ground.

To apply it, scrape the parts clean and apply the compound with a hot iron, smoothing it well over the edges of the joint or fracture. For stone, slate, or glass, add to every four ounces of the compound a quarter of an ounce of *glass flour*. Care must be taken that no fatty substance comes in contact with the compounds, or their destruction will soon follow.

For wood-work sunk in the ground, use :—

| | |
|---|---|
| Caoutchouc ... ... ... ... ... | $1\frac{1}{2}$ lb. |
| Pitch ... ... .. ... ... ... | $\frac{1}{2}$ " |

Melted as before, apply in the same way.

Gutta-percha may be used for these two compounds, but its results will be bad, I have found them so in my experience. In my next communication gutta-percha will be treated for its photographic uses, as I have found them in practice.

2, *St. Jude Street.*

## PHOTOGRAPHIC STUDIES.

BY DR. SCHNAUSS.

*Examination of various Formulæ.**

The fact observed by M. Krüger is very curious; namely that a solution of sulphate of iron, more concentrated than employed at present, gives greater sensitiveness and purer proofs than more diluted solutions, and does not require so much acetic acid. The addition of alcohol is superfluous. I have tried this formula, and find it excellent. As the solution is stronger than ordinary, the plates may be immersed in it. M. Krüger recommends the following formula :—

| | |
|---|---|
| Sulphate of iron ... ... ... | 2 parts. |
| Distilled water ... ... ... | 8 " |
| Acetic acid ... ... ... ... | 1 " |

It is better not to add sulphuric acid ; the solution may be employed immediately. But I advise the addition of the acetic acid *before* filtering the solution, if operating with a sensitizing bath and a collodion recently prepared; or of adding it only *after* the filtering, if the collodion and the bath are old. An aqueous solution of sulphate of iron always contains a little basic salt in suspension, which produces an opaline aspect, or a yellow precipitate, which is formed upon the addition of the acetic acid. This salt is dissolved, and it produces a little acetate of iron in solution. But if filtered beforehand, the basic salt remains upon the filter. The presence of a small quantity of acetate of iron in the bath, favours the vigour of the dark portions of the negative.

We know, at the present day, how very essential it is to satisfy ourselves what proportion the iodides bear to the bromides, and if free iodine be present in the collodion ; the nature of the iodides is of less importance. Frequently, a special iodide influences the properties of a collodion according as it allows the iodine to evaporate or not. It is now settled that no collodion should be employed until it has been some time prepared ; the ether, even when neutral, will separate a little free iodine from every iodide. Now, free iodine is indispensable to the collodion, if we wish to obtain intensity and transparent shadows. This also responds to the theory of free iodine in the sensitizing bath. If free iodine be not developed spontaneously in the collodion, some drops of tincture of iodine must be added to it,

* Continued from page 369.

until it acquires the colour of amber. If bromides are present, we can greatly augment the proportion of iodine, without injury to the sensitiveness. Naturally, every substance which sets iodine at liberty, acts like iodine itself; we can, then, for example, add acetic acid to recently prepared collodion, as recommended.

Many formulæ for rapid collodion possess no value. M. Engène Sahler recommends a collodion prepared with iodide of iron; according to his formula, the collodion gives very good results during a few hours; but its sensitiveness is not so great as that of a good bromo-iodized collodion, and in the course of a few days the liquid becomes brown black, opaque, and gelatinous. It seems as if the pyroxyline lost its sensibility through the iodide of iron. We must make the collodion as thick as possible, else it will give an unequal film, which succeeds better with an alcoholic collodion than with an etherial collodion. The ether disengages the iodine in the collodion, and the collodion gives more vigorous negatives, while alcoholic collodion gives more harmonious pictures, and keeps good much longer. For card portraits, I prefer etherial collodion.

In my next article, I shall speak of the application of the chloric acid to the negative silver bath.—*Moniteur.*

(*To be continued.*)

## NEW COPYRIGHT ACT.

*An Act for Amending the Law Relating to Copyright in Works of the Fine Arts, and for Repressing the Commission of Fraud in the Production and Sale of such Works.*

Whereas by law, as now established, the authors of paintings, drawings, and photographs, have no copyright in such their works, and it is expedient that the law should in that respect be amended: be it, therefore, enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. The author, being a British subject, or resident within the dominions of the crown, of every original painting, drawing, and photograph which shall be, or shall have been, made, either in the British dominions or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, and his assigns, shall have the sole and exclusive right of copying, engraving, reproducing, and multiplying such painting or drawing, and the design thereof, or such photograph, and the negative thereof, by any means and of any size, for the term of the natural life of such author, and seven years after his death; provided that when any painting or drawing, or the negative of any photograph, shall for the first time after the passing of this Act be sold or disposed of, or shall be made or executed for, or on behalf of, any other person for a good or a valuable consideration, the person so selling or disposing of, or making or executing the same, shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing, signed, at or before the time of such sale or disposition, by the vendee or assignee of such painting or drawing, or of such negative of a photograph, or by the person for or on whose behalf the same shall be so made or executed, but the copyright shall belong to the vendee or assignee of such painting or drawing, or of such negative of a photograph, or to the person for or on whose behalf the same shall have been made or executed; nor shall the vendee or assignee thereof be entitled to any such copyright, unless, at or before the time of such sale or disposition, an agreement in writing, signed by the person so selling or disposing of the same, or by his agent duly authorized, shall have been made to that effect.

2. Nothing herein contained shall prejudice the right of any person to copy or use any work in which there shall be no copyright, or to represent any scene or object, notwithstanding that there might be copyright in some representation of such scene or object.

3. All copyright under this act shall be deemed personal or moveable estate, and shall be assignable at law, and every assignment thereof, and every licence to use or copy by any means or process the design or work which shall be the subject of such copyright, shall be made by some note of memorandum in writing, to be signed by the proprietor of the copyright, or by his agent appointed for that purpose in writing.

4. There shall be kept at the Hall of the Stationers Company, by the officer appointed by the said company for the purposes of the Act passed in the sixth year of her present Majesty intituled, 'An Act to Amend the Law of Copyright,' a book or books, entitled, 'The Register of Proprietors of Copyright in Paintings, Drawings, and Photographs,' wherein shall be entered a memorandum of every copyright to which any person shall be entitled under this Act, and also of every subsequent assignment of any such copyright; and such memorandum shall contain a statement of the date of such agreement or assignment, and of the names of the parties thereto, and of the name and place of abode of the persons in whom such copyright shall be vested by virtue thereof, and of the name and place of abode of the author of the work in which there shall be such copyright, together with a short description of the nature and subject of such work, and in addition thereto, if the person registering shall so desire, a sketch, outline, or photograph of the said work, and no proprietor of any such copyright shall be entitled to the benefit of this Act until such registration, and no action shall be sustainable, nor any penalty be recoverable in respect of anything done before registration.

5. The several enactments in the said Act of the sixth year of her present Majesty contained, with relation to keeping the register book thereby required, and the inspection thereof, the searches therein, and the delivery of certified and stamped copies thereof, the reception of such copies in evidence, the making of false entries in the said book, and the production in evidence of papers falsely purporting to be copies of entries in the said book, the application to the courts and judges by persons aggrieved by entries in the said book, and the expunging and varying such entries, shall apply to the book or books to be kept by virtue of this Act, and to the entries and assignments of copyright and proprietorship therein under this act, in such and the same manner as if such enactments were here expressly enacted in relation thereto, save and except that the forms of entry prescribed by the said Act of the sixth year of her present Majesty, may be varied to meet the circumstances of the case, and that the sum to be demanded by the officer of the said Company of Stationers for making any entry required by this Act shall be one shilling only.

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

7. No person shall do or cause to be done any or either of the following acts; that is to say:—First, no person shall fraudulently sign or otherwise affix, or fraudulently cause to be signed or otherwise affixed, to or upon any painting, drawing, or photograph, or the negative thereof, any name, initials, or monogram. Secondly, no person shall fraudulently sell, publish, exhibit, or dispose of, or offer for sale, exhibition, or distribution, any painting, drawing, or photograph, or negative of a photograph, having thereon the name, initials, or monogram of a person who did not execute or make such work. Thirdly, no person shall fraudulently utter, dispose of, or put off, or cause to be uttered or disposed of, any copy or colourable imitation of any painting, drawing, or photograph, or negative of a photograph, whether there shall be subsisting copyright therein

or not, as having been made or executed by the author or maker of the original work from which such copy or imitation shall have been taken. Fourthly, where the author or maker of any painting, drawing, or photograph, or negative of a photograph, made either before or after the passing of this Act, shall have sold or otherwise parted with the possession of such work, if any alteration shall afterwards be made therein by any other person, by addition or otherwise, no person shall be at liberty during the life of the author or maker of such work, without his consent, to make or knowingly to sell or publish, or offer for sale, such work or any copies of such work so altered as aforesaid, or of any part thereof, as or for the unaltered work of such author or maker. Every offender under this section shall, upon conviction, forfeit to the person aggrieved a sum not exceeding ten pounds, or not exceeding double the full price, if any, at which all such copies, engravings, imitations, or altered works shall have been sold or offered for sale; and all such copies, engravings, imitations, or altered works shall be forfeited to the person, or the assigns or legal representatives of the person, whose name, initials, or monogram shall be so fraudulently signed or affixed thereto, or to whom such spurious or altered work shall be so fraudulently or falsely ascribed as aforesaid: provided always, that the penalties imposed by this section shall not be incurred unless the person whose name, initials, or monogram shall be so fraudulently signed or affixed, or to whom such spurious or altered work shall be so fraudulently or falsely ascribed as aforesaid, shall have been living at or within twenty years next before the time when the offence may have been committed.

8. All pecuniary penalties which shall be incurred, and all such unlawful copies, imitations, and all other effects and things as shall have been forfeited by offenders, pursuant to this Act, and pursuant to any Act for the protection of copyright engravings, may be recovered by the person herein-before, and in any such Act as aforesaid, empowered to recover the same respectively, and herein-after called the complainant or the complainer, as follows: In England or Ireland, either by action against the party offending, or by summary proceeding before any two Justices having jurisdiction where the party offending resides: In Scotland, by action before the Court of Session in ordinary form, or by summary action before the sheriff of the county where the offence may be committed, or the offender resides, who, upon proof of the offence or offences, either by confession of the party offending, or by the oath or affirmation of one or more credible witnesses, shall convict the offender, and find him liable to the penalty or penalties aforesaid, as also in expenses; and it shall be lawful for the Sheriff, in pronouncing such judgment for the penalty or penalties and costs, to insert in such judgment a warrant, in the event of such penalty or penalties and costs not being paid, to levy and recover the amount of the same by poinding: provided always, that it shall be lawful to the Sheriff, in the event of his dismissing the action and assoilzieing the defender, to find the complainer liable in expenses, and any judgment so to be pronounced by the Sheriff in such summary application shall be final and conclusive, and not subject to review by advocation, suspension, reduction, or otherwise.

9. In any action in any of Her Majesty's Superior Courts of Record at Westminster and in Dublin, for the infringement of any such copyright as aforesaid, it shall be lawful for the court in which such action is pending, if the court be then sitting, or if the court be not sitting, then for a Judge of such court, on the application of the plaintiff or defendant respectively, to make such order for an injuction, inspection, or account, and to give such direction respecting such action, injunction, inspection, and account, and the proceedings therein respectively, as to such court or Judge may seem fit.

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

11. If the author of any painting, drawing, or photograph, in which there shall be subsisting copyright, after having sold, or otherwise disposed of such copyright, or if any other person, not being the proprietor for the time being of such copyright, shall, without the consent of such proprietor, repeat, copy, colourably imitate, or otherwise multiply, or cause or procure to be repeated, copied, colourably imitated, or otherwise multiplied, for sale, hire, exhibition, or distribution, any such work, or the design thereof, or the negative of any such photograph, or shall import or cause to be imported into any part of the United Kingdom, or sell, publish, let to hire, exhibit, or distribute, or offer for sale, hire, exhibition, or distribution, or cause or procure to be sold, published, let to hire, exhibited, or distributed, or offered for sale, hire, exhibition, or distribution, any repetition, copy, or imitation of such work, or the design thereof, or the negative of any such photograph, made without such consent as aforesaid, then every such proprietor, in addition to the remedies hereby given for the recovery of any such penalties, and forfeiture of any such things as aforesaid, may recover damages by and in a special action on the case, to be brought against the person so offending, and may in such action recover and enforce the delivery to him of all unlawful repetitions, copies, and imitations, and negatives of photographs, or may recover damages for the retention or conversion thereof: provided that nothing herein contained, nor any proceeding, conviction, or judgment, for any act hereby forbidden, shall affect any remedy which any person aggrieved by such act may be entitled to either at law or in equity.

12. This Act shall be considered as including the provisions of the Act passed in the session of Parliament held in the seventh and eighth years of her present Majesty, intituled, "An Act to amend the Law relating to the International Copyright," in the same manner as if such provisions were part of this Act.

## CEMENT FOR GLASS, CHINA, AND EARTHENWARE.

Order and economy are both necessary properties in the routine of any business or art, and more especially so where operations are performed by seconds, or marred in the same short time. The photographer must, of all men, be disciplined to order, if success in the art, or in a financial point of view, be his aim; he must also be economical in all his operations, because he manipulates with materials of the most costly nature—more costly than gold or silver; and also because competition has reduced the honourable profits of the art lower than those of the lowest artizan. It will be the aim, therefore of this Journal to embrace every opportunity of introducing into its pages whatever may tend to economise.

It is very disagreeable to break any of your dishes or baths; but then, it is very gratifying to know how to repair them, and to repair them effectually; moreover, to have a recipe for a cement for glass or earthenware equal to the best in the market, by the aid of which, when all other things fail, you may enrich yourselves as *pedlars*. Pardon the insinuation—and now to the point.

Take one ounce of isinglass, such as is used for clearing wines, that is to say of the best quality, and steep it in rain-water until it is thoroughly expanded; after this point has been arrived at, the water is poured off, and then a sufficient quantity of alcohol is added so as just to cover the isinglass, which, by the application of a gentle warmth, is by degrees dissolved. In another vessel take three ounces of alcohol, and, by a similar application of heat, dissolve therein one ounce of powdered gum mastic. The two solutions are then mixed together, and to these add one ounce of gum ammoniac already reduced into small particles, either by the knife or the mortar. By heat and frequent shaking this gum also dissolves; the solution or mixture is then evaporated to the consistency of ordinary glue, which is used for veneering, or similar purposes. It is then poured into small bottles for future use.

When about to use this cement, the bottle containing it is placed in warm water, or on a thin layer of wood or cardboard on the stove, by which means the cement becomes fluid. The fractured surfaces, if not thoroughly clean, must be well washed, first with soap and water, and afterwards with alcohol, but if the vessel has been newly broken it is not necessary to take this precaution. The edges of the broken parts are next warmed, and then the glue is applied; the pieces are now brought into apposition and kept there until the glue has thoroughly concreted, which will take place in a few days. All the articles used in this cement have to be the purest and best of their kind in order to succeed in its preparation satisfactorily; but it can certainly be relied upon when so prepared.—*Humphrey's Journal*,

## A NEW RAPID DRY PROCESS.

BY E. BORDA.*

Mr. Editor.—As you no doubt inferred from my last comunication to you, I was far from satisfied with the instantaneity of the tannin plate, developed after soaking it in warm water. It was a great step forward, rendering the tannin plate as quick as the generality of wet plates, and its usefulness must have been felt by many in more than one respect: to me it was an auxiliary in one way, of a stimulant, in another; an auxiliary by enabling me to bring out of a tannin plate, not sufficiently exposed for ordinary development, more details in the shadows, avoiding at the same time the solarization near the high lights, which takes place in a view offering great contrasts, when the exposure is sufficiently prolonged to secure details in the shadows; a stimulant, by leading to the supposition that during the shortest exposure, the light had likely performed its share on any sensitive film, and that to render the film sufficiently penetrable to the developer was the true way to obtain a quick dry plate. My last experiments seem to confirm this hypothesis, although contrary to the conclusion of Mr. Sutton, that free nitrate of silver in the pores of the collodion was necessary; Mr. Sutton may be correct that far, that such condition may lead to an instantaneous dry plate, but I do not believe it to be a *sine qua non.*

I am indebted to Mr. H. T. Anthony for a suggestion which has given me results in rapid dry plates, far beyond what I have been able to obtain with warm water. Mr. Anthony, amongst numerous valuable hints which he has freely and generously given to me, stated that some years ago he had submitted a dry plate to the action of ammonia, and obtained with it a good negative with very short exposure. It was shortly after the warm water process was made public that Mr. Anthony suggested to me to try the warm water, and fuming by ammonia combined.

I first tried the fuming alone, and on a tannin plate; the acceleration was remarkable. I obtained with it, at the start, quicker plates than with warm water, by fully one-third. I soon ascertained also that it was not necessary to fume the plate before exposure, but merely before development; rendering the process more valuable for fieldwork, as it is doubtful whether a plate fumed with ammonia would keep; but when I proceeded to add the acceleration by warm water to the fuming, I was disappointed. Both had an accelerating effect, separately, but the result of their combined actions was not the same of the two; nor indeed could I detect any acceleration on the fumed plate, by developing it warm. The film covered with tannin became very tender, and had a tendency to fog, which any amount of acid did not appear to check, and as far as my own work was concerned, I substituted the fuming to the warm water development, when I desired to accelerate a plate, as more controllable, simpler, and requiring less exposure. I merely speak of results in my hands, and would much rejoice to know that others are trying it thoroughly. While making the experiments above mentioned, it happened several times that a tannin plate, from which the free nitrate could not have been washed off thoroughly, gave me a faint image of the high lights, when soaked in warm water, after fuming with ammonia, and before any developer was used. The quantity of free nitrate must have been excessively small, for I wash my plates very carefully, and am not troubled with the spots arising from an imperfectly washed plate. I would have been tempted to attribute it to some other cause, if it had invariably occurred; but it was only occasionally, some of the plates not giving the slightest trace of an image before the developer with silver was poured on. Nor could it be caused by over-exposure, the same plates failing from under-exposure, as I was trying to obtain negatives by very short exposure, and with a supposed combined acceleration, resulting from joined actions of water and ammonia on the film. This fact might confirm Mr. Sutton's theory, when removing from it its objectionable conclusion, that the free nitrate of silver in the film is the only mode of securing the quick dry plate. Is it not possible that, by leaving in the film a certain proportion of free nitrate of silver, such as is left on a Fothergill plate, an image can be obtained sufficiently intense, with the addition of fuming with ammonia and warm water, with very little development, or no development at all?

The fuming with ammonia, like the warm water, is to be regulated by experience, and it is impossible to give any more than general rules. Every operator must depend a good deal on his own judgment. The strength of the ammoniacal solution itself varies very much, as well as the size of the box in which the fuming takes place. For a tannin plate, exposed fifteen to twenty seconds, with one-eighth inch diaphragm, by a clear day (I allude to landscape photography), I fume the plate from five to six minutes, in a box about two cubic feet in capacity; using one ounce of concentrated solution of ammonia, placed in a flat dish in the bottom of the box. By a little fan at the top, moved by a crank at the outside, I equallize the amount of ammonia through the box. The more the plate is fumed, the more citric acid must be used in the developer, to prevent the formation of a deposit which ruins the negative. I even fume plates exposed two, three, and occasionally five minutes, with the view of bringing out details in the shadows. When the plate is almost sufficiently exposed for ordinary development, I regulate the fuming accordingly. I sometimes confine it to one minute, using one ounce of the concentrated solution, diluted with two or three times its volume of water, or some ammonia solution which has already been used for the same purpose, and has lost much of its strength. When the plate has been but shortly exposed and fully fumed, it develops blue black, and the more it has been exposed the more purple it gets; when very purple, care must be used to not over-develop. With distant hills a couple of minutes exposure, and pretty good fuming, is preferable, in order to secure good clear distances. If there is no great distance, and no bright sky likely to solarize the top of trees, &c., more exposure and less fuming is preferable; the older the collodion the less solarization is to fear. When I wish to secure clouds, I reduce the exposure to a few seconds, and rely on plenty of fuming and a good dose of citric acid. I never begin to develop a plate (seven by four) with more than one drop of a ten-grain solution of nitrate of silver, and to each drop of silver I use one drop of a sixty-grain solution of citric acid, for a plate fully exposed and not fumed; if fumed slightly, two drops of citric acid; if shortly exposed and fumed fully, five to six drops, and a proportionate quantity of citric acid for intermediate exposures and fumings.

My experiments with fuming did not stop with the tannin plate. I thought it too valuable not to apply it to other processes, and it naturally occurred to me to try some dry process quicker than the tannin: I tried the resin process, and first on its own merits; I succeeded with it beyond all my expectations, and by a ramble in our mountains, in which I filled every one of my double dry plate holders with a tannin plate and a resin plate, duplicating each view; I ascertained beyond a doubt, that the resin plate was at least twice as quick as the tannin plate; the collodion was the same: the resin plate, with half the exposure, gave more softness and more details in the shadows. The fuming by ammonia accelerated the resin plate fully in proportion, and six to eight seconds gave me a good negative, where fully fifteen were required with the tannin. With a quarter tube of no diaphragm, I obtained with the resin plate, in one second, a negative full of details in the shadows. I tried the iron developer with the very short exposure, but it gave only a faint image, while, with pyrogallic acid, a sufficient intensity was easily attained. If I had the proper apparatus, I would try fuming by the gas ammonia as soon as it is prepared, in which state I imagine that its action is more energetic.

I have cautioned your readers against jumping too quick at conclusions and indulging too readily in the imaginary possession of a truly instantaneous dry process; to be consistent, I cannot give the resin plate fumed by gas ammonia as such, but that it is another great step towards it, I can state positively; my confidence arises from a series of progressive and systematic trials conscientiously done. I long to give the information through your paper, with the hope that others will take it up

* From the *American Journal of Photography*

and improve on my results. To Mr. H. T. Anthony all the credit is due for this simple and valuable discovery.

I will not close without adding a few words about the resin process. It has every possible quality, and but one fault, and that fault, I hope, can be removed. The plates are often filled with small round spots which do not develop, and cause black spots on the positive. As the plates I obtained from the collodion, but one day after the resin had been added, did not possess that fault to the same extent as those prepared with the same collodion a few days after, I am inclined to believe that there is a period, and a short one, during which the resinified collodion is just suited for the purpose. I only used one-quarter grain of common resin to ounce of collodion, and that such a small quantity should render an ordinary bromo-iodized collodion very sensitive dry, indicates that the action of resin is powerful, likely constant, and probably unfitting the collodion for use after a certain time. I do not hesitate to say that if this objection is removed, it will render that process the most valuable of dry processes so far known. The film possesses a remarkable toughness, which I cannot better illustrate than by stating that while wet, before fixing, and after development, it can be rubbed gently with the fingers with impunity. The plates are merely washed thoroughly, after being sensitized, and let dry spontaneously. I have not tested their keeping qualities beyond ten days. The silver bath used is the acidified forty-grain bath I use for tannin plates, the result everything that can be desired in softness, details, &c.—all, but the provoking little round transparent spots. Who will come to the rescue, and give us the resin process perfect? I have not given it up, but the more at it, the sooner it will be conquered.

*Woodside, July 8th*, 1862.

## Correspondence.

### OUR LIVERPOOL CONTEMPORARY.

[We must apologise to our readers and correspondents, for troubling them with a long letter from one of "the staff" of our contemporary, on a subject in reference to which we have declined to publish complimentary letters from our own friends. In such a case we prefer to strain courtesy a little, and allow Mr. Dawson to make his explanation, although he accompanies it by comments and opinions which we feel sure our readers neither endorse nor care about. We print his letter, however, and subjoin one or two remarks illustrative of its value.]

"Sir,—In your last week's article on 'Our Liverpool Contemporary' you have, I think, in your zeal to retaliate and attack, gone somewhat beyond the bounds of ordinary courtesy and discretion. Leaving the Editor of the *British Journal of Photography* to digest the rest of your article, I notice two passages affecting myself, which I cannot let pass without a word or two of explanation. You say 'The especial article we are charged with quoting, without due acknowledgment, was one by Mr. Dawson on Bromides. Now, weeks before that article was published our attention had been specially called to it in a private letter from Mr. Dawson, and we, in another letter, had promised to extract it when it appeared.' This statement would seem to imply an intention and object on my part, which I am sure I was far from entertaining. If my memory serves me right, these are the simple facts of the case. *After* my paper was in the publisher's hands, I, in replying to an urgent note of yours on another subject, incidentally mentioned that I had prepared for publication in the *British Journal of Photography*, an article on the bromides, in which my conclusions materially differed from yours. This is all I stated, and that, too incidentally, as I have said; and if you, in reply, which I do not recollect, threatened or *promised*, as you call it, to extract my article, that was no business of mine, for it had ceased to be my property the moment it passed into the hands of the publisher. Whether it was extracted with a proper recognition is also no business of mine.

"The other passage more indirectly referring to me, to which, in justice to myself, I am bound to allude, is this statement:—'It so happens, that at one of the photographic societies, the editor of our contemporary is the constant chairman: in this capacity he takes charge of, and systematically refuses to ourselves the permission to copy or make abstracts of the papers read at its meetings. It generally happens that we receive copies of such papers from the gentlemen who read them, &c.' Now, as I have occasion sometimes to read papers and act as chairman at the society referred to, and have constantly declined furnishing copies to any but the *British Journal of Photography*, I do not consider myself guilty of discourtesy, but am simply doing my duty to the society, in declining to furnish to others what is specially meant for publication in our own journal. In truth, the papers read at the meetings are the property of the society, and it has made arrangements with the proprietor of that journal, in consideration of certain advantages, of which its members all reap the benefit, to give him the right of prior publication. Reporters are allowed to be present, and are offered every facility for their work, as you must admit. They may record and publish as much or as little of the paper read as they please; but the *bona fide* copy is, as I have said, to be disposed of as the society sees fit. Any member, therefore, of the North London Photographic Society, who forwards a paper read there, to any other than the *British Journal of Photography*, may be doing a courteous act to that other journal, but certainly a very dishonest one to his own, in deliberately breaking a compact to which he is himself a party.

"My esteem for yourself personally, and a desire to set the matter in its true light, have prompted these short explanations in reply to a most sweeping charge of discourtesy, applicable to me as well as to others, and which I am sure your sense of justice must now at once admit, could only have been made through a misapprehension of the facts of the case.—Your, &c.,

"*Bath, July 28th*, 1862. George Dawson.

"Vice-President of the North London Photographic Society."

[To enable our readers to attach its right value to this letter, we print *the* letter to which reference has been made, and in doing so we appeal from Mr. Dawson with a purpose to serve, to Mr. Dawson free from such influence. Our "urgent letter" to which he refers was one making application for copy of a paper he had read at the North London Society. Here is his reply, which being a private letter we do not publish without his permission:—

"*King's College, Tuesday.*

"My dear Simpson,—I have not got any copy of the paper I read at the North London last Wednesday, but I daresay since you don't anticipate the journal, Mr. Shadbolt will have no objections to send you a proof. I have none.—Very truly yours,

"Geo. Dawson.

"P.S.—I have sent him also a short paper on the bromide question, on which I have formed opinions rather different from those usually entertained. I also attack ——* rather mildly.

"G. D."

We leave our readers to form their own opinion as to the intention of the postscript of this letter, calling our attention to the fact that the writer was about to take part in a friendly controversy then existing between the editor of the *Photographic Notes* and ourselves. As a fresh comer into the controversy we gave his remarks with every possible acknowledgment before we commented upon them. The quibble as to "threatening" or "promising" is unworthy of Mr. Dawson, as a promise could only be regarded as a threat if he felt his article unworthy of increased publicity.

Mr. Dawson drags in the North London Society and his position as chairman. We carefully avoided mentioning the name of any society in the matter, and should have preferred to continue doing so; and, we take leave now to doubt his right to enter without authority into this matter officially. We remember Mr. Dawson once to have been chairman at one of these meetings, in which capacity he neither granted nor refused us the paper, since he was never asked; he could not, then, by any possibility construe our remarks as referring to himself. As to his real opinion of our right to copies of papers, we refer to this note, in which it will be seen that there is not one word denying it, but an evident conviction that a proof should be furnished. We have never asked to anticipate the *Journal*, but simply to have facilities for coincident, or early subsequent publication. It is unnecessary here to enter further into the question of how far societies subserve the object of their existence, by becoming parties to narrowness and exclusiveness. We are happy to know that few of their members endorse such opinions, much less enter into a "compact" to aid and abet such a course.—Ed.]

* We suppress the name of the gentleman here mentioned, as it is unnecessary to drag him into the controversy.

## To Correspondents.

Old Photo., Liverpool, Vindex, B. L. G., H., W. H. W., and other correspondents incidentally alluding to the same subject, are thanked for their letters; but we are sure they will not take it amiss that they are not inserted. We are gratified by the expressions of interest and approval; and the desire to vindicate and praise the News; but the insertion of all the letters would nearly fill our pages, and would be only prolonging a squabble which we prefer to exclude from our pages. We make room for one or two extracts. Old Photo says: "Imitation is the sincerest flattery, and in this respect the *Liverpool Journal* is perpetually paying you practical compliments. There is scarcely an 'original' feature in your contemporary which is not an imitation of the News. When the News was first published it appeared in a quarto form, and straightway the *Liverpool Journal* merged from its octavo and expanded into quarto. The News commenced a series of articles on Colouring Photographs, and was followed by the *Liverpool Journal* with a similar series. The News issued a series of articles entitled 'The Amateur Mechanic,' and the *Liverpool Journal* followed with 'Photographers their own Artificers;' The News commenced a series of articles entitled the 'Dictionary of Photography,' the *Liverpool Journal* followed with the 'Photographic Glossary;' the News originated a column of gossiping fragments as 'Talk in the Studio,' and straightway the *British* was inundated with 'Scraps and Fragments,' '*Olla Podrida*,' '*Entremets*,' &c., &c.; the News commenced a series of articles on 'Photographic Chemicals,' and was followed in the *Liverpool Journal* by 'Notes on Photographic Chemicals.' I might extend the list, but I think this is sufficient to suggest to your readers and those of your contemporary, the value of his boasted originality." Quite enough we should think!

Fairplay says:—"I have just, by accident, come across a copy of the *British Journal of Photography*, in which I find a supposed dialogue between *Mr. Journal* and *Mrs. News*, stated to have been sent to the Editor of the *British* by one of their witty (Heaven save the mark) correspondents! Allow me to question the truth of that statement, and, at the same time, to protest against such a prostitution of the purposes of scientific journalism, as the insertion of such very unworthy productions. If a journal has to resort to the *Eatanswille Gazette* style of Billingsgate, in reviling a contemporary, it always appears to me as though there was something wrong in the financial department, and that these stale subterfuges are resorted to to raise the circulation. That the article has emanated from the pen of one whose "fine Roman hand" it is not hard to trace, and whose elephantine playfulness is unmistakable, there can be no doubt. I would just remark that the tone attributed to the News is but too surely the natural manner of expressing opinion, by the writer of the dialogue and his colleagues. There is, too certainly, the remains of that wooden dogmatism, which so often disfigures other columns in the *British*. 'Ourself' is, in fact, a personage who cannot so easily transform himself so entirely as to be taken for any one else. As to the charge brought against the News of copying, the less said the better. As an investigation as to the extent of cribbing generally, might turn out not to be quite so favourable to those who are so profuse in their charges, as would be desirable." As regards "cribbing," our Liverpool contemporary in his last number, in which he so loudly declaims against this practice, himself appropriates part of an article from the News without one word as to the source from which he "conveys" it. But we should fill our pages if we took the trouble to point out all his shortcomings.

F. M. S.—Mere fudge, as you suspect The act defines a newspaper as "any paper containing any public news, intelligence, or occurrences, or any remarks or observations thereon, printed in any part of the kingdom for sale, and published periodically, or in any parts or numbers, at intervals not exceeding twenty-six days between the publication of any two such papers, parts, or numbers." 2. We know nothing of any such phrase in the letter of a correspondent, nor do we care to seek it; the epithet in the case to which we referred was from the pen of the editor. 3. Your other conjectures are probably right, but it is really not worth while to go into the matter.

J. A. R.—We have not had much personal experience in travelling with photographic apparatus on the continent, but in such opportunities as we have had, no difficulty has arisen. We have just consulted a friend who has frequently visited the continent with photographic intent, who informs us that in Switzerland there is no trouble whatever; and very little anywhere if proper tact be used. It is advisable to have dry plates so packed that they may be slung over the shoulder, and at all times to push forward the camera under the attention of custom house officers first, as the object of that instrument is now pretty well understood by every one; other matters connected with photography will then be better explained and understood. It is advisable to have an inner cover of non-actinic glass to the box of prepared plates, in order to be able on emergency to verify your statement, without injuring the plates. Have also a full description of the object of the apparatus, on each article, in the language of the country.

Nil Desperandum.—A bath of protosulphate of iron may be used for developing negatives, but we prefer to pour on the solution, because in immersing the plate a certain proportion of the free nitrate on the plate is reduced *in* the solution instead of *on* the plate, and the image loses in density. If you prefer dipping, however, let the solution be a strong one, so that the development may be rapid. The use of a weak solution under such circumstances would be almost equivalent to washing the plate before developing. The strength should not be less than from 30 to 40 grains to the ounce, with an equal number of minims of acetic acid. The same solution may be used for positives, but it will not be good as a developer made expressly for positives, and containing a little protonitrate of iron, or a trace of nitric acid. A good developer for negatives, if you pour it on, is as follows:—

| | |
|---|---|
| Protosulphate of iron ... ... ... ... ... | 15 grains |
| Glacial acetic acid ... ... ... ... ... | 15 minims |
| Water (distilled) ... ... ... ... ... | 1 ounce. |

For positives, the same with one drop of nitric acid to each ounce may be used. Alcohol sufficient to make the solution flow properly, as a general rule 20 minims in each ounce. Wash away the iron thoroughly, and intensify with pyro 3 grains, citric acid 2 grains, water 1 ounce, and a few drops of a 20 grain solution of silver.

A. B. C.—The Photographic News Almanac is, we regret to say, out of print. Gold toning solution, made with acetate of soda and chloride of gold should not turn dark coloured, unless some decomposition have taken place, which might be produced by a variety of causes, but we cannot tell which, in your case. 2. Toning and fixing should be conducted in the dark-room. 3. For brushing silver solutions over paper, use a glass rod, or Buckle's brush. 4. In using a solution of iodine before pyrogallic acid and silver, for intensifying after fixing, it may be poured on the plate and left in the light a few minutes prior to washing off. 5. Disderi's "Art of Photography" is published in Paris at ten francs, by Leiber, 13, Rue de Seine. 6. Our pages abound with articles on intensifying, printing, toning, fixing, &c., but we cannot undertake to point out any one as absolutely "best," as each one given succeeds best in some hands, and different methods are best under different circumstances. Should we be able to procure a copy of the Almanac we will forward it: you will there find a complete and satisfactory epitome of those processes.

J. Lewis.—We do not know of any place where you can procure Poitevin's recent treatise in this country, but you can obtain it by ordering it through a foreign bookseller. We do not at this moment remember the price.

Doubtful.—If you use common water to make your developer, a turbidity from the formation of chloride of silver, might occur when the solution is poured on the plate. In that case the remedy would be to use distilled water. We suspect, however, that the white, floating particles to which you refer are not chloride of silver but white, sparkling particles of metallic silver, which in certain conditions of the bath, and in very hot weather, are apt to be reduced the moment the solution comes in contact with the plate. 2. The edge of your plate rapidly drying, arises probably from the use of a repellant, horny collodion. A drop of distilled water to each ounce of collodion will often prove a remedy. 3. We have rarely used any alcohol in the developer for years, either for positives or negatives, but methylated spirit. It answers perfectly, and in no way injures the tone of either. There is an objection felt by many to the use of methylated spirit for making collodion; but many commercial samples are made with it, and in one of the most popular positive collodions in the market nothing else is employed.

Pemberton.—The construction of photographic lenses is not a subject which can be treated popularly, nor would be of much use to photographers if it could. There is no work devoted to the subject; the principles involved are treated of in most works on optics, and in some works on natural philosophy, such as that of Dr. Golding Bird, Dicks' "Practical Astronomer," &c. Some popular information on the optics of photography would be very useful to many photographers, but the subject is difficult to popularize. For price, &c., of M. Disderi's work, see answer to A. B. C.

Honesty Good Policy.—See announcement on first page of the present number.

J. H. S.—We are not in possession of any further particulars beyond what Mr. McLachlan gives. A letter addressed to him at the Manchester Photographic Society, 36, George Street, Manchester, would reach him. The subject is, as you state, one of the most important in connection with the art, and Mr. McLachlan treats it as one who has considered it very intelligently. Your specimen enclosed is in many respects very pleasing.

Phos.—Your collodion or bath were probably turbid: the streaks have probably been caused by the silver solution, running in separate streams down the plate during exposure. The plate has not been exposed long enough. You appear to be using a simply iodized collodion; a bromo-iodized collodion, in inexperienced hands, will give much cleaner and better results.

W. J. C.—A good negative iodizer, for iron development, may be made as follows:—for each ounce of collodion 2½ grains iodide of cadmium, 2 grains iodide of ammonia, and from half a grain to a grain of bromide of cadmium, according to the character of the pyroxyline. If the latter be made at a high temperature, and with weak acids, a grain of bromide may be used with advantage. The collodion thus iodized will give harmonious negatives and keep well.

Fred. Power.—The tendency to reticulation in your negatives may be favoured by the character of the pyroxyline; but it probably chiefly arises from the presence of too much water in the solvents. The tendency existing, however, the best mode of getting rid of it will be found in using especial care to let the film set well always before immersion in the bath. If this fail the only plan will be to mix off the collodion with another sample having no such tendency. The picture is otherwise very good, and the tone fine.

C. E. L.—If you carefully observe *all* the precautions suggested in our last, you will not, we think, be troubled with the red deposit; but as it may proceed from different causes, all the precautions should be observed. We have not tried the keeping properties of honey and tannin, but have several times heard that they do not keep well. We shall be glad to hear the result of your morphine plates.

B. T. V.—We see no objection to the dimensions of your dark room, nor to the paper for it, of which sample was enclosed. Blue is not a good colour for the roof. The design of your glass room appears to be similar to that of Mr. Fitch's, described some months ago. As a matter of choice we prefer some side light, and no front light. Tiffany is scarcely a suitable material for blinds, as it will not keep out direct sunlight. We were not aware of the price of the prepared silk. It does seem rather high; but we cannot tell whether it is possible to make it cheaper.

No. 35.—Stereo lenses on the triple construction will doubtless be valuable as regards extent of angle. The compound stereo lenses in existence, however, include a wide angle; it is only when using portrait lenses of seven or eight inches focus, such as you mentioned, that you need to retire so far back. To include much subject in stereo pictures you must use lenses of somewhat short focus; and such lenses are scarcely well suited for *cartes de visite*.

W. W.—There is a little looseness of statement in the remarks you quote from the writer in our contemporary. A print is scarcely likely to contain much free nitrate of silver after toning in an alkaline gold solution.

Actinic.—You will find a report upon your glass in another column. The mode of ventilating a dark room must depend largely upon its construction, but our plan is simply to leave door and window open between the intervals of manipulation.

G. W. Hill.—Thank you for the description of your method of producing transparencies, which shall appear shortly. The card portraits are brilliant, vigorous, round, and well modelled.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 206.—*August* 15, 1862.

## A FEW WORDS ABOUT TONING.

Notwithstanding all that has been written about toning during the last few years, much uncertainty both in theory and practice still prevails; and notwithstanding all the remedies which have been suggested, slaty tones, irregular tones, and the difficulty of getting any tones at all, at times continue to perplex both amateur and professional photographers. There can be no doubt that the various remedies proposed, such as the ammonia-nitrate silver bath, the bath of acetate of soda, &c., have proved beneficial in many instances, and have mitigated, if they have not entirely removed the evils they were intended to cure. Still the subject is of so much importance, and beset with so much uncertainty, that every practical suggestion in connection with it is eagerly sought after. We are not now about to enter into any fresh discussion of the theory of alkaline gold toning, but to lay before our readers a few hints which will prove interesting even if they fail to be instructive.

It may be within the knowledge of some of our readers, that many of the prints of the late Mr. Lacy of Ryde, were distinguished by a rich black tone, and freedom from mealiness, and that this tone was said to be due to the use of a toning process the formula of which was a secret. This was indeed the fact. Mr. Lacy, when in Paris at the beginning of last summer, being greatly struck with the rich tones of the pictures issued by M. Ken, made overtures to him or his printer, for information as to the method of producing them. The tones were said to be due to a secret process, and a sum of one thousand francs (£40) was demanded for the recipe. Finally Mr. Lacy agreed to give five hundred francs (£20) for the information, and received it. A formula for which he paid thus heavily, he very naturally wished to preserve for his own especial benefit, and he did so. During the first few weeks of trying it, he found much difficulty in obtaining anything like perfect results. He persevered, however, and finally succeeded to his complete satisfaction. The prints of which we have some before us, were certainly very fine; the tones of a rich deep neutral tint, or warm black, altogether free from redness or inkiness, and there was, for the most part, an entire immunity from mealiness.

Knowing that Mr. Lacy had paid thus highly for the formula, we did not ask any questions as to its composition. A very superficial examination, however, of a bottle of the solution placed in our hands, convinced us there was not much novelty in the matter, that the solution was, in fact, prepared by some modification of a well-known formula, which, by a singular inadvertence in a highly intelligent photographer and a careful reader of the journals, had escaped his attention. Mr. Lacy subsequently detailed the particulars to us, with a promise to communicate them at some time, together with the result of his experience in the matter, for the benefit of our readers. His untimely death prevented the possibility of this promise being performed, and at the same time exonerates us from any necessity of preserving the secret of which we were the repository. We are now, therefore, at liberty to state what we know on the subject. As our readers will have gleaned, so far as the formula is concerned, we have no great secret to communicate; but there are, nevertheless, a few hints in connection with it, which may be instructive as well as interesting.

The formula was substantially that of Legray, with chloride of lime added to chloride of gold. It may be stated simply thus:

| | | |
|---|---|---|
| Chloride of gold ... | ... | 2 grains |
| Chloride of lime, from | 2 to 4 | „ |
| Water ... ... | ... | 1 pint |

The exact proportion of water was not always strictly regarded. The usual method adopted was to dissolve the bottle of gold, containing fifteen grains, in a pint of water, and add twenty grains of chloride of lime. The solution was kept in this state, and subsequently diluted for use by placing in a bottle which was filled up with water: the bottle was stated to hold a gallon, but, from our own observation, we should conceive it did not hold more than six pints. This was the toning solution for use.

So far the process is nearly identical with that originally proposed by M. Legray, which will be found on p. 213 of our first volume, and repeatedly given with modifications since. The essentially valuable part of the instructions consisted in defining the age at which the solution was to be used. This bath used immediately, or soon after its mixture, gave the worst possible results. The prints were always impoverished; if they remained long in the bath they became slaty and grey, if a short time, they were brown and red, and in each case were mealy and flat. The great secret of success consisted in keeping the solution a proper time, after mixing, before using it for toning purposes. The shortest time in which it acquired the proper qualities was eight days, and it was stated to go on improving for a month longer. It might be used, however, with advantage, at any age, from eight days to five weeks. The prints were excited in a strong silver bath, a little over-printed, washed, but not with any especial care, toned in the solution just given, washed again, and fixed in fresh hypo. The results were generally as we have already stated—fine, black, vigorous prints.

A few words may be said regarding the keeping of alkaline gold solutions. The result of adding carbonate of soda to a solution of chloride of gold is a double decomposition, in which a peroxide of gold or auric acid is formed, which, Hardwich states, is capable of uniting with excess of alkali, forming a colourless solution. The same reaction takes place when several other of the soda salts are added. This colourless solution, although it is usually found to be comparatively inert in toning, yet generally gives the best results if the toning action be once set up. A solution of chloride of gold, with carbonate of soda added, will often refuse to tone if it have been mixed a few hours; but if a trace of fresh chloride of gold be added, the toning will go on rapidly and satisfactorily. The solutions of gold with the acetate and phosphate of soda generally work better after having been made a few days, a much greater immunity from the tendency to mealiness being the general result. It is somewhat singular that, with the addition of chloride of lime, which is more strongly alkaline than either of these, which generally have a feebly alkaline reaction, the toning properties of the solution should continue for several weeks unimpaired. The change which takes place is difficult to determine, but it is probable that the effect of age on toning solutions is a question which would repay further experiment.

Mr. Lacy was satisfied that the improvement in tone, and freedom from mealiness which he obtained, were worth the twenty pounds he had expended; but it is only fair to state that one or two who have tried the formula have not found any especial advantage in it. Whether the unquestionably good tone he obtained were due to the method, or to the perseverance with which he worked it out, we cannot undertake to state. But to whichever cause it was due, the twenty pound recipe is now the property of our readers. We do not generally attribute much importance to secret nostrums, although we do not doubt for one moment the right of an investigator to be paid for his trouble. As a commentary, however, upon the practice of buying and selling secrets, we may mention one anecdote which recently came under our notice. A certain printer boasted that the good qualities of a batch of prints, which turned out unusually fine and brilliant, were due to a little discovery of his own, which he would reveal for a consideration. His employer, willing to remunerate him for his discovery, gave him a guinea to disclose it. The revelation was made: a pin had accidentally dropped into the silver bath and turned it green: all the prints turned out fine; the operation was repeated with like success. And the pin was the cause of it all! That was the secret. We have heard the addition, to the silver bath, of nitrate of copper recommended as an aid to toning, but only in this instance the addition of the compounds of tin, copper, &c., which are found in a pin. Still some photographers are fond of the use of empirical nostrums; those who like may try this one.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Potassium Salts* (continued).—*Lactate of Potash.*—This salt is formed by the direct union of lactic acid with either caustic, or carbonate of potash. Compounds of this acid have, on several occasions, been employed in photography, and, owing to the silver salt being soluble in water as well as sensitive to light, there is little doubt that future experimenters will derive considerable benefit from a more thorough examination of the photographic value of the salts of this acid. Lactic acid is a very common product of vegetable, or animal decomposition; it is contained in sour milk, and is formed by inducing a particular kind of fermentation in solutions of glucose, or common sugar. The processes of preparing lactic acid are rather complicated, and to persons unaccustomed to organic chemistry, somewhat repulsive. One of the easiest processes for preparing it is to keep milk until it has became sour; the whey is then separated from the curd by filtration, and the clear liquid evaporated down over the water bath, until it is reduced to about one-eighth of its original bulk. If any more curd be separated during the evaporation, it must be filtered off a second time. Lime water must now be added, until the phosphoric acid is all precipitated; the base being introduced in slight excess. The precipitated phosphate of lime is now to be filtered off, and the filtrate diluted with three times its bulk of water. A solution of oxalic acid is now to be added, a few drops at a time, until the lime is all precipitated, avoiding excess of the acid; the oxalate of lime is filtered off, and the aqueous solution evaporated to the consistency of honey. The viscid mass is next mixed with four times its bulk of alcohol, and heated: the lactic acid will be taken up by the spirit, leaving most of the impurities behind. Filter from the insoluble portion, and mix the filtrate with water; upon evaporating this over a water bath lactic acid will be left behind. Another process, which is better when preparing the acid in quantity, is to mix together in a gallon stoneware jar two hundred and fifty grammes of milk sugar, two hundred grammes of powdered chalk, one quart of skimmed milk, and sufficient water to fill the jar. The mixture is then placed on a sand bath, or in some warm place where it can be kept at a uniform temperature of between 25° and 30° C. It must be frequently stirred, and fresh water added to it, to supply that lost by evaporation. Fermentation will take place with evolution of carbonic acid. In about twelve days the evolution of gas ceases, a sour and cheese-like odour will be perceptible, and the chalk powder will have become granular. When this point has arrived, the contents of the jar are emptied out into an enamelled saucepan, and boiled for a quarter of an hour. It must then be strained through flannel, and the residue well washed with boiling water. The whole of the liquid must be filtered through paper until it is quite clear, and then evaporated at a gentle heat over a water bath. When it has become reduced to a fraction of its original bulk, allow it to cool, and set it on one side for twenty-four hours. At the end of that time a considerable quantity of lactate of lime will have crystallized out, and upon separating this from the mother liquor, and evaporating the latter to a still smaller bulk, a fresh quantity of lactate of lime separates. The whole of these deposits are then to be strongly pressed between canvass. If the operation has been conducted properly, the product will amount to 350 grammes. The separation of lactic acid from the lime salt has now to be effected; for this purpose, oil of vitriol is diluted with six times its bulk of water, and the lactate of lime decomposed by a slight excess of this diluted acid; alcohol is added to the mixture, and the precipitated sulphate of lime filtered off; the clear liquid now contains a mixture of lactic acid with a little sulphuric acid; in order to separate the sulphuric acid, a little previously prepared lactate of lead is to be added, and boiled with it. The sulphate of lead is separated by filtration, and the trace of lead in excess removed by sulphuretted hydrogen. Upon evaporating the clear solution over the water bath, lactic acid will be left behind. It forms a colourless syrup, inodorous and of an intolerably biting pure acid taste; it decomposes when heated. Upon adding to the diluted acid carbonate of potash, and evaporating, a very difficultly crystallizable salt is obtained, which is soluble in water and in alcohol. This is the potash salt, which may be used to prepare the other less soluble salts of this acid.

*Ferro-cyanide of Potassium.*—The photographic value of this salt has been investigated by Mr. Robert Hunt, who, as early as the year 1841, described a photographic process in which it was used in conjunction with iodide of silver. In a communication which he made to the Chemical Section of the British Association, at Plymouth, in that year, he stated that when paper, prepared with the iodide of silver, as in the ordinary Talbotype process, was washed over with a solution of ferro-cyanide of potassium, it blackened instantly on being exposed to the sun's rays. This effect, Mr. Hunt proceeds, will take place with the greatest rapidity when the iodide of silver on the paper is as free from admixture as possible. Perfectly pure iodide of silver, it is well known, does not appear to undergo any change by exposure to light, but if, upon some pure iodide of silver, spread out on glass and exposed to sunshine, a little solution of ferro-cyanide of potassium is dropped, an instantaneous darkening will take place, which extends in different degrees over the whole space moistened by that salt.

The preparation of ferro-cyanide of potassium illustrates, in a remarkable manner, the wonderful powers which modern chemistry possesses, of transmuting substances, apparently the most worthless and repulsive, into products of the utmost purity and beauty. For its manufacture scarcely anything is used except substances which are too waste and too refuse to be employed for any other purpose; for instance, the horns and hoofs of cattle, clippings of leather, the cast off woollen garments of the inhabitants of the sister isle, blood and offal, and similar kinds of refuse are mixed up with crude pearl ash obtained from the combustion of wood, and with scraps of iron, hoops from beer barrels, old iron horse shoes, or any other old iron that can be obtained; the whole is then fused together in an iron pot until the nitrogen and carbon, potash and iron, have rearranged themselves in a different manner; the mixture is then lixiviated with hot water, and metallic iron or sulphide of iron added to the mass. After standing some time at the boiling temperature, it is filtered and evaporated to the crystallizing point. The ferro-cyanide will separate upon cooling. Commercial ferro-cyanide of potassium is often contaminated with carbonate and sulphate of potash. It may be purified by dissolving it in the smallest possible quantity of hot water, filtering and allowing the liquid to cool; sulphate of potash, with part of the ferro-cyanide crystallizes out, the mother liquor is decanted and mixed with its own bulk of alcohol; ferro-cyanide of potassium will be precipitated in the form of a white powder, this must be filtered, washed with alcohol, and then crystallized from water. It forms brilliant lemon-yellow crystals, belonging to the prismatic system, they are soft, and somewhat flexible, and quite permanent in the air. When finely powdered and heated for some time to the boiling point of water, it loses three equivalents of water and becomes converted to a white powder or friable mass, inodorous, and having a sweetish, saline, somewhat bitter taste. It fuses at a heat a little below redness, giving off nitrogen gas, and leaving a mixture of cyanide of potassium and bi-carbide of iron. On this account ferro-cyanide of potassium is a very excellent reducing agent, and would serve well for the reduction of silver residues to the metallic state. When dissolved in water and exposed to the light, it is decomposed with separation of prussian blue: it is owing to this reaction that the reagent bottles, containing ferro-cyanide of potassium, in chemical laboratories, are generally discoloured blue. Ferro-cyanide of potassium dissolves readily in water, forming a pale yellow solution, and is more soluble in hot than cold water.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

The display of photographic apparatus in Class XIV., at the International Exhibition, comprises some of the very best mechanical appliances for the practice of the art which can be conceived, and we question very much, if, for ingenuity of design, quality of material, and excellence of workmanship, it could be, as a whole, equalled in the world. The fact that cabinet work, much of it hastily prepared at the last moment, should have stood uninjured the heat of an apartment, equalling, at times, the temperature of the tropics, the direct rays of the sun for some weeks, until an awning was provided, being superadded, speaks in the strongest terms for the thorough seasoning, and careful workmanship, especially when it is remembered that not all the objects exhibited could have been prepared for use in a tropical climate. There are not, however, many special novelties with which the public were not previously acquainted; nor, indeed, is every branch of the art represented, as we do not remember to have seen a single solar camera.

There are about five-and-twenty exhibitors of apparatus: the catalogue contains a few more names and numbers, for which no corresponding contributions are to be found. The articles exhibited are cameras of all kinds, lenses, camera stands, baths, &c.; dark tents, and manipulation chambers; rolling presses, head-rests, and a few other small articles. The majority of the contributions are in enclosed glass cases; some having descriptive cards attached, a plan we should commend to all exhibitors. It would be manifestly out of place here to enter into any detailed criticism of articles which can only be generally examined, and not tested; we shall briefly refer to the general characteristics of the contributions, only entering, where the novelty or importance of the article demands it, into more detailed description.

Mr. Austen (3,033) exhibits the contributions of a machinist to photographic apparatus, in the shape of rolling presses, camera stands, and head-rests of metal. A rolling press for cards consists of two rollers, without any plate: we have not tried this form of press, but it is maintained by some that a more perfect pressure is obtained when the card passes between two polished rollers, than where a burnished plate is interposed. A larger rolling press, by Mr. Austen, is chiefly distinguished by the fact, that, instead of having a steel plate resting on a bed of wood, the plate itself consists of a thick, solid piece of cast metal. A very ingenious and solid-looking camera stand, made entirely of metal, with every form of motion, is also exhibited. There are some metal head-rests for standing figures, which look firm and steady. One of these, however, strikes us as very bad in principle: instead of depending for its firmness, as a support to the head, upon the weight and breadth of its base, it is screwed down to the ground. This, of course, keeps it always in one place, and it inevitably follows that the head must be "backed" into the rest, instead of the rest being placed so as to gently support the head, after it has assumed an easy and natural position. One of the causes of the appearance of constraint in many photographic portraits arises from the injudicious management of the head-rest, even where it is moveable; but if the rest be immoveable, this constraint must be an inevitable result. The object in the present instance is, we presume, to facilitate the concealing of the head-rest, the base of which often awkwardly obtrudes in standing figures of gentlemen; but there are better modes of meeting the difficulty than this, which is entirely inadmissible.

Messrs. Bland and Co. have a good display of apparatus, one of the noticeable circumstances in connection with which is the fact, that a large portion of the articles are intended for use in India, and tropical climates generally. These include every form of camera, both for the operating-room and the field, and comprise every modern improvement in design and workmanship. A "new universal camera" is arranged for stereoscopic and *carte de visite* pictures, with wet or dry plates, facilities for carrying half-a-dozen of the latter being provided. Amongst other conveniences which this camera possesses, is an arrangement for sliding the lenses into the body of the camera, which then packs up into a compact square parcel. A small chemical chest with a selection of bottles, developing cups, dishes, &c., is provided to accompany this camera, which is invented by Mr. C. D. Smith. Some water-tight baths have a convenient arrangement in the form of a door near the bottom of the outer case of mahogany, which enables the operator to examine the condition of the solution in the glass bath, when turbidity or deposit is suspected. Some flat baths for exciting plates with a small quantity of solution; a collodion filter, Keene's metal boxes, with gutta-percha grooves for dry plates; and samples of Keene's and Ponting's collodion, complete the equipment of Messrs. Bland and Co's. well-arranged case. In referring to the collodion by Mr. Ponting, for which a medal was awarded, we may remark that we have recently tried a sample of his new bromo-iodized collodion, and are much pleased with its qualities, instantaneous exposure with a portrait lens giving a good negative, in which sufficient density was obtained by iron development only.

Messrs. Bull, Brothers (3053), exhibit a variety of photographic profile accessories, and pictorial backgrounds. The legitimacy of these accessories has been the subject of some little discussion. A practical answer might be given to those who challenge them, by stating that the immense demand for them proved that they were what photographers wanted. Whilst there can be no doubt, however, that they can be misused, such misuse is no argument against their proper use. They require using with judgment and taste, and in their proper place can be made very effective. The designs are in many instances good: perhaps both in some of the profiles and the backgrounds, if the lines were softer and the contrasts a little less definitely pronounced, the result would be better. Messrs. Bull very naturally tell us, however, in reply to any such suggestion, that they are quite ready to adopt it for those who desire it, but that the mass of those who use them demand sharply cut outlines, and vigorously marked lights and shadows. Some of the highest art authorities amongst photographers, such as Mr. Rejlander, for instance, entirely condemn the painted background, as an illegitimate mingling of the unrealities of conventional art with the truth of photography, which must ever result in incongruity. So long, however, as the demand exists among the public for photographs with pictorial backgrounds, so long will professional photographers necessarily produce them, and so long will scenic artists paint just the designs which are required by photographers. Messrs. Bull display an immense variety of designs both in backgrounds and accessories.

## BRITISH PHOTOGRAPHIC DEPARTMENT.

The *Times* has an excellent article on British Photography, speaking of this and the Educational Department contiguous, it says:—"Both these classes are far better worth a visit than many others which receive more notice. The visitor will find the staircase which gives access to them in the centre tower, between the picture galleries over the entrance from the Cromwell-road. Photography may be said to be an entirely new class since 1851; indeed, the art itself can scarcely be said to have existed at that time, if we compare it with its now universal spread. It is true we had then the Daguerreotype and the Talbotype, the former the only process sufficiently rapid to take portraits, and the latter only suited to views and objects admitting of long exposure to the camera. We all remember the very beautiful specimens of both these processes exhibited in the building in Hyde Park. They were, however, few in number, and exhibited as mere adjuncts of the philosophical instruments. In 1851 Archer invented the collodion process, and this has given rise to the marvellous development of the art of late years. The Daguerreotype, however exquisite in its details (probably even now unsurpassed by any process), had an unpleasant leaden hue, and gave a ghastly appearance to the picture. The Talbotype, owing to the negative being on paper, was subject to all the imperfections of texture; and though, when great care was bestowed on the manipulation, charming pictures were produced, the art had no commercial value, and it remained in the hands of a very few amateurs. The Exhibition of 1851 showed what was doing, for hitherto the workers had carried on their labours without knowing what others were employed upon, and this, combined with Archer's invention, gave a great impulse to the art. The Society of Arts established and held in the Adelphi the first photographic exhibition, and this led to the formation of the Photographic Society of London, the parent of the innumerable photographic societies existing all over the Kingdom. By the collodion process the extremest rapidity was obtained, the imperfection of the texture of the paper got rid of, and the power of multiplying copies to any extent, at a cheap rate, was achieved. Hence photography at once took a commercial standing, and photographers multiplied in all directions. With this the adaptation of the art to an infinite variety of purpose rose up in all directions. Mr. Charles Vignoles was, it is believed, the first to turn it to account for engineering purposes. Having large works in Russia, he had photographs sent him periodically of their progress, and copies were also sent to the Emperor Nicholas. Such reports could not be "cooked," and the Emperor saw literally with his own eyes what was doing. Astronomers have turned the art to account, and Mr. Warren De la Rue this year has received the gold medal of the Royal Astronomical Society—the highest honour it can bestow—for the perfection to which he has brought the art in this direction, and for the valuable addition to science which he has made by its aid.

"The Commissioners for the present Exhibition seemed to have been puzzled in what class to place it, and at last decided to give it a class to itself, and, fearing to give it a position in Section IV. (Fine Arts), placed it in Section II., as a sort of branch of philosophical instruments. This gave great offence to the lovers of the art, and the Council of the Photographic Society of London, whose assistance had been invoked by the Commissioners, after a long correspondence, flatly refused to give, as a body, any aid whatever in the matter. Some few persons, having at heart the interest of the Exhibition and of their art, and not wishing that English photography should be imperfectly shown, took the matter up, and a committee was formed. The result will show, notwithstanding the very inadequate space which the Commissioners have been able to allot for the display of the art, that British photography need fear no comparison with its Continental rivals. The landscapes of Bedford, Mudd, Robinson, the Earl of Caithness, Vernon Heath, Lady Jocelyn, Cundall and Downes, and a host of others, attest a supremacy in the art which, we venture to assert, very few, if any, Continental rivals will dispute. C. Thurston Thompson and Caldesi show gigantic photographs of the cartoons of Raffaelle, which are wonderful as masterpieces of manipulation. In portraits, the well-known names of Williams, Claudet, Mayall, Lock and Whitfield, Mayer, Dolamore and Bullock, Maull and Polyblank, &c., as exhibitors, give assurance of that branch of the art being well represented. Their coloured photographs are in reality miniatures, being so worked by hand as to leave no trace of the photograph. Doubts at one time existed as to whether these should be admitted in this class, but, inasmuch as they are founded on the photograph, it was thought desirable to allow their introduction. Photography has completely destroyed miniature painting proper; hence it was but fair that the new art of converting photographs into miniatures should be represented. Very charming and artistic are some of the specimens shown, but photographs these are not. One of the great drawbacks in photography has been the liability of the specimens to fade or change colour, and sometimes absolutely disappear: hence great efforts have been made by chemists and photographers to get some process in manipulation which should defeat this enemy of the art. The result has been that photographs, when carefully and honestly prepared, and preserved with ordinary care, are now very fairly permanent—probably as permanent as a water-colour drawing. Many trials have been made to produce in printers' ink or carbon a print from a photograph, which would thus have all the permanency of an engraving, and some very charming results have been produced; but hitherto—probably from expense, uncertainty, or difficulty in manipulation—none have come into general use. Negretti and Zambra exhibit transparent photographs on glass, similar to those well-known productions of Ferrier of Paris, than which none were thought finer till Negretti and Zambra entered the field against them. Enlarged photographs are shown by Claudet and others, which are life-sized, and some of them coloured; the latter, however, can scarcely be called photographs—they are simply a result of photography. Paul Pretsch, Pouncey, John Field, and F. Joubert, contribute specimens of this class.

"Colonel Sir Henry James, director of the Ordnance Survey, shows specimens of a very valuable adaptation of the art, by which the Government saves many thousands a year in the operations of his department, in the reduction, enlarging, and printing of maps and plans. It is termed "photozincography," and the results are extremely beautiful and interesting. Sir Henry shows adaptations of it to the production of fac-similes of ancient MS., and one of a page of Domesday Book is shown. The photograph, by a simple and cheap process, is transferred to a zinc plate, whence any number of copies can be taken off by the ordinary plate-printing press.

"F. Joubert exhibits a series of very beautiful pictures burnt in on glass, a marvellous adaptation of the photographic art in an absolutely new direction; and here perfect permanency is obtained, at least so long as the glass will last. By a pure photographic process he produces on the glass, in ceramic colours, a picture, which by exposure to heat in the furnace becomes burnt in like any other picture on glass or china. By a careful and artistic manipulation he has been able to produce effects in several colours. The process has been perfected, and a cheap and artistic ornamentation of our windows, whether in portraits of our friends, landscapes of familiar scenes, architectural objects, or statuary, is brought within the means of the many.

"Mingled with the photographs, and closely packed on the small floor space allotted for their display, are the instruments and appliances used in the art. In lenses, on which the artist is so greatly dependent, there has been great progress made since 1851. Ross and Dallmeyer show some very fine specimens—marvellous proofs of a combination of methematical theory with the skilful development of the practical optician; Horne and Thornethwaite, veterans in the field of photography; Murray and Heath, Bland and Co., attest what the English can do as makers of apparatus. All sides show a host of contrivances thoroughly unintelligible to the uninitiated, but seemingly contrived with great ingenuity for extemporizing a laboratory, workshop, and dark room, wherever the labours of the photographer may carry him. One firm shows specimens of albumenized paper, an article much in use by the photographer, and it is said that this firm alone (and it is only one of a legion of others) uses for this purpose annually half a million of hen's eggs.

"Class 14 has a high position in the building, and, though only to be reached by overcoming the labour of a long staircase, will, we venture to say, well repay the toil of the undertaking."

## DIRECT COLLODION POSITIVES UPON GLASS.

BY DR. SABATIER.

Writing preceded typography: painting preceded engraving and lithography. In photography, writing and painting do not even exist. Objects are not copied directly; we have to proceed through the *cliché*, or negative; and to arrive at the result achieved by the scribe in an instant, the long and delicate operation of printing must be undertaken. Writing, that cursive heliography, will it then become useless; or, rather, have we hitherto dreamed of seeking it? I believed and foresaw the possibility of it, when, a year ago, I published my process for obtaining directly, and in the course of a few minutes, direct collodion positives upon glass.

Notwithstanding the modification I have introduced and indicated in my last communication, this process leaves much to be desired, and cannot become popular; but the new improvements I have recently made reduces the manipulation so much, renders its production so rapid and easy, that the least experienced photographer may easily become familiar with it, and its adoption will, I hope, afford a pastime and pleasure to all who undertake it.

My direct positives upon glass were not very visible, and could only be properly appreciated when viewed as transparencies. I now make them visible at pleasure, by transparency or by reflection, like photographs upon paper. These two kinds of positives require different manipulations. I shall now describe the method of obtaining them.

### *Direct Positives by Reflected Light.*

This kind of positive, I must first premise, in order to prevent misunderstandings, does not completely respond to the exigencies of photography. It is in order to excite the improvements of which it is susceptible, that I proceed to describe the manipulations by which they can be produced; and also, because these manipulations, well understood, assist in the comprehension of the production of transparent positives.

When the development of the negative picture is completed in the laboratory, there remains in the collodion film a certain quantity of uncombined iodide of silver, either because it has not been acted upon by light, or because it has not been sufficiently so to be influenced by pyrogallic acid. Finding a substance which, in acting upon this iodide, forms a colour approaching that of a negative, and then we have the means of producing a collodion positive upon glass, by reflection: for, necessarily, the new colour will be more abundant and more intense where the non-reduced iodide is most abundant; for the diffusion of the iodide in the collodion film is such, that the new colour necessarily places itself in perfect harmony with that of the negative.

Now, in the absence of more suitable materials, which yet remain to be found—pyrogallic acid, which has already given the colour of the negative by acting upon the iodide impressed in the camera—can also furnish another colour by combining with the iodide unacted upon by light, provided, that, before putting one into contact with the other, the plate be exposed to diffused light for a few seconds.

Doubtless, it is an extraordinary fact, that pyrogallic acid reduces the iodide impressed in the camera, while it also combines with it, when it is impressed by diffused light, which seems to prove that the action of the light is not the same in both cases; but, although extraordinary, the fact is none the less true. These two reactions of pyrogallic acid may also manifest themselves under the influence of other causes quite as mysterious.

To be convinced of this, take two test-tubes; pour into the one four or five c. centimetres of a solution of nitrate of silver, and into the other an equal quantity of solution of pyrogallic acid; the strength of the solutions is unimportant; then, drop three minims (or drops) of pyrogallic acid into the test-tube containing the nitrate of silver, and into the test-tube containing pyrogallic acid pour three drops of the solution of nitrate of silver; in each test-tube a different colour and combination will be evident.

The pyrogallic acid poured upon the nitrate of silver does not appear to combine with it immediately; the liquid remains for a few moments colourless, then the upper stratum commences to blacken. The black descends down the tube, communicating gradually with the lower strata, and after four-and-twenty hours' repose, a precipitate will be found at the bottom of the tube, exactly similar to the reduced silver of which a negative is composed. The liquid, now become limpid, has only a very light tinge of green.

The nitrate of silver poured into the pyrogallic acid behaves quite differently. The liquid mass immediately becomes thick, and of a dull yellow colour; a rusty-coloured precipitate gradually falls to the bottom of the test-tubes, and twenty-four hours after the experiment, the liquid becomes limpid, and assumes the yellow colour it presented at the commencement. The image has all the appearance of the combination which constitutes the positive image.

To what is this difference in the mode of acting due? Is it to the respective quantity of the elements put into contact, or rather to the manner in which that contact is made? Will it be with the nitrate of silver and the pyrogallic acid as with the letters A and B, which form a different syllable according as the first of these letters is placed before or after the other? M. l'Abbé Despratz, in proving that the nitrate of silver poured upon the iodide of potassium gives rise to an electro-positive current, while iodide of potassium poured upon nitrate of silver gives rise to an electro-negative current, has rendered this hypothesis very probable.

What confirms also the fact that the colour of the positive, and that of the negative are due to different combinations, is, that in leaving a transparent positive in a solution of hyposulphite, the positive portion of the picture disappears even before the negative portion is attacked, and that the sulphide of potassium, which lines the positive remains without influence upon the negative.

Pyrogallic acid, which forms two combinations, two different colours, and which has already served to develop the negative, serves also to develop the positive, I proceed as follows:—

When the negative appears to have attained its highest perfection, I pour off the acid, and wash the plate in rain or distilled water, and drain it with one corner resting on blotting paper. It is next moistened with a solution of nitrate of silver, strength 5 to 6 per cent. in order to render sensitive all the iodide which has not contributed to the formation of the negative, and then exposed for a few seconds to diffused light, and not to the direct rays of the sun, o which I have not yet studied the action. After the exposure, I return to the operating room, and give it a second bath of pyrogallic acid, this time pure, that is, without the addition of any other acid, and the positive is instantly developed.

It is very superior to the negative, and much more strongly defined. To give it more vigour, the exposure must not however be prolonged until certain portions become solarized, for in such parts, the negative, instead of defining it, is confounded with it.

This first kind of direct positives, as I have already stated, does not sufficiently respond to the exigencies of photography: the two colours differ, but are not sufficiently opposed: the gradations of tone also, are not very distinct, and the finer details are lost in the shadows. But if one among the numerous searchers into the mysteries of the philosophy of photography will undertake to improve this defect, it will not be long before he furnishes us with excellent results.—*Moniteur.*

(*To be continued.*)

## THEORY OF THE ACTION OF LIGHT UPON IODIDE OF SILVER, IN COMBINATION OR CONTACT WITH OTHER SILVER SALTS.

BY THOMAS SUTTON.*

In our last number we promised to discuss more fully in the present a new theory of the action of light upon iodide of silver, by means of which all the known phenomena of photography in the various processes in which that silver salt is employed, may be satisfactorily explained.

According to this theory pure iodide of silver is itself insensitive to light, but when placed in combination or contact with some other salts of silver, it has the effect of greatly exalting their sensitiveness to light, and of hastening their decomposition by light, in consequence of its mere presence in the film; its action being what is called in chemistry "catalytic."

Since our first brief allusion to this theory in the last number, we have seen an article by M. Van Monckhoven, in the News, from which it appears that he is also tending towards similar views.†

Our object will now be to show that the theory stated at the commencement of this article is strictly in accordance with fact, and that it is capable of affording a satisfactory explanation of all the phenomena in photography in which the iodide of silver occurs.

We have to prove in the first place that pure iodide of silver is insensitive to light; it being understood that a salt is said to be insensitive to light in photography, when it neither exhibits visible evidence of reduction on exposure to light, or yields an image, after exposure under a negative, by any after process of development.

Although we cannot obtain iodide of silver in a state of absolute purity, yet we can obtain it in a state bordering very closely upon perfect purity. For instance, if you add a solution of nitrate of silver to a solution of iodide of potassium, the latter salt being in excess, and then wash the precipitated iodide of silver very thoroughly in numerous changes of water, you find the iodide of silver thus obtained perfectly insensitive to light. And again, if you coat a sheet of paper with a solution of iodide of silver in iodide of potassium (as in the calotype process), and then precipitate the iodide of silver in the paper, by thoroughly washing out the iodide of potassium, you find the paper perfectly insensitive to light; that is, you can neither obtain visible reduction, nor develop an image upon it after exposure to light.

In both these cases there is, no doubt, present with the iodide of silver a slight trace of iodide of potassium; but if the iodide of silver were itself sensitive to light, and capable of reduction like the bromide, chloride, and other salts of silver, it is inconceivable that so slight a trace of iodide of potassium should prevent the reduction of so comparatively large a quantity of iodide of silver, especially as we find that it cannot do so in the case of any of the other really sensitive silver salts, for both the chloride and bromide of silver can be darkened by light under a weak solution of iodide of potassium.

Another instance of insensitive iodide of silver occurs in the Taupenot process, in which, after the excited plate has been thoroughly washed, iodized albumen is poured over it, which converts the last trace of free nitrate which remains in the film into iodide of silver, after which the plate becomes insensitive to light.

Let us next consider some of the facts which seem at first to be inconsistent with the idea that pure iodide of silver is insensitive to light.

However thoroughly you may wash with water an excited iodized collodion plate, you can never entirely destroy its sensitiveness. The reason is, not that the iodide of silver is sensitive to light, but that the film of collodion retains some free nitrate, which no amount of washing will remove, and it is this collodio-nitrate of silver which is sensitive to light. The more thoroughly you wash such a plate the less sensitive it becomes, and this shows that the free nitrate is the true cause of its sensitiveness. Dip it into a solution of iodide of potassium and you convert this free nitrate into iodide of silver, and then the sensitiveness is entirely destroyed.

But Dr. Hill Norris some years ago denied the truth of the latter statement, and asserted that he had taken negatives upon plates which had been washed with iodide of potassium, and not excited again in a nitrate bath. This we explain by supposing that he had used bromo-iodized collodion; for it is perfectly true that bromide of silvor is sensitive after being washed with iodide of potassium. The collodion which Dr. Norris used, probably, contained a bromide, and was *not* simply iodized collodion. A Taupenot plate prepared with bromo-iodized collodion does not lose all its sensitiveness by having iodized albumen poured over it.

Another fact, apparently adverse to our theory, is that an iodized Daguerreotype plate (without bromine), is sensitive to light, although very feebly so. This we explain by supposing that the surface of the plate becomes slightly oxidized in the operations of polishing, and the film which is exposed to light then consists of iodide of silver plus oxyde of silver, and it is the oxyde which is reduced when the plate is exposed to light. Pure silver is white, but a polished Daguerreotype plate is black.

Such are the reasons for concluding that pure iodide of silver is not sensitive to light. If this be true, its effect in accelerating the action of light upon other salts of silver, placed in contact with it, must be due to a molecular disturbance produced by light among the particles of iodide, and not to its reduction by light, and the liberation of iodine. If this be true, the iodide of silver forms a remarkable exception to the law which governs most of the other silver salts when exposed to light. For instance, when chloride of silver is exposed to light in presence of moisture, or hydrogen, the chlorine unites with the hydrogen and forms hydrochloric acid, and the silver is reduced. When bromide of silver is similarly exposed, bromine is liberated, hydro-bromic acid formed, and silver reduced. When organic silver salts or compounds, such as the citrate of silver, are exposed to light, sub-salts of silver are formed; and so on. But when any of these salts of silver are exposed to light in presence of iodide of silver, the reduction proceeds much more rapidly than before, upon the particles which are actually in contact with the iodide of silver. And the law which determines the most exalted sensitiveness of the combination, seems to be this, viz., that every atom of the reducible silver salt should have an atom of iodide of silver in contact with it, and no more. Should there be an excess of the reducible salt present on the one hand, or of iodide of silver on the other, then the slowly reducible salt in the first case, or the insensitive iodide in the second case, would interfere mechanically by its presence with the action of light upon the pairs of atoms of iodide and the other salt which were distributed through the film. Thus, in the Daguerreotype process the iodized plate has but slight sensibility, but when it is put over the bromine, its sensitiveness continues to increase up to a certain point, and then diminishes, the most exalted sensitiveness being probably that in which an atom of bromide exists side by side with an atom of iodide throughout the film.

Those salts of silver which are most sensitive alone, appear, with the exception of the nitrate of silver, to be the most sensitive in presence of the iodide. Thus, iodo-bromide of silver is

* From *Photographic Notes.*

† See Photographic News, p. 279, present volume.

more sensitive than iodo-lactate of silver, and the presence of such salts as the lactate, oxalate, and acetate of silver reduces the sensitiveness of the collodion film, but gives greater density to the image, because those parts which *are* reduced by prolonged exposure to a strong light are very easily intensified by the developer.

Of all known silver salts those which are reduced most rapidly by exposure to light are the bromide and chloride, the former of which assumes a blue, and the latter a grey tint under the action of light. It would appear, therefore, that the most sensitive film would be produced by a bromo-iodized or chloro-iodized collodion. We cannot, however, assert that such is the case, because, singularly enough, the nitrate of silver in combination with the iodide forms a highly sensitive compound; so sensitive that when all the materials are pure, and the nitrate neutral, you can take instantaneous views as readily with this combination as with a bromo-iodized film.

Bromo-iodide of silver appears to be sensitive without free nitrate in excess, and this fact lies at the foundation of the rapid dry processes.

There is a curious circumstance which occurs in the Daguerreotype process, and requires explanation in this place, as it appears at first sight to be irreconcilable with our theory. It is this: If you happen accidentally to expose to light a bromo-iodized silver plate, you can restore its good qualities by putting it once more over the iodine for a few seconds. The explanation is, that the iodine converts into iodide of silver the whole of the silver which has been reduced by the action of light upon the bromide, and leaves the plate nearly in the same condition as before, the difference being that there is now a rather larger proportion of iodide to bromide of silver upon the plate.

We have now endeavoured to explain the leading phenomena which attend the action of light upon iodized films, plates, and papers. The theory now advanced is different from that which we have hitherto held, and which has been explained in an article by Mr. Worden, in our *Dictionary of Photography*. As that work has been for some years out of print, it may be interesting to many of our readers to reproduce that article, so that they may be able to compare both theories, and decide for themselves.

We need hardly say that it is of the utmost practical importance to be able to give a sound explanation of what one is about, and that theories are only despised by ignorant and uneducated people who work by rule of thumb.

## WATERPROOF VARNISHES AND CEMENTS.—GUTTA-PERCHA COMPOUNDS.

BY H. R. NICHOLLS.

To resume my communication on the wants of photography, I shall describe the waterproof compounds of gutta-percha with pitch, and how to construct the various apparatus to which it is applied, in order that the amateur or professional photographer, at home or abroad, may not be brought to a stand still when "on the tramp," at all events for the want of a water-tight vessel.

The dark room I shall make the base of operations, the tanks, sinks, trays, and waterways may be lined with this compound, which is easily applied or repaired when fractured.

Take of gutta-percha, cut in small pieces, one pound, put it into pipkin, and melt it over a clear fire, keeping it well stirred with a *wooden spatula*, adding gradually three pounds of Stockholm pitch. When thoroughly incorporated it is fit for use.

The surfaces of either wood, metal, or stone, to which this compound is to be applied, must be well dried, and all being in readiness, pour sufficient of the melted cement into the sink, or whatever vessel is to be coated, at the same time spreading it with a piece of flat wood, to about 1-16th of an inch in thickness; then smooth it down with a hot iron, similar to that used by laundresses, working well into the corners and joints. In case of curves, or angular parts, a piece of stout iron rod, bent in the form of the letter J, will be found useful. When fractures occur, or joints require to be made, the application of a hot iron rubbed over the parts at once remedies the defects; observing carefully first to dry the parts where such fractures appear.

This compound mixed with one twentieth of fine dry silver sand, or one fiftieth of vegetable charcoal, forms an excellent material for coating damp floors or bad roofs, and may be applied in the same manner as before mentioned.

The next compound requires great purity, as it may come in contact with the various chemical solutions. The gutta-percha must be well cleansed, and dried in the following manner: cut any quantity of gutta-percha into fine shreds, wash in several changes of cold water, or until the water come away quite colourless, it is then to be well kneaded in hot water, with a clean *wooden spatula*, and well pulled out and dried for further use. The pitch requires to be kept in a melted state for an hour or more, that any earthy particles may subside, the upper stratum alone is then to be used; it may be broken away as soon as cold, and kept in well corked bottles for use. A well glazed earthenware pipkin should be used, and kept for this compound only. Equal parts by weight of the purified gutta-percha and pitch are to be melted together as before. This compound also forms an excellent covering for bottles, protecting them from injury when travelling. The method I adopt is, fit a piece of wood into the neck of the bottle long enough to hold conveniently in the hand, clean the outside of the bottle well, then make it gradually hot, and dip it into the pot of melted compound up to the stick, holding it by the handle; when withdrawn, hold it vertically, bottom up, that the superfluous cement may run off at the neck, which may then be stopped upon the stick with a pasteboard collar placed about an inch from the bottle neck upon the stick. To perform this job nicely requires a little dexterity, at the same time it will repay the trouble.

I will send you next a few hints upon the construction of baths, dishes, trays, &c.

2, *St. Jude Street, August 9th*, 1862.

## A SHORT LESSON IN PHOTOGRAPHY—No. 1.

BY J. TOWLER.*

Take a grain of nitrate of silver and a grain of common salt (chloride of sodium). Dissolve each in a separate two-drachm vial, filling each about half-full with rain water. Now light a candle with a very fine wick, or a fluid lamp with a very small wick, and follow me into a darkened room, as, for instance, under the stair-case, if no better can be found. Bring with you a pitcher containing rain water, a slop-pail, an empty vial, and two tea-cups. Shut the door after you. Now pour the solution of nitrate of silver into the solution of chloride of sodium; you observe a dense white precipitate is formed in the chloride salt. This is an example of what we call double decomposition in chemistry. Thus we have nitrate of silver, which consists of the *oxide of silver*, combined with *nitric acid* in such a way that neither acid, nor silver, nor oxygen, is manifest in the combination. This nitrate is dissolved in a neutral solvent—water—which dissolves also the chloride of sodium, consisting of *chlorine* and the metal *sodium*, in such a way also that neither the metal nor chlorine can be recognized by the senses. In this solvent—water—you must then understand that we now have these four substances in intimate contact, namely, oxide of silver, nitric acid, chlorine, and sodium. Now, all chemical bodies have their likes and dislikes, that is, their predilections, affinities, or attractions, on one side, and their repulsions on the other; we cannot as yet, *a priori*, account for such tastes and distastes; they exist, and are invariable when once found out. Well, what is the result? Chlorine leaves Sodium the moment she sees Oxide of Silver; but you observe that the silver compound has already got a companion, Miss Oxygen; she, however, wisely decamps at the sight of so powerful a rival, and runs and allies herself with the poor Mr. Sodium,

* From *Humphrey's Journal*.

in order to sooth him in his desolate condition; Nitric acid follows her example, whereby they form a new and compact trio—the nitrate of the oxide of sodium; but the oxide of sodium is denominated soda, therefore the name of this new compound is generally called nitrate of soda: that of the other new compound is chloride of silver.

This decomposition takes place as soon as contact is effected, and is, therefore, almost instantaneous. But observe well the difference in one of the new compounds; it is insoluble in water, and is therefore precipitated, or falls to the bottom of the vial. The supernatant liquid is the water holding in solution the nitrate of soda, which can now be decanted from the residue; after this we can drive off the water from the nitrate of soda by boiling, when we shall have the nitrate of soda alone, tasting and acting very much like saltpetre. The residue, after decantation, we will wash several times, pouring off the water at each time after the white precipitate has settled. Now take two teacups and pour into the bottom of either half of this white chloride; leave one cup in the dark room: I will take the other into the light, in fact, allow the sun to shine upon it; you observe how quickly the colour is changing into a beautiful violet; the colour, however, is only on the surface; for by stirring the precipitate you perceive it is still white beneath. This change of colour has been effected by the light, and it is in proportion to the intensity of the light; and where the light is obstructed the change is not produced; so that if I were to place a ten-cent piece on a portion of the chloride before exposition to the light, the chloride beneath the coin would remain white.

Let us now return to the dark room, and see if the other half has changed in the meanwhile. No alteration is visible. And none will take place, as we know by experience, if light is excluded. But what you have seen is not all the change that has been effected in the chloride; for if we convert all the white chloride into the violet chloride, by exposing it some time to the sun, and by continually stirring it all the while, it will undergo another very important change, as I will show you.

I have here a solution of another salt called hyposulphite of soda; in this solution the white chloride is quite soluble, so that now not a single particle is visible; on the other hand, the violet chloride is insoluble in a similar solution in this other vessel. On these two changes, produced by light, depends, in a great measure, the science of photography; the light *produces colour* according to its intensity, and *renders this colour insoluble* in the same proportion.

Repeat these experiments at home until you are quite expert in their manipulation. Your next lesson I will give you in about two weeks from now.

## PHOTOGRAPHIC STUDIES.

BY DR. SCHNAUSS.

*Examination of Various Formulæ.*

We know that the collodion and the silver bath must contain a slight excess of acid, or of the element *iodine* which supplies the acid. M. Gaudin recommends *chloric* acid for acidifying the silver bath; but, in fact, this acid has the instability and volatility of those heretofore employed for the same purpose, namely nitric and acetic acid. Doubtless we should add to the silver bath only an acid whose salts are soluble in water, for upon adding an acid which forms an insoluble combination with silver, we set at liberty an equivalent of nitric acid. In this particular, chloric acid, $Cl\,O^5$, must not be confounded with hydrochloric acid, $Cl\,H$, which produces a precipitate of chloride of silver in the bath:—it is well suited for this purpose, for all its salts are very soluble in water. But it is different with regard to its instability, for chloric acid and its salts form some of the most unstable chemical combinations known. Strong friction, or the presence of an incandescent body, is sufficient to decompose the chlorates, and cause a terrible explosion. Chlorate of pottassa, one of the most familiar salts of this acid, is used in the manufacture of "lucifer" matches. Chloric acid itself is very easily decomposed into chloric acid and oxygen. If a piece of paper be moistened with the concentrated acid, it ignites spontaneously on drying. The facility with which chloric acid gives up its oxygen greatly surpasses that which characterizes nitric acid. In this respect, the employment of the new acidifier will not be an improvement. But we perceive from this example, that a greater or lesser instability in these bodies, which are added to the silver bath in very small quantities, must not be regarded as important, for the action of chloric acid is the same as that of acetic acid or of free iodine. For those of our readers who desire to repeat the experiment, we give the preparation of chlorate of baryta (which is not nearly so dear as stated by M. Gaudin), and of chloric acid.

Chlorate of baryta is prepared by dissolving 7½ parts of crystallized carbonate of soda in 24 parts of boiling water. As the carbonic acid is given off, a large vessel must be employed for making the solution in, 6 parts of chlorate of potassa are dissolved in 16 parts of boiling water, and added to the solution of soda, well stirred, and left to subside; tartar is deposited, and chlorate of soda remains in solution, which is filtered, evaporated, and 14 parts dissolved in 27 parts of cold water. On the other hand, 19 parts of vinic acid are dissolved in 19 parts of cold water, and the solution added to the solution of chlorate of soda, and also double its volume of alcoholized spirits of wine is added. After 24 hours a precipitate is deposited, and the liquid, which is a dilute solution of chloric acid, is filtered. It is then saturated with carbonate of baryta, and filtered. The filtered liquid contains chlorate of baryta; we then add to it, cautiously, some diluted sulphuric acid, until a precipitate of sulphate of baryta is formed. The filtered liquid is chloric acid.—*Le Moniteur de la Photographie.*

(*To be continued.*)

* Continued from p. 380.

## THE STEREOGRAPH AND THE STEREOSCOPE.

The stereograph, as its name implies, is a solid picture, or a picture whose different parts retain their distances apart in space proportionately to those in the objects of which it is a picture. Such a picture naturally can never be printed, because it then would be on the same plane, and hence not solid; but it can be produced by two pictures of the same objects, these pictures being on the same plane, and endowed with the *requisite conditions.* A combination of two such pictures, mounted side by side, receives the appellation of that which they produce—the stereograph.

The conditions thus required are, in the first place, a regular difference in the distances between the corresponding points on the two photographs, or pictures, increasing or decreasing according to a certain law from the front objects to those in the back ground; secondly, that, theoretically, the maximum distance shall not be less* than that between the centres of the two eyes, whose average is about two inches and a half, nor the maximum greater than the sum of the distance between the centres of the two eyes and twice the tangent of the parallactic angle to be described hereafter; and, thirdly, that an equal number of objects shall be contained in either photograph or picture.

The pictures of near objects in a landscape projected on the retina of either eye, that is, as seen by the two eyes separately and independently, possess, when mounted on the same cardboard side by side, the above conditions: that is, if the picture, as seen by the right eye, be mounted on the right side, and the other on the left side, then the distances between the corresponding points of the two pictures will de-

* Practically, these maxima and minima distances admit of a considerable range of variability, arising from the expansive capability of the eye (if I may so express myself) under difficult conditions.

crease from the foreground to the background; if the photographs, &c., be mounted in the reverse order, the distances will likewise be inverted, and will increase backwards.*

The photographs, therefore, of near objects taken by a pair of corrected lenses, whose distance apart is equal to that between the centres of the eyes, will possess the requisite conditions for producing a stereograph. Without the conditions of difference, no stereoscopic effect can be produced; and since these differences for distant objects are so slight as scarcely to be appreciable, binocular photographs without a foreground produce only *plane* not *solid* pictures.

The angle subtended by the axes of the two eyes converging to a point at a given object, is the parallax of that object; this parallax becomes zero at an infinite distance, in which case the axis of the eyes become parallel: as far as optical accuracy has attained, however, this parallelism supervenes within a mile or so; and, for practical photographic purposes, objects at a few hundred feet distance cease to give any stereographic effect. But the parallax of an object can always be maintained at a given quantity by increasing the base line, that is, by increasing the distance apart of the two lenses. By this expedient, the photographs of distant objects, as, for instance, of the moon, can be endowed with the requisite conditions for stereoscopic effect; and this expedient must never be omitted in practical stereography. It is a common error to regard perspective as stereoscopic effect. Most of the stereoscopic views of streets, avenues, bays, mountains, &c., for sale, are totally devoid of true relief; all that is produced by the stereoscope with such views is the superimposition of two similar photographs in true perspective producing a perfectly flat picture. For instance, with a pair of one-quarter tubes, let two binocular views be taken of a house having trees in front, of which the nearest is distant 200 feet from the observer; in one case let the lenses be 2½ inches apart, in the other 7 feet apart, and then mount the views respectively for lenticular observation in the stereoscope. The result will be as follows: in both cases we have perspective; but in the former case the picture is nearly flat, the trees being projected on the building, with but very little relief; whilst in the latter case the relief is much more marked, so that the picture *may be* a fac-simile of the reality condensed into a small space, in fact, a *stereograph;* or it may exhibit a decided distortion of relief, according to circumstances, which I hope to be able thoroughly to designate.

As a general occurrence, large objects, as, for instance, human beings, are seldom photographed at a less distance from the lenses than six feet; smaller objects frequently require a much shorter distance. Assuming, then, this distance as a starting point, and 2½ inches for the average distance between the eyes, the parallax for this distance is obtained as follows:—Let A and B represent the two eyes, and C the object, distant from A and B, six feet; then we have the propostion; as 72 inches : R : : 1¼ inch : Sine : parallax = 1 deg. nearly. In this way was obtained the following table:—

| Distance. | Parallax (doubled). Degrees. | | | Distance. | Parallax (doubled). Degrees. | | |
|---|---|---|---|---|---|---|---|
| feet. | deg. | min. | sec. | feet. | deg. | sec. | nearly. |
| ½ | 24 | 2 | 58 | 12 | 1 | 0 | ,, |
| 1 | 11 | 57 | 30 | 15 | 0 | 48 | ,, |
| 1½ | 7 | 39 | 0 | 18 | 0 | 40 | ,, |
| 2 | 5 | 58 | 12 | 21 | 0 | 35 | ,, |
| 2½ | 4 | 46 | 34 | 24 | 0 | 30 | ,, |
| 3 | 3 | 58 | 46 | 27 | 0 | 27 | ,, |
| 3½ | 3 | 24 | 40 | 30 | 0 | 24 | ,, |
| 4 | 2 | 59 | 4 | 33 | 0 | 22 | ,, |
| 4½ | 2 | 39 | 12 | 36 | 0 | 20 | ,, |
| 5 | 2 | 23 | 14 | ¼ mile | 0 | 0 | 32¼ sec. |
| 5½ | 2 | 10 | 14 | ½ mile | 0 | 0 | 16¼ ,, |
| 6 | 1 | 59 | 24 | 1 mile | 0 | 0 | 0 ,, |
| 9 | 1 | 20 | nearly. | | | | |

* This fact can be verified by taking a pair of compasses and expanding them so that the foot of either rests upon what you suppose to be the nearest point in each photograph, as for instance upon the nose of the nearest individual; lay off this distance on a piece of paper, or measure it on a scale. Then place the points of the dividers on the points you suppose the most distant in the landscape behind, and lay off as before; this latter distance will be less than the preceding. If there be no difference, the photographs are not stereographic.

From the preceding table it is evident that the axes of the eyes fixed upon an object at the distance of one mile have nearly half the same parallax as that of the sun; but to obtain this latter parallax was a practical problem of considerable difficulty, by reason of the approximate parallelism of the rays subtending this angle; we may hence regard all objects beyond the distance of a mile devoid of all practical parallax, and consequently *incapable of producing stereographic effect* at this angle.

But with a given parallax it is easy to derive the amount of displacement which must take place between the cameras in order that an object at any given distance may be photographed as if seen at the distance corresponding with the said parallax, when 2½ inches is the width between the cameras, and consequently that the photographs just taken shall produce the same stereographic effect as a similar proportionately diminished object placed at this nearer distance. For instance, it is required to find the distance between the cameras, so that an object situated one quarter of a mile off shall be represented as if seen at the distance of 6 feet.

Now the parallax for 6 feet is 2° nearly; therefore, taking the line C A in the preceding figure equal to one quarter of a mile or 1,320 feet, we proceed as follows:—

As R : 1320 feet : : sine 1 deg. : 53 feet = A D.

But the distance A D is only half the amount of displacement; hence the two cameras have to be separated 46 feet if an object is to be represented stereographically at the distance of one quarter of a mile. The following table was derived in accordance with the above formula:—

Table exhibiting the distances between the two lenses, in order that objects may appear stereoscopically as if photographed at the distance of six feet from the observer.

| Distance of the object from the observer. | Distance of the lenses apart. | |
|---|---|---|
| 25 feet ... ... | 0 feet | 10·49 inches. |
| 30 ,, ... ... | 1 ,, | 0·56 ,, |
| 50 ,, ... ... | 1 ,, | 8·95 ,, |
| 60 ,, ... ... | 2 ,, | 1·13 ,, |
| 75 ,, ... ... | 2 ,, | 7·41 ,, |
| 90 ,, ... ... | 2 ,, | 11·18 ,, |
| 100 ,, ... ... | 3 ,, | 5·88 ,, |
| 120 ,, ... ... | 4 ,, | 2·26 ,, |
| 125 ,, ... ... | 4 ,, | 4·36 ,, |
| 150 ,, ... ... | 5 ,, | 2·82 ,, |
| 175 ,, ... ... | 6 ,, | 1·30 ,, |
| 200 ,, ... ... | 6 ,, | 11·77 ,, |
| 225 ,, ... ... | 7 ,, | 10·24 ,, |
| 250 ,, ... ... | 8 ,, | 8·08 ,, |
| 275 ,, ... ... | 9 ,, | 7·02 ,, |
| 300 ,, ... ... | 10 ,, | 5·07 ,, |
| 325 ,, ... ... | 11 ,, | 3 07 ,, |
| 350 ,, ... ... | 12 ,, | 2·06 ,, |
| 375 ,, ... ... | 13 ,, | 1·01 ,, |
| 400 ,, ... ... | 13 ,, | 11·05 ,, |
| 425 ,, ... ... | 14 ,, | 9·96 ,, |
| 450 ,, ... ... | 15 ,, | 8·50 ,, |
| 475 ,, ... ... | 16 ,, | 6·96 ,, |
| 500 ,, ... ... | 17 ,, | 5·04 ,, |
| 600 ,, ... ... | 20 ,, | 11·68 ,, |
| 700 ,, ... ... | 24 ,, | 5·16 ,, |
| 800 ,, ... ... | 29 ,, | 6·84 ,, |
| 900 ,, ... ... | 31 ,, | 4·92 ,, |
| 1000 ,, ... ... | 34 ,, | 10·08 ,, |
| 1100 ,, ... ... | 38 ,, | 4·68 ,, |
| 1200 ,, ... ... | 41 ,, | 10·26 ,, |
| 1300 ,, ... ... | 45 ,, | 4·44 ,, |
| 1320 ,, or ¼ of a mile | 46 ,, | 0·84 ,, |
| 2640 ,, or ½ of a mile | 92 ,, | 1·08 ,, |
| 5280 ,, or 1 mile ... | 202 ,, | 1·02 ,, |

*Application of the preceding Table.*—Any object, or assemblage of objects, that might be comprehended on the stereographic glass plate at the distance of six feet, or at any other given distance from the camera, may be photographed at any other distance, and still retain the stereographic effect as if photographed at the given distances, as follows :—

*Example* 1.—At the distance of fifty feet there is a pic-nic party ; if the camera could be planted close by, or at six feet distance from the first object, it is known that the whole party would be taken in by a one-fourth tube on an ordinary stereographic plate ; but a small pool of water intervenes, what is to be done ? Look in the table for fifty feet ; opposite this number stands one foot nine inches nearly ; take, therefore, two camera stands, and place them each at fifty feet, or as near this distance as may be from the nearest central object in the view, and at the tabular distance apart, that is, one foot nine inches, and at the same elevation. If you are furnished with two separate cameras, focus either of them as an independent instrument ; if, on the other hand, you have a pair of tubes on the same camera, focus with the right tube from the left camera stand, and with the left from the right camera stand, taking strict care to mark the position of the camera on either camera stand.

As soon as this part of the operation is performed, take the view in the same order as you focussed, which is done of course by transferring the camera from one position to the other. In such cases it is always advisable to use longer focussed tubes, as, for instance, half view tubes, or whole view tubes, or even still longer ones, to compensate for the diminution of the size of the figures at the increased distances. By this allowance of distance between the camera, the proper relief is obtained when the two photographs are superimposed ; and by focussing as recommended in the latter case, where only a single camera is used, the prints do not require to be separated when mounted.—*Humphrey's Journal.*

(*To be continued.*)

## THE GREAT PHOTOGRAPHIC DUELLO.

[We subjoin an extract from the *American Journal*, in which Mr. Coleman Sellers describes the contest of Wet *v.* Dry Collodion, to which our American correspondent, Mr. Thompson, referred in a recent letter. It will be seen, as before intimated, that Dry came off victorious.]

The excursion was planned, on my arrival in New York, by Messrs. Thompson and Anthony, and was looked forward to with pleasure by me. The day came, and with it a bad headache. Thompson called for us at Anthony's store, in Broadway, and we were soon enjoying a ride through Central Park (seen by me for the first time), towards the High Bridge. The park had been well represented in my collection of stereographs, thanks to many kind friends, and it was with pleasure I saw and recognized the views I had admired so much on paper. The ride and fresh air relieved my aching head, but the pain came back with redoubled violence when we reached our destination, and the boxes and traps for wet collodion were to be carried. Thompson, the representative of Siccus, started off with five or six pounds under his arm, while Humidus trudged on, aided by his kind friend Anthony, who relieved him of half his load.

On the edge of the river bluff we pitched the tent, or rather developing box, and soon a plate was ready for the camera. But now the trouble began. The plates were fogged and useless, four were spoiled in succession, until my kind companion found a yellow envelope in his pocket, this he opened with care and fastened over the yellow glass window : this cured the evil, and I had the pleasure of making four or five good negatives (two being of the same view), and adding to my headache, until it seemed unbearable. In the meantime Siccus had scrambled over the rocks, and visited all manner of (to me) inaccessible localities, and exposed seven dry plates. Mr. Anthony stood by me in all my trouble, and added to my stock of knowledge many choice items of information.

The ride home and rest from the exertion of "wet photography" cured my headache ; I say the ride and rest, but perhaps more was due to the curative influence of my companions' wit and humour. It was a delightful merry ride. One little scintillation from their brains shall find a record here. We were talking about the "troubles of an amateur photographer in portraiture," and giving our experience as to the assurance of some folks in their demand for gratuitous work. One of my companions said, "Why, the other day quite a stranger sent me a polite request *to take his aged parent.*" "You did not see it, did you ?" exclaimed his companion. "No, I did not ; it was not apparent (*a parent*) to me."

I'll not take up your valuable space by telling all that I saw, in our secretary's sanctum ; enough, I took some lessons in dry photography. The end of the matter is, that I have barely four (one of these nothing to brag of) prints to send my friends, while Thompson incloses me in a recent letter seven prints, one from each of his seven dry plates, ALL *very good indeed.*

I have given a faithful history of my friend's success and my own failures. Some days afterwards, at Springfield, Mass., I did better. Starting from the hotel at 9 a.m., I rode to the country, then to the pine woods back of the lower water shops, making five stoppages. I secured fourteen negatives, twelve of which were good, the other two spoiled by the horse moving, that animal being the conspicuous object in the view ; we returned to the hotel in time for dinner, 2 p.m., having been gone five hours.

Mr. Thompson's box for dry plates is the best I have seen, and one is being arranged for me, by my carpenter, on the same plan. It will soon be done, and in my plate-box stand a goodly row of tannin plates awaiting exposure.

Having by the above "exposed myself," I am with due regard, Coleman Sellers.

## FATAL EXPLOSION OF GUN-COTTON.

The *American Journal of Photography* records the death, by an explosion of gun-cotton, of Mr. L. M. Dornbach, a photographic chemist of considerable ability, with whose name some of our readers may be familiar, through occasional extracts in our pages from American journals, to which he was a frequent contributor. We quote the details :—

"The death of Mr. Dornbach was, in consequence of injuries received by an explosion of gun-cotton, which occurred at one o'clock p.m., on the 21st inst. Mr. Dornbach, for the past six months, has been engaged in the manufacture of gun-cotton for use in the preparation of waterproof cartridges. The business was conducted on a much larger scale than was ever before attempted, the explosive material being manufactured a part of the time at the rate of hundreds of pounds daily. The peril of the business was fully appreciated by his friends, and Mr. Dornbach adopted many expedients to ensure safety, which his experience and his scientific judgment approved. Before he received the mortal injuries several accidents had occurred in his factory, in one case three hundred pounds of gun-cotton being exploded at once, demolishing a large three-storey brick building ; but in the accidents heretofore, fortunately no one received any personal injury. For the past two months the manufacture was carried on in a secluded part of Williamsburgh, and so far away from other buildings, that no danger could occur from it, outside the premises. On the fatal Saturday, two persons only were engaged in the factory, Mr. Dornbach, and his brother-in-law, Mr. George E. Hall, of Cambridge, Mass. At the time of the explosion Mr. Dornbach was engaged in packing the gun-cotton for shipment to Connecticut, in stout oaken casks of twenty gallons capacity, and intended for thirty-eight pounds of the cotton. A cask was nearly filled, and Mr. Dornbach was pressing down the cotton with a heavy stick, when a thrust, probably heavier than usual, ignited the mass. His hands, arms, and face were severely burned, and his clothes were set on fire ; but these injuries did not disable him, and he ran towards a small building which contained the hydrant, and where Mr. Hall was employed. Mr. Hall witnessed the explosion, and, with commendable presence of mind, at once directed a stream of water upon his friend. But this thoughtfulness of both at the terrible moment was of little avail, for another more fearful explosion took place, completing the destruction which the first began. Mr. Hall was much injured, but will recover. Mr. Dornbach's case from the first was almost hopeless : death relieved him from all suffering at one a.m. of the 23rd. His widow and child, his venerable parents, and many friends will never cease to lament his untimely removal from among them.

"Mr. Dornbach had by nature an inclination for the study of the physical sciences which could not be restrained. While a farmer's boy (in a district of Pennsylvania where science is little thought of), with nothing but his tastes to encourage him, he became an accomplished chemist. Afterwards, he entered the Scientific School of Harvard University, and graduated with distinction, securing the approbation of his instructors, and his classmates; there he systematized and made compact the knowledge which he had acquired in his earlier voluntary studies. While at the college, he translated from the German a profound treatise on crystalography, and performed other similar tasks, which entitle him to the grateful remembrance of men of science. He was a man of extraordinary vigour of mind and body, and, had he been spared, would have made his mark in the progress of science. He was well known to the photographers of New York, and to many in the country, as a manufacturer of photographic chemicals, and as a writer on photographic subjects."

## PHOTOGRAPHS OF THE EXHIBITION.

Photography in 1851 was a scientific curiosity. In the interval that has elapsed it has risen and spread from a chemical wonder into a commercial branch of art, that increases in value every day. In our first Exhibition there were not more than a dozen or so of Daguerreotypes and Talbotypes shown, and we believe there is not a single one of these sun-pictures in existence which records the interior of the beautiful old building in Hyde Park, with the truth and accuracy which belong to photography alone. Since that time, short as it may seem, photography has grown to be a distinct art—an art which has been made to subserve the strategy of war and the works of peace, which has been pressed into the service of science, till eclipses and comets are made to print themselves, and even the viewless winds compelled to leave the force and direction of their track recorded on paper. During the last five or six years there is scarcely a mode of life or learning into which photography has not been introduced, from the capture of a thief to the elucidation of some of the least known and most difficult of our scientific problems. If the Commissioners in 1851 had called for tenders to purchase the right of taking photographs in the building, what wonder would there not have been among the few amateurs who then had solved the mystery of taking pictures at all! Yet on the present occasion, when tenders were called for, there was an active competition among all the great photographic houses, which ended at last in the contract being given to the London Stereoscopic Company, for the sum of 1,500 guineas—a sum that has since been increased to nearly 2,000 for additional privileges. The first results of the efforts of this Company have now been given to the public in about a hundred large and small, plain and coloured, *carte de visite* views, and views adapted only to the stereoscope. The latter, as might be expected from the fame of this Company for such pictures, are among the best, and are really wonderfully good, when we consider the extreme difficulty of taking them. The light in the building is so extremely bad for photographic purposes, that at first it was believed that none could be taken there at all. This supposition was so near the truth, that even now, on bad days, it requires from 12 to 15 minutes' exposure of the plate to get a good negative; and when we remember that, in addition to this difficulty, the varied colours are so sadly metamorphosed in the process as often to destroy not only the beauty but the likeness of the picture, the care and cost required to get good views have been very great. Of these difficulties, however, there is no trace in the series which has just been issued. They are each as clear and sharp as instantaneous views, and the tinted views especially bring out every light and shade, and every tone of colour in the building. Here we see the nave as only photographers and policemen have the luck to see it—in the cool clear air of the early morning, when there is no dust, no cloud, when not a living being is visible over the whole expanse of the noble hall, when it looks like a fairyland of beauties undiscovered and unknown. In these pictures the statuary comes out with all the sharpness of high relief, and every column and rib of the nave may be counted. In some, such as the collection of glass in the English and Austrian Courts, the effect is more than stereoscopic—it is an optical delusion; less a picture of the places as we see them than the places themselves. The quaint, funny monstrosities of the Japanese Court are here reproduced to the life; here we get the long vista of ponderous wheels and thrusting pistons of the Machinery Annexe; here we find the Picture Galleries as visitors have never found them yet—quiet and empty; and here, above all, are the best specimens of the statuary. The tinted Venus of Gibson is so tinted as to avoid the discolouration of the marble, which, in the original, gives the goddess the appearance of having dirty legs; the veiled figures of Monti come out with beautiful distinctness; and the pale earnest features of the Reading Girl are copied with all the force of the statue itself. This latter is apparently the popular picture, as nearly 200 gross of its copies are sold per week. Some of the best gems of the Roman Court are among these pictures, though it is much to be regretted that, up to the present, no permission has been obtained to copy two of the finest works in it—Storey's beautiful statues of Cleopatra and the Sibyl. On the whole, this pictorial record of the finest Exhibition that has yet been held, is in every way worthy of the advance the chemical art has made since our last World's Fair in 1851. These views will be enduring records of what we did in 1862, and the only regret we feel in looking over this wonderful delineation is, that the art was not sufficiently advanced to have served the same purpose for our first great effort in 1851. Many more views have yet to be brought out before the series is complete. If they are only as good as those already issued, they will reflect high credit on the Stereoscopic Company.—*Times.*

# Correspondence.

## DISCOLOURATION OF SILVER BATH, ETC.

Dear Sir,—I have often wished, like many another photographer, that some means were devised to avoid the necessity of decolourizing the silver bath used for sensitizing albumenized paper. The published plans I have tried succeed only for a short time, or at the expense of the silver in the bath. I have now a printing-bath which has been in use for some weeks, sensitizing albumenized paper of various sorts; it is as clear and colourless as when first made, and has no sediment.

The obtaining such a treasure being, I may say, a happy accident, I am unable to give a formula for making it; but if I give the history of the bath, I am in hopes that you, or one of your readers more versed in chemistry than myself, may be able to suggest whence its good qualities are derived.

It was converted from an old negative bath by the process given in "Hardwich's Manual," viz., the iodide being thrown down by citric acid, which was afterwards neutralized, and the acidity just restored by nitric acid. After such an operation, what extraneous matter can there be in the bath? Possibly some alcohol and ether, though the quantity of these remaining must be small, seeing that the solution was concentrated by heat from 30 grains to 80 grains to the ounce.

The enlargement of photographs being at the present time an especially interesting subject, I am induced to enquire if you or either of your contemporaries have noticed in the Belgium Gallery, at the International Exhibition, an enlarged portrait of, I think, the Comte de Flandres. It is by Ghemar, of Brussels (Class XIV, No. 358). I thought it the finest enlargement I saw, as regards uniformity of definition. I find no notice of it by the Jurors, but that, you will agree with me, is no reason it should not receive honourable mention in other quarters, if deserving it.—
Yours truly, G. S. Penny.

*Cheltenham, August* 8, 1862.

[It is somewhat difficult to say what may be in an old negative bath. Mr. Samuel Fry has more than once described a method of making a silver bath with common water, which did not discolour, and we have seen in his atelier large baths which were perfectly clear after long use; but the plan does not always answer, "common water" being a rather indefinite term. We have more than once referred to the portrait of the Comte de Flandres, by Ghemar, as the finest enlargement in the Exhibition. You will find some particulars regarding it on pp. 39, and 289 of the preset volume.—Ed.]

## Talk in the Studio.

Photographs of Rome.—A fine and interesting series of photographs of the various treasures of architecture, sculpture, painting, &c., in Rome, produced by Mr. Macpherson, is now exhibiting in one of the rooms in which the Architectural Photographic Association held their exhibition, in Conduit-street. The number of pictures is between four and five hundred, of which one hundred and thirty are devoted to the Vatican sculptures. The interest of the subjects of these pictures does not require one word of comment, and the photographs are for the most part very good. We commend such of our readers as have the opportunity, not to lose the chance of inspecting them.

Photo-Zincographs for Reproduction.—More than once we have suggested the reproduction of rare old books—such as "Shakspeare's Sonnets"—by the new process of photo-zincography. By this process, which Sir Henry James has applied to a reproduction of "Domesday Book," every beauty, every flaw in the type, every peculiarity of punctuation or division in the arrangement of letters, is preserved. How important such trifles may become, has been recently shown by M. Philarète Chasles, in his letter on the publication of "Shakspeare's Sonnets." The idea has been taken up by Mr. Lovell Reeve, who is about to issue a fac-simile of the first edition of the "Sonnets," taken by this new process from the famous copy in the Bridgewater collection. This fac-simile we have now before us, and we cannot imagine a more perfect or interesting present to a book collector, or even to a reader of Shakspeare. The dedication of the sonnet will enable every one to judge of the value of M. Philarète Chasles's discovery. Lord Ellesmere deserves every credit for allowing this fac-simile to be made. Mr. Reeve, we are glad to say, proposes to issue other important books in the same style. "Much Ado about Nothing" is already in hand.—*Athenæum.*

Formic Acid.—A correspondent says, I have tried formic acid in the negative developer, as mentioned in No. 202 of the Photographic News, p. 339, and think it answers perfectly oven without the addition of nitric acid to the bath.

Photographs of Volunteers.—We were recently favoured by Mr. D. Combe, photographer, of Cheapside, with an inspection of a selection of portraits of Volunteers belonging to the City of London Rifle Brigade, of which he is a sergeant. The portraits were mounted in a handsome album, and had been prepared for presentation to His Royal Highness the Duke of Cambridge, Colonel of the regiment, at the annual inspection of the brigade. It contained excellent photographs of Lieut.-Col. Warde; the late Lieut.-Col. Montague Hicks; the Honorary Chaplain, the Rev. Thomas Dale, M.A., Canon of St. Paul's; Drs. Attkins, May, and Prophert; Captains and Adjutants Ewens and Smith; Sergeants-Major Southgate and Talbot; Musketry Instructor Grainge; the captain, lieutenant, ensign, and one sergeant, one corporal, and one private of each of the sixteen companies forming the brigade, and a group of the cadets. The album bore the following dedication: "To His Royal Highness the Duke of Cambridge, K.G., G.C.M., G.G.C., H.K.P., General Commanding-in-Chief, Colonel of the London Rifle Volunteer Brigade, these photographs of the officers, staff, non-commissioned officers, and some of the privates of the London Rifle Volunteer Brigade, are, by gracious permission, most respectfully dedicated by the artist, His Royal Highness's most obedient servant, D. Combe, Sergeant of N. company." His Royal Highness examined the photographs, expressed his admiration of their execution, and having graciously accepted the gift, thanked Sergeant Combe for his appropriate present.

Clean Fingers.—A correspondent says:—I would suggest for the benefit of your readers, who wish to keep their fingers clean whilst developing, that on removing the plate from the slide one corner should be wiped with a dry cloth just enough to take hold of; the liquid will not flow over the wiped part.

Holder for Cleaning Plates:—A correspondent says:—I send you a description of a plate-holder I use for cleaning glasses; it consists of a piece of board twelve inches square, two pieces of flannel the same size as the board are then laid on it, and then a piece of American cloth rather larger than the board (shiny side upwards) is stretched tightly over it, and secured at the edges with tacks. The glass to be cleaned may be laid on it, and will bear any amount of rubbing without becoming detached.

## To Correspondents.

F. P. J.—It is probable that your bath has a large accumulation of ether and alcohol, to which may be attributable your difficulty in getting the solution to run evenly over the plate. In this case exposing it for some hours in an open vessel, in a warm place, will evaporate some portion of the ether and alcohol. The effect may arise also from the use of a collodion giving a very repellant film. A change of collodion will test that. In any case the repeated moving of the plate in the bath, both laterally and up and down, will aid in causing the solution to flow evenly, by facilitating the evaporation of ether, &c.

D. Padgham.—See first article in the present number. The slight yellow tint of which you speak is very easily obtained, as it simply arises from sulphur, and is produced by the use of an acid fixing bath. It is, however, generally a sign of commencing decay, and such prints generally fade. Your toning bath, if not exhausted or decomposed, but merely inert, may generally be made active again by the addition of a little freshly made toning solution, of the same kind, or a little of a solution of chloride of gold.

G. M. E.—The purchaser of any lot of photographs at a public auction, has a perfect right to dispose of them as he thinks proper, and can be in no wise compromised by the use to which they are put by persons to whom he may sell them. If any copyright exist in the pictures, the person who violates that copyright only is responsible, and not the person selling them to him.

F. M. Y.—The extension of the body of the camera depends entirely on the size you wish to copy. If you wish to reproduce objects or pictures the same size as the original, the camera must be extended to just double the solar focus of your lens. The size of the box to be added to the camera must of course depend on the length to which the camera already extends. With your No. I triple, the equivalent focus of which will be a fraction under eight inches, the camera will require to be extended for objects the same size 16 inches. 2. No rule can be given for exposure, it must always be ascertained by experiment. Not only the kind of collodion, and the condition of bath, but the time of day, the time of year, kind of object, strength of light, and a variety of other conditions, will influence the matter. From one minute to three may be a rough approximation.

Robert Boyne, and some other correspondents.—The address of Mr. Bailey is, "Chemist, Wolverhampton."

J. Lewis.—M. Poitevin's treatise on "Photography without the Salts of Silver," is published in Paris at four francs and a half, and may be had of Lieber, 13, Rue de Seine.

T. A. S.—It is probable that you do not tone sufficiently deeply. We can tell you better on seeing a specimen. Remember that it is necessary to all the prints to become deeper in the toning bath than is required in the finished print.

Actinic.—A third piece of glass forwarded by this correspondent since Nos. 1 and 2, has been examined in the spectroscope. It is decidedly better than either of the others, and might safely be used in cases where a very brilliant light did not shine on the window. It is not, however, so adactinic as a good sample of silver coloured glass.

J. B. B.—The spot of light in the middle of the picture is a trouble which frequently occurs where portrait lenses, with small central stops, are used for landscapes. We have not met with it ourselves, and cannot state certainly either the cause or the remedy. It is attributed by some to diffraction, consequent upon the use of a very small central stop; and by others to reflection from some defect in the mounting. If it be the latter cause, the maker will doubtless remedy it. If the former, try the use of a little larger stop.

F. B. T.—Your ether has probably become ozonized Exposure to light and air has a tendency to spoil it for photographic purposes. The thin grey image you describe would arise from such a cause. If your bath, &c., work well with other collodion, only failing with the sample made from old ether, it seems easy to fix upon that as the cause. We can only recommend you to use this batch of collodion for cleaning plates.

L. M. C.—The ammonia should not be applied to dry plates in your usual dark room, as the vapours of ammonia are very detrimental there, and apt to cause fogging, &c. For the purpose of trying the experiment you must fit up an *impromptu* dark room. An old iodizing box, such as was used in the Daguerreotype process, will answer admirably for the experiment, we should think. We shall be glad to learn the results.

M.—Very foolish indeed, since a reference to our pages shows the statement to be simply untrue. Palpable falsehoods are not worth the trouble of denying, and we do not intend to notice the matter further. It is an old game, to obtain gratuitous advertizing. 2. Glass transparencies may be toned in a variety of ways. The old method of toning paper prints with a bath of hypo and gold, may be used; bichloride of mercury, followed by dilute hypo, or ammonia may be used, and some other methods. As a matter of taste, however, we prefer the warmer tones. Where the wet process is used, and camera printing, the free use of acetic acid, both in bath and developer, gives a fine warm tone. We have obtained various tones of purple and ruby, even with iron development by this method. Expose well and develop rapidly.

S. G.—For enlargement, a very perfect negative is necessary. The specimen sent is defective only in this particular: the enlargement is very good indeed, but the original negative has not been sufficiently perfect for the purpose. The slight, crapy lines running diagonally, which would probably scarcely show at all in the original, are here very palpable. It is not sufficient that a negative for enlargement be very perfectly defined up to the edges, and full of detail; but it must be as free as possible from structural workings in the film, and pin-holes or irregularities of any kind, as all these things contribute to produce coarseness when magnified in the enlargement. A negative for enlargement should not be varnished. The tone of your print is very good, but a little too inky for our taste.

Al Fresco.—It is purely a matter of personal choice; some operators prefer a tent in which they are entirely enclosed, and others merely a dark-box in which the hands and arms only are placed, the operations being watched through yellow glass. We know some first-class professional photographers who adopt each method. Of the two operators who have produced the best instantaneous marine pictures of the day, one works in a tent, the other in a dark-box. We cannot advise you which is best. Many photographers simply wash the developed plate, place it in a box and fix at home.

W. Tucker, R. Fowler, C. M. Smart, W. Mayland, and Thomas Ratcliffe; Received with thanks. Attention at an early date.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 207.—*August* 22, 1862.

## REGISTERING PHOTOGRAPHS.

It may, probably, be interesting to our readers, and save some of them delay and trouble, if we describe exactly and in detail the steps which have to be taken in securing, by registration, the copyright in any of the photographs which have been for the first time sold, or published, since the passing of the new law of fine-art copyright, on the 29th of last month. The first step is to procure from the registering officer of the Stationers' Company a printed form, with blanks, which require filling up. The Hall of the Company is in Stationers' Hall Court, which leads from the west-end of Paternoster Row to Ludgate Hill; the Register Office is at the right-hand corner, on passing through the gate. The following is a copy of the form of memorandum to be filled up:—

MEMORANDUM FOR REGISTRATION UNDER COPYRIGHT (WORKS OF ART) ACT.

I, of , do hereby certify, That I am entitled to the Copyright in the undermentioned Work; and I hereby require a Memorandum of such Copyright [*or*, the Assignment of such Copyright] to be entered in the Register of Proprietors of Copyright in Paintings, Drawings, and Photographs, kept at Stationers' Hall, according to the particulars underwritten.

| Description of Work. | Date of Agreement or Assignment. | Names of Parties to Agreement. | Name and Place of Abode of Proprietor of Copyright. | Name and Place of Abode of Author of Work. |
|---|---|---|---|---|
| | | | | |

Dated this day of , 186 .

(Signed)

*To the Registering Officer of the Stationers' Company.*

*N.B. Office Hours from Ten to Four.*

Under the head, "Description of Work," the photograph to be registered must be briefly described, using as few words as possible, but mentioning the distinctive characteristic or difference; thus, for example, "A photograph of Lord Brougham, standing, head in profile, arm extended." It is not necessary to specify the size, the registering officer suggesting, that since a copyright is obtained in the picture registered, and in all copies of it, whether smaller or larger, it is undesirable to say anything about size.

Some pictures are easy to describe, others difficult; but in all cases it will be wise to append either a print from the original negative, or a small copy of it, since the act permits a "sketch, outline, or photograph" of the work to be protected, to be entered in the registration. In ordinary cases, where the photographer is registering his own work, the next two columns will simply require the word, "none," filling in each; but in case any assignment, or sale, of a negative, in which it is desired to secure a copyright, an agreement in writing must be made, stating whether such copyright is acquired by the buyer, or retained by the seller, and the names of both, with their addresses filled in their proper place in the form. In all cases the name and address of the photographer must be filled in its place. The memorandum must be signed by the owner of the copyright or his authorized agent.

For each registration, a fee of one shilling is charged; and each picture, no matter how many in a series, is made the subject of separate registration. Copies of the form of memorandum, for filling up, are sold at one penny each; we should recommend photographers with copyrights to register, especially those residing in the country, to procure a small stock of the form of memorandum: these, with copies of the photographs, and the proper fees, can then be forwarded from time to time without any trouble, either by the hands of an agent or by post.

The process is a very simple one, but we have detailed the steps to be taken for the especial benefit of our provincial readers, as the authorities of Stationers' Hall cannot enter into explanatory correspondence in reference to registrations.

As a commentary upon our remarks on a former occasion, regretting the ambiguity of some of the phraseology of the act, we may mention that, on our presenting ourselves with some photographs to register immediately after the passing of the act, we were informed by the registering officer that no such registration could take place until a sale had been effected, in which case a memorandum, stating to which of the persons concerned in the agreement the copyright belonged, could be duly entered. These were the instructions he had received from the legal adviser of the Stationers' Company. After a long conversation on the subject, he resolved to consult again with the lawyer, and courteously promised to let us know the result. In a few days we received an intimation that the registration could be effected in the way we desired, without any sale, in the manner we have just described. If the reading of the Act, as interpreted in the first instance by the registering officer, had been correct, a factitious sale must, in all cases, have been effected before the registration could have been made, and the copyright secured.

## THE REVISION OF AWARDS IN THE EXHIBITION.

Our announcement relative to a revision in the Awards of Jurors in the International Exhibition, appears to have given rise to some misconception. We spoke of *revision*, and referred to a *corrected* list. It appears, however, that some of our readers have understood from this that a *reconsideration* of the awards was to take place, by which the decisions of the Jurors might be amended. This, however, was impossible, however desirable it might have been in some cases.

The Juries were dissolved on the completion of their work, and no alteration in their verdicts, could, under any circumstances, be made. The revision we announced, simply consisted in revising and correcting the official list of awards published by Her Majesty's Commissioners, into which, owing to the haste with which it was prepared for the press, many errors had crept. A revision of this kind is really more important to those whom it may concern, than a reconsideration of the decisions would have been. An award secured by a reconsideration of the case, would have implied in many instances, that the merit was at least doubtful; but the addition of a name omitted by inadvertence, is merely the late publication of a deliberate award. These errors consist, in some cases, of the entire omission of names in the hurry of transcribing, in others of the insertion of wrong names, from the mark indicating an award standing equally near to two numbers in the catalogue. In some cases the phraseology stating the reason for an award, is, through wrong transcription, incorrectly given. In all these cases the errors will be corrected, but it should be distinctly understood in all cases, that these corrections merely consist in a rigid adherence to, and exact statement of, the final decisions of the Juries, no power existing by which a single award could be altered in the verdicts of the Jurors after they were delivered. The complete list in its corrected form will be published shortly, with an explanation of the causes of error in the first edition.

## Scientific Gossip.

STEREOSCOPIC PHOTOGRAPHS OF THE ORGANS OF VOICE IN ACTION—SILVERING GLASS AND OTHER SURFACES.

THE photographer has carried his art into the most inaccessible regions of the earth; the glorious panoramas visible from the summits of Alpine peaks have been fixed and brought down for the admiration of the non-mountaineering section of the public; his instrument has been lowered to the bottom of the sea, and brought up again with an impression of the kind of ground on which mermaids and sea-serpents are supposed to exercise themselves; the heavenly bodies floating in space, have by his art been made to draw their own likenesses; the minute microcosms in a drop of water, and those elementary cells, hovering, as it were, between the confines of the animal and vegetable, have been self-imprinted in all their magnified beauty, disclosing new secrets to the earnest student; catacombs, grottoes, and caverns deep in the bowels of the earth have been illuminated by the electric light, and their hidden wonders fixed on the sensitive plate; but all these achievements fall short of one which has recently come under our notice —obtaining photographs of the interior of a living human body. For some years past it has been known that instruments had been devised by which those organs concerned in the production of the voice could be rendered visible. Mr. Garcia was, we believe, the first who brought the glottis and its movements during speech under the cognizance of our eyesight, and in 1855 he exhibited, at the Royal Society, his instrument, and at the same time described some of the results he had obtained with it in reference to the mechanism of the voice. Only a very limited portion of the whole extent of the glottis could, in this manner, be brought into view, and the instrument remained very incomplete until recently, when it may be almost said to have been brought to perfection in the laryngoscope of Professor Czermak. By means of this instrument the whole glottis and the adjacent parts are clearly seen; its condition during vocalization and the changes of the cords in the production of the different chest and falsetto notes, become patent to the eye; and the ingenious contriver has actually succeeded in producing photographs, nay, even stereoscopic views of the phenomena. It is needless to enlarge on the physiological value of this visual test, applied to the various speculations on the voice. We may notice it here, as a conspicuous example of an unseen process in the human body which has remained hidden through all by-gone time, being in our own day brought fairly into light and fixed by the wonderful art of the photographer for the benefit of all future students in this branch of science.

An invention, which may be of some importance to the photographer has just been made public, having for its object the precipitation of a film of perfectly bright, pure silver into a surface of glass. The inventor, Mr. Cimeg employs a mixture of ammonia, nitrate of silver, and a solution of Rochelle salt (tartrate of potash and soda); this mixture is applied to the surface of glass to be silvered, and after a short time the metal is deposited on the glass as a bright film. The silver is thrown down at the ordinary temperature of the air; thus it is not necessary to heat the surface as when other mixtures are employed. The film of silver may be strengthened by depositing over it a cheaper metal, such as copper. The process above-described is also applicable for silvering other surfaces; for example, it is very useful for giving a metallic and conducting surface to articles into which it is desired to deposit copper by electricity, where the article itself is not a conductor. The surface of paper, or of a woven fabric or other similar surface, may be silvered by first depositing the metal on to a polished surface, such as glass; the fabric may then be attached to it by suitable cement, when the whole may be stripped off together. This process is likely to be of considerable interest to experimenters. We have seen some very good results obtained by the ordinary Daguerreotype process, employing a plate of glass, silvered by Liebig's process: the effect produced being very similar to that of an ordinary collodion positive. We think good effects might be also obtained by preparing the silvered glass plate with iodine and bromine vapour, as in the Daguerreotype process, and then after exposure, developing with pyrogallic acid, as suggested by Mr. Kingsley. For the benefit of those who may wish to experiment with this process, we give the full particulars of the manner in which Mr. Cimeg prepares his solutions, &c. The sheet of glass, previously washed clean with water, is placed upon a table, and the whole surface rubbed with a pad of cotton or other soft fabric, wetted with distilled water, and afterwards with a weak solution of Rochelle salt in distilled water, about one part of salt in 200 parts of water. A solution of ammonio-nitrate of silver is then prepared, by adding nitrate of silver to ammonia of commerce, very gradually, until a brown precipitate commences to be produced; the solution is then filtered. For each square yard of glass to be silvered a quantity of this solution is taken containing 20 grammes (about 309 grains), of nitrate of silver, and to this is added as much of a solution of Rochelle salt in distilled water, as contains 14 grammes of salt: the strength of this latter solution being so adjusted to that of the silver solution, that the total weight of the mixture of the two in the quantities above mentioned may be 60 grammes. In a minute or two after the mixture is made it begins to become turbid, and it is then immediately to be poured on to the glass, which has previously been placed on a perfectly horizontal table; the plate, however, being temporarily blocked up at one end so as to give it an inclination of about one in forty. The liquid is poured on to the plate at the higher edge, so that it may run towards the lower; the pouring being done in such a manner as to distribute the liquid over the whole surface of the plate, without allowing any to escape at the edges. When this is effected the plate is placed in a horizontal position, at a temperature of about 68° Fah. The silver will begin to appear in about two minutes; before the expiration of ten minutes the plate will be covered, and in thirty minutes sufficient silver will be deposited for most purposes (about 2 grammes per square yard). The mixture is then poured off the plate, and the silver it contains afterwards recovered. The silvered surface of the glass is washed by pouring water over it four or five times, and the plate is set up to drain and dry. If it is required for photographic purposes, it may be used at once, only needing perhaps a polish with fine leather or cotton wool; but if it is intended to utilise the brilliant reflecting surface which the metallic mirror presents, it must be varnished. The inventor prepares the varnish of the following materials, viz.: gum dammar 20 parts, asphalte (bitumen of Judea), 5 parts, gutta-percha 5 parts, benzol 75 parts. This varnish dries, and sets hard on the surface, and the glass is then ready for use as may be required. Instead of varnish a layer of copper may be deposited over the silver by the electrotype process, and if this is made of a suitable thickness, the two metals may together be stripped off the glass, producing a sheet of highly polished plated copper. Plates and surfaces of other non-absorbant materials which will not act chemically on the silver solution may be coated with silver in the same manner as plates of glass. In order to silver paper, woven fabrics, and other materials, the metal is first deposited on to a plate of glass as already described; then a varnish is poured over the silvered surface, consisting of one part of gum lac dissolved in from six to ten parts of wood spirit. When this varnish is dry and hard, a solution of one part of gelatine in from six to ten parts of water is also poured over, and allowed to set into a jelly; the paper, leather, woven fabric, or other similar material to be silvered, is then laid on and pressed in contact with the jelly, when it is left to dry thoroughly; afterwards the material with the silver is stripped from the surface, and the process is complete. This process, which we ought to state is patented, is likely to prove of considerable use to electrotypists in coating their moulds of wax, gutta-percha, or similar material, with a conducting film; the article will only require to be placed in this prepared silver solution for it to become in the short space of twenty minutes or half-an-hour thoroughly coated with a metallic film of the reduced metal.

## Critical Notices.

### PHOTOGRAPHS OF VIEWS AND ARCHITECTURE IN CAMBRIDGE. By W. Mayland.

This series consists of a variety of landscapes in the neighbourhood of Cambridge, and of interior and exterior views of some of the architecture in that city. As a whole, these photographs are worthy of high commendation, the subjects are interesting, the treatment is artistic, and the photography nearly faultless, the delicacy of manipulation reminding us in many respects of the pictures of Mr. Vernon Heath.

"The Robinsou Crusoe, from Sheep's Green," is a 12 by 10 photograph of a noble old tree, the spreading limbs and graceful foliage of which are beautifully rendered. A great charm about this picture is found in the *entourage* of the tree, which is the principal object. A rustic cottage, embowered in foliage, small trees, and shrubs, with water in the foreground, reflecting the foliage, all combine to produce a picturesque effect. An opening in the foliage, showing the windings in the river, and giving distance, and a couple of youths fishing, helping the composition without disturbing the repose or destroying subordination, complete the picture.

"The Library, Trinity College," is one of the most perfect interiors we have met with. The noble and magnificently equipped and arranged library, presents a vista of apparently from a hundred and fifty to two hundred feet, the whole of which possesses satisfactory definition in every part, the perfection of which, and of the half tone and modelling throughout, gives a most marvellous effect of monocular relief, scarcely surpassed in the stereoscope. A memorandum on the corner informs us that the negative was taken in winter, with an exposure of fifteen minutes, iron development, and the full aperture of a Dallmeyer's triple lens for 12 by 10 plates. This print is 13¼ inches by 10½ inches, and possesses very satisfactory definition. The picture is both soft and vigorous; brilliant and full of relief, but without black shadows or patches of white without drawing.

"Kings College Chapel" is an excellent piece of photography, but scarcely an artistic picture, the building completely filling the plate; there is sufficient definition up to the edges of a picture 13½ inches by 10½ inches, and vigourous freedom from distortion, the architectural lines being perfectly straight at the extreme edges.

"St. John's, from Trinity," is a fine landscape, with the river in the foreground, the distant college being seen through an avenue of well defined foliage. "King's College from King's Meadows," and "Ditton," are two equally fine pictures.

"Thorwalsden's Statue of Byron in the Library of King's College," is a very perfect photograph, well rounded and soft, of a noble piece of sculpture. The interior of the library, indicated but not made out, forms an excellent background for the statue.

"The Avenue, Trinity College," is a charming piece of photography of a good subject. The sun glancing through the trees, athwart the avenue, and interlacing the walk with the long east shadows of the trees and their branches, giving it a most fantastic effect.

"King's College Chapel." This is a vignetted print of a very pleasing composition; the many pinacled building is in the middle distance, the foreground consisting of a mass of fine foliage. The time is winter, and the boughs of the leafless trees bend under heavy masses of snow, which is very finely rendered.

Two views of the interior of Trinity Chapel, one looking east, and the other looking west, are marvellously fine views of a very noble building. Every detail of the old and dark carving is made out, the shadows are rich aud transparent, and the prints are full of relief and vigour. The negatives were taken by a 6 by 5 triple, but these prints are 7½ inches by 6½ inches, thus giving a very wide angle, including a large portion of each side of the interior, whilst the definition is very fine throughout. The stereoscopic effect given by these single pictures is very striking. A view of the cloisters in Trinity College has the same characteristic. This is a very charming photograph, the lighting, the point of view, the amount of softness and detail, and great brilliancy, all displaying the taste, judgment, and manipulatory skill of the operator in a pre-eminent degree.

We recently referred to Mr. Mayland's card portraits as amongst the finest in the International Exhibition: the series before us affords evidence that his skill in landscape and architectural photography is not inferior to the ability displayed in his portraits. The artistic qualities of his pictures are good, whilst in care, delicacy, attention to minute details, freedom from slovenliness or manipulatory faults, uniform and good printing, they are unsurpassed.

### PHOTOGRAPHS FROM ENLARGED NEGATIVES. By W. H. Warner, of Ross. London: H. S. Warr, High Holborn.

Our readers will recognize the name of Mr. Warner as a frequent correspondent in our columns, and they will also be familiar with his announcement in our advertising pages, undertaking to produce enlarged negatives for amateurs and the profession. The photographs before us are specimens of the excellence to be obtained by the method of enlargement adopted, which is that described in the Photographic News Almanac for this year, and brought into recent notice by Mr. Heath's paper, at a late meeting of the Photographic Society. The method consists in producing an enlarged negative from a small one at two operations, a transparent positive being first obtained, and from that another negative. The whole of the specimens before us are on whole plates, and are enlarged from stereoscopic negatives; the amount of enlargement is not, of course, limited to this proportion, but Mr. Warner finds that an enlargement of this extent is pre-eminently satisfactory. These specimens are duplicates of some which appeared in the British Department of the International Exhibition, and were removed on account of injury from the damp walls.

To those interested in this mode of enlargement, we especially commend a view of the South Aisle in Hereford Cathedral, which is, in every sense, a very fine picture, and an excellent specimen of enlargement. As a picture, it is beautifully lighted, and a charming specimen of breadth. Architectural subjects, it will be readily seen, are trying tests for definition in this mode of enlargement, inasmuch, as unlike many subjects, portrait busts for instance, the necessity for fine definition, is not confined to a portion in the middle of the plate, but is carried to the extreme edges. This specimen and many similar ones, are therefore valuable as showing the amount of definition to be secured by the process.

The "Blind Harper, Raglan Castle," is another picturesque photograph and excellent enlargement. "Oscar," a fine portrait of a handsome dog, is also fine. A Norman doorway in Ludlow Castle, and another in Kilpick Church, as well as some others, also satisfactorily illustrate the excellence of the method, and are in themselves interesting pictures.

As our readers know, we have always recommended this mode of enlargement, feeling well convinced that by its judicious use a sufficient amount of definition could always be secured, whilst, in some instances, the sharpness is in no perceptible degree inferior to that of the original. The facility of securing many beautiful results with small apparatus, difficult or impossible with larger instruments, and the temptation to reduce the amount of *impedimenta* whilst on photographic rambles, are, we think, strong inducements to the amateur to be content with obtaining perfect small negatives, with a view to the subsequent production of large pictures from enlarged negative.

## PHOTOGRAPHS OF VARIOUS VIEWS. By Ernest Edwards. London: Published by McLean, Melhuish, and Haes, for the "Amateur Photographic Association."

The series of photographs before us is a striking illustration of the value of the Amateur Photographic Association, in affording a ready way for the amateur to publish his productions without entering the ranks and competing with professional photographers.

From the catalogue of the Association, we find that Mr. Edwards contributes not less than one hundred and nine negatives, prints from a dozen of which we have before us, and we may add that if the bulk be anything like the sample, which we do not doubt, Mr. Edwards may not only claim a very high position in the amateur ranks, but may ably try conclusions with some of our best professional artists.

The first print which arrests our attention is a view of King's College Chapel, Cambridge, from a similar point to one we have just noticed above. This is, however, a summer scene, in which the wooded foreground is thick with leaves instead of snow; and although both are excellent photographs, we prefer the effect of the summer picture, the leafy entanglement being highly picturesque; whilst the light, graceful form of the building, seen through and above the trees in the distance, has a very charming effect. There is a fine atmospheric tint in the sky, and the picture is tastefully vignetted. Altogether this picture is a photographic gem.

"Ryde Pier and Steamer."—This is an instantaneous picture, and is in no respect inferior to that we have just noticed: it is a fine composition, and is delicate, soft, and transparent.

"Whippingham Church" is a very excellent photograph of the church which Her Majesty has recently rebuilt at Osborne. There is a little under-exposure in the foliage, and this is scarcely, we think, the best view of the building, which is, however, one of which it is somewhat difficult to obtain a suitable position for getting the best effect.

"Netley Abbey, East Window," is one of the most charming photographs of the series, exquisitely brilliant, and perfect in chiaroscura, it is at the same time delicate and soft in the extreme; the climbing foliage, almost bridging the chasms in the broken arches, is very beautiful. Some other views of the ruins of this fine old abbey are equally good.

"Anchor Church, Derby," and "A Cleft in the Rock, Anchor Church," are two good photographs of natural curiosities, the chief charm in which, pictorially, consists in the beautiful rendering of the mass of luxuriant vegetation with which the rocks are overgrown, creeping plants, and grasses of all kinds, intertwining in fantastic wreaths. These would form fine subjects for the stereoscope, but they scarcely make pictures.

A statue of "Silence," in the Fitzwilliam Museum, is a charming photograph of a charming piece of sculpture. It is illuminated chiefly by a side light, and in the point of view selected, the camera is directed to the shadowed side of the figure; the attempt is a dangerous one, but the result is very beautiful when it is successful, as it is here. The vignetting is very judiciously managed.

The "Shield of Achilles" is a fine piece of photography, rendering with great delicacy every part of the magnificent design, and doing full justice to the *relievo*, a task not always easy with a bronze surface.

"The Library, Trinity College," is a beautifully executed small interior of this magnificent library.

The whole of Mr. Edwards' pictures are characterized by fine feeling and great delicacy of manipulation. It is only right to add that the printing is uniformly good, the prints are of fine tone, and the vignetting judiciously managed, the whole reflecting great credit on the firm who print for the Association.

## THE INUNDATIONS IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

As we passed the Magdalen Fen engine, I was much surprised at its unwonted state of activity. The large drain made to convey the waters thrown out by its wheel into the river Ouse, and which was usually nearly empty, was now full from bank to bank, and the surface of the water was covered with yeasty foam, caused by the laborious efforts of the engine to lessen its quantity. We learned, on enquiry, that the pig-headedness, if not something worse, of the occupiers and labourers on the inundated side had occasioned this unusual strain upon the Magdalen engine. It appears that immediately upon the breaking of the bank the Magdalen Fen men eagerly rushed to the culverts,† and stopped them up; but in the night some persons, actuated by the insane notion that if the waters were allowed to run through these outlets, it would lessen the quantity on the submerged land, opened the communications again; and in the morning there was a lake of about the area of 50 acres to greet the terrified gaze of the Magdalen Fen men. They proceeded at once to prevent the increase of the evil, by stopping up the outlet once more, and to prevent a repetition of the mischief, left it guarded night and day. We now turned into a narrower road, and in about eleven minutes we were at the foot of a bridge now useless, for all traces of the path beyond were obliterated by the cruel resistless waters now raging before us.

I shall not easily forget the impressions produced by the first sight of this extraordinary scene. I had, during our ride, endeavoured to picture it, but I saw at a glance that description failed entirely in conveying anything but the faintest outline. I knew the spot so well, and expected to see the monotonous flat of land made still more monotonous by being converted into an inland sea, but I was altogether

* Continued from p. 353.

† The culvert is an under-ground communication to connect the drains stopped by construction of the Middle Level drain, and is carried under its bed.

unprepared for the relentless eagerness of the destructive waters.

Immediately before me was the broken bank, with a gap in it about 100 feet across, through which the waters were rushing with a fierce triumphant fury, as though mad with joy at the mishaps that gave them their own again; but not without opposition though, for the wind, usually so fickle, seemed determined to be the farmer's friend, for it was blowing with most determined earnestness from the S.W., and further out the elements were having a most determined battle. The crests of the waves were white with fury at this bar to their victorious career, but in vain, for the wind was steady and determined, so lashed their sides with rage, and retreated to an unfortunate cottage a mile off, when finding the door open, they expended all their fury in banging it about most unmercifully. To the right the course of the railway could be traced for about a mile, when it was swallowed up by the waters, and the occasional gate house, or the posts of the telegraph, were the only indications of its course. Further out the waters were madly dashing against a bank, and occasionally leaping over it, whilst on the other side was comparative calm. In the extreme distance I could distinguish the towers of Walsaken and Emneth churches breaking the horizon line.

I turned from this melancholy scene to look at works in progress immediately near me. Several stacks of faggots were collected, and a number of sacks of clay filled in readiness, and at the foot of the bridge a temporary beer-house had been contrived. It was rudely constructed of poles and tarpaulin, but it appeared to content the navvies, who were congregated round it, busily employed in imbibing sundry pints of a muddy beverage called by the landlord beer. A tall countryman advanced from this group, and, having caught my eye, proceeded to narrate most circumstantially all the events connected with the catastrophe. I found him a veritable phenomenon in a smock frock, for in the space of a week he had acquired a new business, and one that proved more profitable than the old one. He appeared to be quite up to his duties, and proceeded to hold forth quite in the style of the professional guide. I learned from this old man, who informed me that he had been one of the anxious watchers for the breaking of the bank, that every precaution had been taken at all the weak points along the bank, but that it was evident to every one, long before the actual arrival of the catastrophe, that nothing short of a miracle could save the Fens from inundation after the breaking of the sluice. It appears that the water found its way through, some feet below the top of the bank, and spurted out on the other side, like the stream from the hose of a fire engine, but that in almost less time than it takes to tell, there was an aperture, twenty feet across, which continues to widen at an alarming rate, the earth crumbling away on each side and disappearing in the most extraordinary manner. Various attempts to stop it were made, but all in vain. Barges were knocked to pieces by the force of the waters, and the fragments were carried miles away.

I did not attempt to unpack, for the weather unmistakably said, no photography to-day. As, however much could be done in selecting spots for future operations, I left my companion in charge, and strolled on along the bank towards an unfortunate house, which the hanger-on informed me was an inn. A brisk walk of some ten minutes duration, brought me to it and truly it was a melancholy picture to look at. The house stood about 100 yards from the bank on which I stood, and was surrounded by several outbuildings, and the water was nearly up to the roof of some of them. A little nearer a gate peeped out just above the water, and evidently stood upon a higher piece of ground. The sign of the house had evidently been removed, for its announcement—"good entertainment for man and beast"—would have indeed been a bitter jest at the present moment. The waters were sullenly dashing against the closed door, as though angrily asserting that a public house should be open to all comers.

About a mile further on the bank I saw a large farm, with many outbuildings, and several cottages at a short distance from it, and therefore went still on. A strange feeling took possession of me as I wandered on alone. I looked out on the vast waste, and, far as the eye could reach, not a trace of human existence was visible—nothing but ruin and desolation. No sound came upon the ear but the howl of the wind, and the angry response of the waves. The clouds were wild and strong, and were coursing after each other rapidly, as though eager to get away from so dismal a spot. It seemed no great stretch of the imagination to fancy the deluge once more here, and I the last man left.

When I came up to the farm I found that it would be the best point for photographic operations. I therefore determined that on the following day, weather permitting, it should be my first point, for without carrying the camera far several very interesting pictures could be made.*

(*To be continued.*)

## THE TANNIN PROCESS.

BY PROF. EMERSON, OF TROY.†

Photography on dry plates possesses so many advantages over the wet for outdoor work, that great attention has been given by scientific photographers to experiments in this department, with a view either to devise some entirely new method which should not be subject to the defects attending the old methods, or so to improve some one of the known processes as to render it more easy and certain in the practical working. The vast amount of laborious research which has been made to this end, can only be appreciated by those who are familiar with the practice of photography in its different branches.

Among the dry processes, the collodio-albumen and the Fothergill have, until very recently, received the most attention, and in the hands of adepts have given excellent results. But as success in these methods depends greatly upon the mechanical state of the collodion, and the favourable condition of the sensitizing bath, it is evident that neither of them can be worked with certainty by the generality of operators.

Major C. Russell, of England, after a series of experiments extending through five or six years, has perfected a dry process, now known as the Tannin Process. Its advantages may be briefly summed up as follows:—1. It is simple. 2. It is not dependent upon the mechanical state of the collodion. 3. A sensitizing bath in ordinary working condition is sufficient. 4. The development of the latent image is under complete control. 5. It gives, if desired, great intensity. 6. It affords an excellent tone. 7. The prepared plates will keep well both before and after exposure. 8. The silver in the development is thrown down in a very finely divided state, and it is thus more favorable for obtaining extreme sharpness.

As might have been expected, this process has excited great interest in the photographic world. Many experiments have been made upon it, and thus far the testimony has been uniformly in its favour. Our own observations have extended through a year, and experience corroborates fully the favourable estimate which has been formed of it by others.

We give now the details of this process as worked by us:—The plate should be very carefully cleaned, and must be perfectly dry before coating with collodion; it is coated and sensitized in the same manner as for the wet process; it is then washed thoroughly in pure water with five or six changes of water; a good plan is to have a succession of baths of pure water into which the plate can be dipped successively without removing the plate from the dipper, as recommended by my friend, F. F. Thompson, Esq. (see

* A small portion of the preceding, through an error in the "making up," appeared in a former number.

† From *Silliman's Journal.*

*American Journal of Photography*, May, 1862).* After being thus washed with water, it is flowed with or dipped into a bath composed of fifteen grains of tannin dissolved in each ounce of pure water, the solution being carefully filtered. The plate should remain in this bath four or five minutes. It is then drained, and set up on one corner, on bibulous paper, to dry in a dark room or box. The ordinary exposure necessary is about four times as loug as a wet.

Two solutions are used in the development—

| | | |
|---|---|---|
| No. 1.—Pyrogallic acid | ... | 72 grains |
| Alcohol (95 per cent.) | ... | 1 ounce. |
| No. 2.—Nitrate of silver | ... | 20 grains |
| Citric acid | ... | 40 " |
| Water, pure | ... | 1 ounce. |

To develop—wet the plate rapidly with pure water, when the film is thoroughly moistened, flow the plate with water, to each drachm of which has been added two drops of No. 1, and one drop of No. 2; keep this developer in motion over the plate until the details are well out; then add to it drop by drop of No. 2, until the required intensity is obtained. Fix in hyposulphite of soda as usual.

Experience in the use of this process teaches—1. That dryiug by artificial heat is not necessary. 2. That the amount of acid in No. 2 may be judiciously varied with the length of exposure. It is better to have an excess of acid than too little. 3. Warming the plate in a bath of water heated 90° F., but using the developing solutions at the usual temperature, as recommended by Dr. Draper, of New York, and otheis, shortens the time of exposure necessary, so that this process may be worked almost as rapidly as the wet. 4. By the use of honey in combination with the tannin, fifteen graius of each to the ounce of water, as recommended by Mr. England, of London, great rapidity is gained. 5. A bromo-iodized collodion is to be preferred, and an old collodion works better in my hands than a new sample. 6. The silver bath should not be neutral, but ought to be decidedly acid; this may be done by addiug one drop of nitric acid for every twelve ounces of bath. 7. This process is peculiarly adapted to the production of glass transpareucies for the stereoscope, affording great beauty and richness of tone.

## A SHORT LESSON IN CHEMISTRY.—No. 1. †

The land, the water, and the atmosphere, together with animal and vegetable substance, constitute what is denominated the *earth*. All the matter of this earth, as varied as it is, as far as has been discovered, consists of sixty-three simple forms of matter, called elements, by which we mean such forms as are homogeneous throughout, and incapable of being reduced into any other simpler forms. Of these elements four, when isolated from all combination with other elements, are in the gaseous and aeriform state, their names are: hydrogen, oxygen, nitrogen, and chlorine. One element has never yet been isolated from its combinations, so that we do not know what may be its independent or elementary form; it is called fluorine. One of the elements, called bromine, exists in the liquid state when uncombined. The rest are solid. The sixty-three elements are divided into two groups, one of which is denominated the group of the metalloids and comprehends thirteen elements; the rest of the elements receive the appellation of metals. The study of the metalloids is the most important for the chemist; for it is, as it were, the key to a knowledge of all the rest. The following is a list of the metalloids: hydrogen, oxygen, nitrogen, chlorine, iodine, bromine, fluorine, carbon, boron, silicon, sulphur, selenium and phosphorus.

Now, although the earth contains no other sort of matter besides the metals and the metalloids, to the number already mentioned, yet there is an indefihite variety produced by their intermixture, or chemical combination. Mixture is totally different, however, from combiuation. Sugar dissolved in water, and lac in alcohol, are examples of mixture, because the sugar and the lac have not changed their nature by their solution, and can be regained in their original states by evaporatiug the water and the alchol. Commou salt and nitrate of silver are examples of chemical combination; for these salts show no signs visible to the eye of the metals or acids which form them; the acids have disappeared and so have the metals, and totally different substauces are formed from the combinatiou of acid and metal respectively, called chemical combinations.

Since mixture and chemical combination are so different it becomes an important question to ask by what cause this difference is produced, or, which is about the same thiug, to ascertain the cause or causes of chemical affinity whereby composition and decomposition are effected. Researches in this department of natural science demonstrate that there is something more than matter required to make up even an element of matter; that certain *forces* are always brought into play in every formation or transmutation of matter, and that one or more of these forces form a part in the composition of all matter. The forces alluded to are denominated *the imponderables*, and are recognized in heat, light, electricity, and gravitation. There is not a single atom of matter on the earth that is, or can be isolated from all these forces, if from any of them: and not a single combiuation or separation in chemistry is effectuated without the application or disturbance of these forces.

The precise method by which all this chemical work is performed, that is, the intellectual part of this work, is as yet in a great measure a mystery. We know the effects, we can reproduce the effects. by the application of these forces as immediate causes or agents; but we cannot always give a satisfactory *rationale* of the varied phenomena in chemical changes. For instance, in the film of iodide, bromide, or chloride of silver, nothing is now better known than the changes that occur whenever these films are exposed either to the light of the sun, or the diffused light of day. But we are very far from being iu a condition to explain philosophically, that is logically, as applied to cause and effect, the changes that we know must follow. We know that the chloride of silver, by being exposed to light, is changed into what is called a subchloride, which has a beautiful violet colour and is insoluble in solvents in which the chloride is quite soluble; but neither the microscope nor any other aid in science has detected any constitutional alteration to account for the change. Sufficient however, is known to determine that these imponderable forces are the very essence of chemical science. Certain generalizations, too, in their action have been well determined; so that we know that heat, light, and electricity, in many instances compose and decompose with almost equal facility; for instance, heat changes ice into water, water into vapour, vapour into its elements—oxygen and hydrogen; electricity with a slight modification of application will do the same. Again, visible heat (that is flame) will recompose oxygen and hydrogen iuto vapour, so will electricity. Withdiaw heat or apply its negative, that is, cold, or apply compression, which is simply a modification of gravitation, and vapour will be restored to water. Thus, then, by the co-operation of these forces, or by their antagonism, arise all the unspeakable and unintelligible phenomena of chemistry.

Harrison's New Lens.—The new lens, stated to include a very wide angle, has recently been patented in America. The specification runs:—"We claim the combination of two sets of cemented lenses, tho exterior surfaces of which shall form part of the same sphere, the axes of which shall be coincident, and the other curves of which shall be so proportioued to the focal distance of tho combination, and to the refractive and dispersivo powers of the glass used in their construction, that tho image found at the focus shall bo achromatic, and that said image shall bo upon, or almost exactly upon, a plano without distortion of form, and including a larger visual angle, substantially as before described aud represented."

* See letter from Mr. Thompson on p. 359 of the present Volume.
† From *Humphrey's Journal of Photography*.

## ON THE STUDY OF THE ELECTRIC SPARK BY THE AID OF PHOTOGRAPHY.*

BY PROF. OGDEN N. ROOD, OF TROY, N.Y.

Photographic images of the electric spark between the carbon electrodes of the voltaic pile were obtained on silver plates in November, 1840, by Prof. B. Silliman, jun., and Dr. W. H. Goode. These observers remarked the greater actinic activity of the negative spark as compared with the light from the positive electrode, which I believe is the earliest recorded observation on this point. These authors also noticed a double concentric structure in the impression from the electric spark similar to that described in this paper.

Photographs of the stratification and luminous discharges in Geisler's tubes, were obtained in the spring of 1860, by Professor W. B. Rogers, of Boston, operating with one of Ritchie's coils. These results were communicated to the British Association at their Oxford meeting in June, 1860.

Similar photographs were obtained by Gunther and Dove, and presented by the latter to the Prussian Academy, on the 27th of May, 1861. A photographic camera was employed, and an exposure of from 3½ to 6 minutes.† In the same number of Poggendorff's Journal, W. Feddersen, in a highly interesting article on the electric discharge from the Leyden jar, states that, by means of a concave mirror silvered according to Leibig's process, he obtained fine photographs of the electric spark, even when the mirror was in rapid rotation. Photographs of the spectra from the spark of Ruhmkorff's coil have also been obtained by Prof. W. A. Miller.

In all these cases the electric line was photographed from a position at right angles to its motion, a side view being obtained. My object in the present article is to describe a very simple and easy method of obtaining remarkably fine photographs of the electric spark from a point of view parallel to the direction of its motion, the pictures being as it were transverse sections of the spark and of the electric brush in all its variety. The very short duration of the electrical discharge renders its study by ordinary means difficult and uncertain; while photography, by revealing a mass of new details otherwise invisible, and furnishing a permanent record, which can be studied at leisure, offers advantages that cannot be too highly estimated.

*Method Employed*.—M. E. Becquerel showed, several years ago, that paper coated with the bromide of silver is sensitive to the light of the electric spark; the discharge of a battery of four Leyden jars in its immediate neighbourhood causing a slight darkening. When a single spark was allowed to strike the paper no effect was produced.‡

In experiments on instantaneous photography with the wet collodion process, I was often encountered by the well-known fact that, while those portions of the sensitive surface which had been acted on by a very bright light darkened strongly under the developing solution, adjacent parts, where the action of the light had been somewhat feebler, remained quite transparent and free from a deposit of silver. This rendered it probable to me that if the electric spark were made to strike directly on the sensitive surface, only those portions would be effected which were in immediate contact with the luminous atmosphere. Actual experiment confirmed this idea to a most surprising degree. When a single spark was allowed to fall on the sensitive surface, under the action of the developing solution, a fine intense, and sharply-defined image, full of delicate details, was produced. The sharpness and perfection of these images was such that they bore examination by the microscope under a power of 40 diameters, while there was not the least difficulty in enlarging them by means of photography as high as 20 diameters. The enlarged negatives then furnished good prints on paper. Sometimes the small original images were accompanied by an irregular partial halo caused by the diffused light of the spark, but this for the most part was so faint as in no way to interfere with the distinctness of their outline.

The question naturally arises whether these delicate and beautiful images are produced by the action of the *light* on the sensitive plate, or are owing to a decomposition of the silver salt by electrical agency: in other words, whether these pictures are photographs or electrographs. That they are due to the action of light the following experiments will render probable.

(1.) Sparks were allowed to fall on sensitive plates, and their form was observed by the aid of a lens of one inch focal length: on developing the latent images they corresponded in shape with those observed.

(2.) A glass plate was coated with plain collodion, free from iodide or bromide, and allowed to remain five minutes in the bath of nitrate of silver. It was then removed, and single sparks were allowed to fall on different portions of the wet collodion surface. Under the action of the developer the well-known spark images appeared.

A simple clean glass plate without any coating at all was placed in the nitrate bath for a few seconds. On its removal, and while still quite wet, sparks were discharged on different portions of its surface. When the sulphate of iron developing solution was poured over it as usual, clear sharp images of the spark were obtained!

As plain collodion, free from iodide and bromide, as well as simple glass plates moistened merely by the nitrate bath, have not been considered by photographers as sensitive to light, these unexpected results rendered it probable that the electrical discharge produced a decomposition of the nitrate of silver. I was, however, enabled to prove that these surfaces really are sensitive to *light*, in the following manner:—A plate coated with collodion, free from iodide or bromide, but saturated with a solution of nitrate of silver from the bath, was placed in a camera which was directed towards a window with a bright sky beyond. The lens used was the "portrait combination," its focal length being six inches, with an aperture of 1½ inches: the exposure lasted ten minutes, the full aperture being used. Under the sulphate of iron solution, a distinct image of the window, of no great intensity was obtained. Next, sunlight was concentrated by a "bull's-eye" condenser on a little stand, which, to avoid too great heat, was arranged so that its surface was about half-way between the lens and its focus, the bright spot on the stand covering an oval space ¾ of an inch in diameter and two inches long. A plate merely moistened by immersion in the nitrate bath was placed on the stand for ten seconds, and then developed by the sulphate of iron solution, which brought out an intense image of the oval spot.

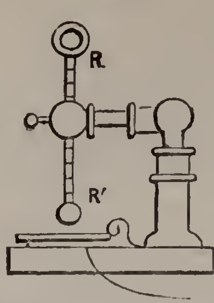
(3.) The image of the positive spark falling on a plate merely wet with nitrate of silver has a peculiar and definite form. If this form is really traced by *light* we should expect that the light would be able to act on another sensitive plate placed directly under and in contact with the first. This was found to be the case. A glass plate coated with sensitive collodion, on its removal from the nitrate bath, was covered with a piece of the very thin glass used for microscopic purposes, the latter having previously been moistened by a solution of the nitrate of silver: sparks were then discharged on the covering plate of thin glass. When the latter was removed and the collodion surface developed as usual, images of the spark were obtained. The definition was much impaired, and the intensity lessened. When the thin glass was blackened so as not to transmit light, and the experiment repeated, no images were produced, not even by allowing a large number of sparks to strike the same spot.

*Apparatus for the Production of the Photographs*.—For the generation of the electricity a small cylinder machine was used. The diameter of the cylinder was seven inches,

* From the *American Journal of Science and Art*.
† Pogg. Annalen, vol. cxiii., No. vii.
‡ Pogg. Annl., vol. liv., p. 54.

its length ten inches: the prime conductor exposed a surface of 200 square inches.

Fig. 1.




The apparatus for throwing the spark on the sensitive plate is seen in the diagram A brass rod R R′, terminated by a freshly polished brass ball six-tenths of an inch in diameter, is supported over the centre of the sensitive plate and insulated in the manner seen in the woodcut (*fig.* 1). The rod is graduated and held in position by a binding screw. The sensitive plate is supported on a silver disc, which is in metallic connexion with the rubber of the machine. A weak spring of platinum foil rests on the collodion film and connects it with the silver disc. R is connected with the prime conducter.

The manipulation was as follows:—A glass plate three inches square was carefully cleaned, coated with collodion, and sensitised in a bath of nitrate of silver of 40 grains to the ounce of water. The plate on being taken from the bath was held in an upright position, so that it could *drain* for one or two minutes: it was then placed on the stand, and the machine very slowly turned, until an apparently single discharge had been effected, when the plate was removed about three-tenths of an inch, and the operation repeated until twenty sparks had fallen upon it. The plate was then developed and fixed as usual. After each experiment the brass ball was wiped to remove dust, &c.

The pictures produced in this way are apt to be too intense, whereby the interior details are often unobscured. Some care must therefore be taken in the selection of a collodion; that which is suitable for "ambrotypes" is to be preferred. The following formula answered well in my hands:—

| | |
|---|---|
| Plain collodion ... ... ... | 8 ounces |
| Iodide of potassium ... ... | 40 grains |
| Bromide of ammonium ... ... | 20 do. |

This collodion should be used while still new, as it then is sensitive and not too intense in its action.

## THE STEREOGRAPH AND THE STEREOSCOPE.*

*Example* 2.—Suppose, however, the whole party could not be taken in, or condensed into the proper sized view at a less distance than thirty feet; in this case it would not be proper to make the allowance between the cameras of one foot, this being the tabular distance opposite thirty feet; such a distance would produce distortion by making visible at six feet a view that could not be comprehended by the eye at that distance; such relief as this, although exceedingly manifest, would produce pain to regard it. We will suppose in this case there is the same difficulty intervening between the party and the artist in the form of a pond or otherwise, and as before, the photographs have to be taken at the distance of sixty feet. Opposite thirty feet in the table you will find 1 foot 0·56 inches, and opposite fifty feet, 1 foot 8·95 inches; subtract the former from the latter, and the remainder will be 8·39 inches, that is, nearly 8 and two-fifth inches, which is the distance at which the cameras have to be placed asunder in order to produce the desired stereograph.

Whenever the preceding table is used in its application to views, it is absolutely necessary to regard the distances in reference to the *nearest* object in the view; for if the principal object should be several feet more remote, and the distance were measured to this principal object, all the nearer objects would be exhibited in distorted relief, which it would be painful for the eyes to behold.

By the observance of this rule, as exhibited in the table, photographers have been enabled to perform one of the brightest triumphs in the heliographic science, namely, by stereographing the moon, which shows that the moon is indisputably a globe, undulatiug with hill and dale, mountain and ravine. Simply to photograph the moon is a triumph: but to stereograph the moon is a much greater; for the mode by which stereography is effected presupposes that the photographer can see more than one surface of a body either at the same time or at different times, which phenomenon can be effected by regarding it from different positions, as from either eye separately and independently; or combinedly, from one and the same position; or separately, from two more distant positions; or finally, by causing the body to revolve so as to show more than one surface to the beholder. But the distance to the moon in round numbers is 237,000 miles from the artist; to look around her corners, therefore, at the parallactic angle of two degrees, he would have to plant his cameras at the distance 8,270 miles apart, a distance greater than the diameter of the earth, so that in imitation of the revered Archimedes of old, all that he could do would be to cry out: "Give me where to stand and I will *stereograph the moon.*" But, says the young astronomer, the moon not only revolves around the earth in her orbit, but also on her axis; perhaps you may take her photograph at two different times; that is, one photograph now, and one in half-an-hour or later, by which means two requisite pictures for the stereograph may be obtained. This suggestion is all useless, for just in the same time that she revolves around the earth she revolves upon her axis, and thereby presents the same surface to our view. The binocular photographs cannot thus be taken. But at a parallactic angle less than two degrees; as for example, at one degree and a half, which is less than double the moon's horizontal parallax, it would be possible for two astronomical photographers, if located at the extremities of the chord on the earth's surface subtended by this angle, to obtain stereographic effect from two photographs taken at the same moment of astronomical time. The difficulties, however, to be overcome by this method are very great; nor was it by this method that the triumph alluded to was gained. It is, moreover, true that, by the unequal velocity of the moon in its orbit, we do see a little more sometimes of the eastern edge, and sometimes of the western edge, so that by photographiug the full moon under these opposite conditions a partial stereograph can be obtained.

But it was not by this method that the moon was stereographed. The method by which a good stereograph of the moon has been obtained, depends upon the inclination of the axis of the moon to its orbit, by which we can look a degree and a half as it were over the top of the moon at one time, and at another as much angular space around the under surface. The task, therefore, of stereographing the moon is solved as follows: first, by ascertaining the time of full moon, when one of these phenomena would take place, and when the other, and at these times to take the respective photographs, which, when properly mounted, will produce a due degree of stereoscopic effect, in fact a degree that *may* amount to distortion.

If a small globe or marble be placed at the distance of six feet from the eyes, it is evident that each eye sees a distinct hemisphere for itself; it remains, therefore, to find the angular distance between the edges of the two hemispheres on either side. By a moderate knowledge of geometry we ascertain that this angular distance coincides with the paral-

* Continued from p. 394.

lactic angle for this distance; it is consequently two degrees. If, then, the inclination of the moon's axis to its orbit be one degree and a half, or thereabouts, we shall have a libration in latitude of about three degrees, which is more than enough to give an agreeable relief to the superimposed photographs. That the stereograph of the moon, to be had of all dealers in such materials, was taken as just described is evident, in the first place, from the fact that the south pole of the moon is to the right on the cardboard, and the north to the left, or *vice versâ*, by inverting the card on which the two photographs are mounted. In the second place, the difference in the distances between the corresponding points on either photograph is in the direction of north and south, and not in that of east and west; this is an infallible proof. This difference, too, between the maximum and minimum distance is of such a magnitude as to indicate the parallactic angle at which the photographs were taken.—*Humphrey's Journal.*

## PRINTING, TONING, FIXING, AND MOUNTING.

BY CHARLES WALDACK.*

The printing on albumen paper should be carried further than on the ammonia nitrate, as the prints lose more in the process of toning. The colour of the prints when taken out of the printing frame varies from a red to a violet black. This colour depends greatly on the kind of paper used; and somewhat on the strength of the silver solution. A paper giving dark prints is to be preferred. Red and vigorous prints can, however, be brought up in the toning. But when the prints are red and dim, the fault lies in the silver solution, which is not of the proper strength, and no toning will bring them to the proper shade.

When four card negatives are made on a whole plate, the box printing-frame is the only one that can be used, as it enables you to look at each one of the negatives. If one of the negatives prints quicker than the other, it should, when sufficiently printed, be covered with a piece of cardboard, and the printing allowed to go on.

Several causes induce the discolouring of the albumen paper, while printing: the principal ones are—

1. The heating of the negatives by the sun.
2. The use of moist paper.
3. The use of moist flannel, or cloth, on the back of the paper.
4. The use in hot weather of flannel, or cloth, which has been in contact with ammonia nitrate paper.
5. The silvering with ammonia nitrate of silver in warm weather.

The best prints are made in diffused light. To be printed in the sun, the negatives require to be more intense. Vignettes should, as much as possible, be printed in diffused light, as the paper requires to be kept very white.

The shading off, in vignette prints, is obtained by placing, at about three-fourths of an inch from the negative, a piece of cardboard with an aperture in it of the shape of the pictures, but cut a little smaller. When the printing is done in the sun, this aperture is covered with a piece of tissue paper; in diffused light a ground glass is substituted; or, when the light is weak, it is allowed to strike the negatives directly. Great care should be taken in printing vignettes, to have the printing-frame in such a position as to cause the rays to fall perpendicularly on the negative.

Silvered albumen paper being very sensitive, should be kept as much as possible out of the light. The prints can be kept several hours before being toned and fixed, by being placed in the dark.

Albumen prints should not be put in the same drawer or box with ammonia nitrate prints; to prevent them from getting brown when they come in contact with each other.

The operations which follow are—

1. The washing to remove the free nitrate of silver.
2. The toning.
3. The washing to remove the toning solution.
4. The fixing in hyposulphite of soda.
5. The final washing to remove the hyposulphite of soda.

The three first of these operations should be done in the darkest part of the room.

To remove the free nitrate of silver, the prints are put in a tray with clean water, and the water is changed five or six times, until all the nitrate of silver is removed.*

This being done, they are ready to be toned.

For the preparation of the toning bath the two following standard solutions are used:—

| | | |
|---|---|---|
| No. 1.—Bi-carbonate of soda | ... | 2 drachms |
| Water ... ... | ... | 16 ounces. |
| No. 2.—Chloride of gold (neutral) | | 30 grains |
| Distilled water ... | ... | 16 ounces. |

The toning bath is composed of sixteen ounces of water and one ounce of each of these standard solutions. In summer it is used at the ordinary temperature; in winter, to make it more active, it is made tepid, or bloodwarm. The prints are immersed one at a time, and as many as can be conveniently watched. They pass in a few minutes through all the intermediate tints to a bluish-black. The first prints which are immersed tone rapidly; but in proportion as the gold is taken up, the bath loses its activity: when this arrives, add one ounce more of each solution, No. 1, and No. 2. The toning is stopped by immersing the prints in a tray of clean water, kept at hand for the purpose. The real colour of the print is only seen after the fixing, and it requires considerable experience to discern to which tint the print has to be toned. A print which is undertoned assumes a red colour in the hyposulphite of soda. One overtoned gets inky blue. The toning bath should not be too active, as the toning would proceed irregularly. Too rapid toning has also a tendency to make more apparent the mealiness spoken of below. To prevent irregular toning, the print should all the time be kept in motion.

Acetate of soda, citrate of soda, phosphate of soda, &c., have been recommended by some writers as an addition to the toning bath. These seem, when fairly tested, to have no action whatever on the toning of the prints. We shall, therefore, not give the formula in which these salts enter, being satisfied that in photography, as in all pursuits, the shortest and least complicated method is the best. The toning bath given above, can compete for results with any used. The chloride of gold is what gives the tone, the bi-carbonate of soda is added to facilitate the separation of the gold from the chlorine. Perhaps acetate of soda or any of the other salts used possess also a reducing action, but in connection with bi-carbonate of soda, which is much more energetic as a reducing agent, their presence is useless.

Acetate of soda has been claimed by some writers to be a preventive of what is known as *mealiness*; experiments carefully conducted have convinced us of the fallacy of this claim. The mealiness in our opinion, results mainly from the use of a weak silver solution, or from not being floated long enough. With some kinds of thick and highly albumenized paper, it assumes the form of white spots: with thin paper it has the form of minute, mealy specks. These spots in thick or highly albumenized paper, can, on close inspection, be detected on removal of the paper from the printing-frame, and are brought out more distinct in toning. They result, we believe, from an imperfect formation of albuminate of silver.†

* From a work entitled "The Card Photograph."

* The first and second changes of water, containing most of the nitrate of silver, should be poured in a large jar, or keg; and a handful of salt thrown into it, which will precipitate the silver in the state of chloride. After settling, the liquid can be poured off, or drawn off with a faucet. When a sufficient quantity of chloride of silver is thus obtained, the mass can be thrown on a filter, and allowed to drain and dry; after which it can be sent to the refiner to be converted into metallic silver.

† What first made us suppose that imperfect silvering was the cause of these mealy spots, are the following facts. An inexperienced photographer undertook to silver albumenized paper, in a small quantity of solution, and not having the porcelain tray level, the upper part of the tray touched the bottom of the dish, while the lower part floated on liquid half an inch deep; when the prints were toned, the upper ones were spotted, and the lower ones perfect. The same thing being repeated, the spots could, on close examination, be detected on the removal of the paper from the printing board.

The mealy spots should not be confounded with the marbleized appearance, resulting from the imperfect transformation of the chloride of ammonium, or the chloride of sodium, into chloride of silver.

Before being fixed, the prints should be rinsed off, to remove the gold, which would otherwise communicate toning properties to the fixing bath.

The fixing bath is composed as follows :—

| | |
|---|---|
| Hyposulphite of soda ... ... | 8 ounces |
| Bi-carbonate of soda ... ... | 1 drachm |
| Water ... ... ... ... | 32 fluid ounces. |

On immersion in the hyposulphite, the real colour of the print shows itself immediately.

The fixing will not require more than ten minutes. It is done when the paper presents, by transmitted light, an uniform appearance, showing no opaque spots of undissolved chloride of silver.

The fixing solution will, by being used, acquire toning properties which are very objectionable, as they are due to the liberation of sulphur. The operator should thus not, for reasons of economy, use this solution too often, and in such way endanger the permanency of his prints.

The washing should be done with the greatest care for half an hour, the prints being laid on a frame, covered with strong muslin, and the water sprinkled over them, as described on p. 157. Where no such facilities for washing can be had, the prints should be washed in several changes of water, for two or three hours, the first changes being made at intervals of five or ten minutes. The prints having been dried are cut out on an even glass, with a sharp knife. To cut them of a proper shape and size, a mat or cleanly cut glass can be used.

Before mounting the prints, it is advisable to keep them for a short time folded up in a damp towel, to prevent their curling.

For pasting the pictures on the cards, use either starch or dextrine paste. Starch paste is made by mixing one ounce of starch with ten ounces of water, and warming gradually to the boiling point, stirring the mixture all the time. Dextrine paste is simply dextrine mixed with water, in the proportion of one ounce of dextrine to five ounces of water.

## Correspondence.

### MEALINESS IN TONING,

Sir,—As a slight return for the many useful hints I have received from your very excellent journal, I beg to place at your disposal a few remarks which may perhaps cast an additional ray of light on the perplexing subject of mealiness and uneven toning. The principles on which the process of toning are based, appear to be but imperfectly understood, hence it is the manifold remedies which have from time to time been proposed, have been based on empirical rather than on thoroughly understood grounds—abundantly successful in some cases, a total failure in others. My object, then, is to show that the remedies proposed, if judiciously applied in their proper places, are capable of performing all the promises which have been advanced in their behalf (omitting acetates and chlorides, as being altogether unnecessary, except as direct toning adjuncts).

The causes which produce mealiness and uneven toning, my experience induces me to believe, are mechanical, rather than chemical, when a print is placed in the toning bath, there are impediments existing on the surface of the paper which must be overcome ere the gold can settle where it is required, and unless those impediments act with unbroken evenness—mealiness or uneven toning will most assuredly be the result. An oft but unsuspected cause of uneven toning; is to be found in the irregular texture of the paper; if a print after undergoing the short washing usually recommended, is held up and viewed by transmitted light, it has an appearance similar to a partially fixed one, the transparency being very unequal under these conditions, even toning is altogether impossible, and the paper is declared worthless; but if the soaking is continued until this unevenness disappears, the results will be all that can be desired; and this fact will fully explain the reason why a thick paper is more prone to mealiness than the thinner samples, the latter requiring a much shorter soaking previous to toning, to open the pores, and thus rendering more even its texture than will suit the requirements of the former.

Another source of mealiness is a too strict adherence to a given formula, no allowance being made for strength of sensitizing bath, and amount of intensity of light, for be it remembered that when a strong bath is employed, and the printing is carried on in direct sunlight. the prints are more liable to become mealy than if the printing had been effected in diffused light. The reason of this is obvious, the greater deposit of reduced silver in the former case, forms a proportionally greater impediment to the action of the gold in the toning bath, and measures must be adopted to clean the surface of the paper as quickly as the gold can act. From close observation I have come to the conclusion, that this clearing process is the work which the carbonates and acetates have to perform, instead of being employed in merely rendering the bath alkaline. When the resistance offered to the gold is great, by the judicious increase of the clearing material the impediment is rapidly overcome, and the toning goes on satisfactoilry. With slowly-printed pictures a more alkaline reaction is sufficient, an excess of soda will retard rather than increase the rapidity of toning, giving, at the same time, disagreeable brown tones; whilst, on the other hand, if an excess of the reducing agent is not employed in toning pictures produced by direct sunlight, if the paper be at all inclined to mealiness, this much dreaded effect must follow, except, indeed, the toning is slowly performed, for in this case the impediments are removed fast enough to meet the requirements of the limited supply of gold.

I need go no farther to show the nature and constitution of the impediments spoken of, every intelligent reader of these lines will readily understand this as clearly as it would be possible for me to explain.

It will be sufficient for me to observe, in conclusion, that, by sticking to this theory of impediment removal, and tracing these obstacles to their several causes, I am able to obtain clear prints from every kind of paper, from the thickest to the thinnest, from every maker. I have tried, and I believe I have worked on samples from most *all known*. I have an idea that there is no paper sold which a clean picture cannot be printed on (the quality differing of course). When a bad paper is placed into my hands, I do not rest content until I have discovered the cause of failure, and the cause I have always found to be under control; and in removing that I have removed the evil, and exonerated the character of the maker. I could have entered more fully into details, but fearing to trespass on your valuable space, I have condensed my remarks as closely as possible. If a few hints on printing and its relation to toning would be acceptable, I will, at some future time, be most happy to place them in your hands.—I remain, yours respectfully,

A Photo's Assistant.

P.S. To explain a remark made on the clearing agents, I do not understand acetates to be alkaline, but they are no less agents or pioneers in advance, to clear the way for the gold.

[Our correspondent's hints are important, and go far to meet the case. We shall have pleasure in hearing further from him.—Ed.]

# Photographic Notes and Queries.

### Angle included by View Lenses.

Sir,—There appears to be a very erroneous impression prevailing with regard to the angle of view included by lenses of various constructions, and I must confess that I entertained similar notions until I instituted a series of comparisons between nearly all those at present in use for photographic purposes. The photographic, orthoscopic, portrait, and triplet are all advertised as embracing a *very large* angle of view, and I have frequently seen them recommended for taking views in confined situations. Now, if I understand the matter rightly, not one of these compound lenses embraces so large an angle of view as the single achromatic. Taking the angle of the latter at 36°, which will, I believe, be found about the average, the double and triple combinations vary from 24° to 30°. My latest trial was made with Dallmeyer's triplet, 18½ inches focus, measured from the back lens against a view lens of precisely the same focus. I had two cameras, the ground glass of that used for the triplet 14½, and the other 12½ inches long. The amount of view included was the same, within one-eighth of an inch, in both cases, consequently taking the angle embraced by the single lens at 36°, that of the triplet would be within a fraction of 30°.

I think this fact shows the unfairness of measuring the focus from the back lens of a combination; the equivalent focus ought, in all cases, to be stated. In the triplet in question the equivalent focus must be about 21½ inches, and it covers with sufficient definition, no larger surface than would a single lens of the same focus, viz.. 14½ by 12. I wish it to be clearly understood that I have not the slightest intention of disparaging this lens, I consider it of the very greatest value for architectural subjects, and for copying, added to which, its capabilities for instantaneous views when the whole aperature is used, are truly astonishing.

There is another misconception to which I would call attention. I have seen it stated in more than one work on photography that the intensity of light passing through diaphragms of different diameters is in proportion to the squares of their diameters; and, therefore, supposing a lens stopped down to one inch to require one minute for taking a picture, the same lens, with a stop of half-an-inch, would require two minutes. There can be no general rule laid down on this subject. With a bright light it would not require 1½ minutes, whereas, on a very dull day, 10 minutes might not be sufficient. I believe there is no better plan for judging of the intensity than that of carefully examining the brilliancy of image on the ground glass.—I am, sir, yours most truly, Baynham Jones.

*Cheltenham, 18th August*, 1862.

[We have repeatedly stated that, in the pictures produced by the triple lens, a very large angle is included with good definition. We are indisposed, at present, to discuss the question, but may remark that our correspondent's experiment does not appear at all conclusive. To test the lenses properly, it would be necessary to use a triple of an equivalent focus, the same length as that of the single lens, to try each lens with the same sized stop, and to use a plate larger than they were intended to cover, so that a careful measurement might be made of the amount covered and properly defined by each. By the usual calculation, if an exposure of one minute be required with an aperture of one inch, an exposure of four minutes would be required with an aperture of half-an-inch. The calculation upon which this is based is very simple; an aperture of half a square inch has an area of one-fourth of the size of an aperture of one square inch, and will, therefore, admit just one-fourth of the amount of light. A variety of circumstances, however, will modify the time of exposure, and our correspondent is right in his suggestion that the brilliancy of the image on the ground glass is the best guide.—Ed.]

### Toning Process.

Sir,—Seeing a few words about toning in the last number of the News, I forward, for the readers of your valuable pages, a method I have practised with great success for some months, and can produce a variety of tones. I tone as described in your pages some time ago, viz., by placing the print from the frame in a bath of acetate of soda, wash, and tone (or rather *half* tone) in the usual acetate of gold bath. I place them next in an old hypo fixing bath, one quart, with the addition of half-an-ounce of acetate of lead and half-an-ounce of nitrate of soda. I leave them in this bath till the prints are the desired colour (which will vary in time, owing to the depth toned in the gold bath), and fix in a fresh hypo bath if required. The lead and hypo will cause a precipitate, which I leave in the bottle, and as the hypo bath gets saturated with silver it redissolves the deposit. I generally throw away quarter of the hypo, making up the quantity with fresh, and adding a little more nitrate of soda and lead; it is as well to wash the prints in a little distilled water after fixing, previous to the thorough or final washing. Should any of your readers try this I think it will repay them for any extra trouble they may have.—I remain, sir, yours respectfully,

A. L. Henderson.

49, *King William Street, London, August 16th*, 1862.

### Rapid Fothergill Plates.

Sir,—As the subject of rapid dry processes appears to be now absorbing so much attention, we have sent you (accompanying this) two prints from Fothergill plates, which were exposed on the 29th ult., the first (the town from the Church Cliffs) was exposed at half past eleven in the morning, and received four seconds exposure; the second, (the Cliffs and Ledges) received but three seconds exposure, at half past one the same day, and we think you will agree with us that the latter is the best picture. Should you think the pictures sufficiently good, and the times of exposure sufficiently rapid to be worth notice, we shall be happy to furnish details as to their preparation and development.

We have now merely to add that the plates keep an indefinite period.—We are, sir, yours truly, H. & J. Walter.

*Broad Street, Lyme Regis, Dorset.*

[We shall have pleasure in publishing the details of the process by which the negatives were obtained with such rapid exposure. There is perhaps a trace of under-exposure; a second more in each case would have been quite sufficient.—Ed.]

### Nomenclature of Stops.

Dear Sir,—Would you excuse one at a distance suggesting your giving information which may be useful to many.

We constantly see references to trials of processes in your pages. Sometimes the nature of lens employed is quite omitted, occasionally it is imperfectly described, and sometimes, some not having a similar one by him can guess what is meant. We see a notice of a picture taken with A's lens and No. 3 stop. Now, if the information is to be useful, we must know more.

I would suggest that till makers adopt some mode of numbering stops, which will define their size, the diameter should be given, but perhaps Messrs. Ross and Dallmeyer would not find it hard to agree on a system of guages for all diameters and sizes of lenses. I have a Ross whole plate orthographic lens, till I reach the full aperture I find the diameter of the stops are two-tenths of an inch larger than the number of tenths denoted by that of the lens. I find this simple relation most useful; and in a 15 by 12 orthographic of theirs I find this changed for the worse, the numbering is wild.

By the bye I have often seen objections to the orthographic lenses, and those like it for landscape. I always use mine, and rarely stop down at all unless I have very near objects. It always works well, and gives me far better pictures on the glass with 0·85 inches of stops, 0·9 of aperture, than a view lens of another maker (but a good one) with only five-eighths of an inch. It is evenly illuminated, or very nearly so, and, of course, works fast. I have taken landscapes well lighted in five seconds, and clouds, on a heavy day, in the same time.

I have seen many complaints of films dissolving on varnishing. The following cause has not been I believe given viz., *overheating* to which one is especially liable when drying the plate artificially.—Yours faithfully, J. P. T.

*Rovitree, July 3rd*, 1862.

[We always give the best information with which we are furnished as to the lens and aperture used; but there is room for more precision in the matter. In stating our own experiments we always give these particulars definitely.—Ed.]

## Talk in the Studio.

Instantaneous Dry Plates.—Mr. Fowler, of the firm of Harvey, Reynolds, and Fowler, writes:—"I am somewhat surprised at the search of many of the contributors to the Photographic News for an instantaneous dry process. I have recently been with a gentleman who has been working dry plates as rapidly as Dallmeyer's quick acting lenses, and his instantaneous shutter will allow; and the results he has obtained are *quite as good* as any picture from a wet plate that I have seen of that class, and a great deal better than many. I will send you some in a few weeks, and you can judge for yourself. You will see street views, the bustle of a railway station, train starting, &c., faithfully given. As our firm will publish them, my object in sending the pictures to you will be partly for review, as well as to prove the existence of an 'Instantaneous Dry Process.'"

A New Application of Photography.—The *Philadelphia Press*, of June 21st, tells us that a new application of miniature photographic portraits has originated with Messrs. Whit and Yost, the extensive Bible manufacturers, of Market Street, Philadelphia. In the Bible—the text of which is conformable to the standard of the American Bible Society—they insert, as usual, blank leaves, suitably headed and divided for notices of births deaths, and marriages. Such records in a family Bible constitute good evidence in our courts of law. In addition to these they are introducing the novelty (patent applied for) of placing several cardboards, perforated for the reception of small photographic portraits, to follow the family register, thus accompanying the record with resemblances of the loved ones whose names are entered there. The idea is ingenious, and will, no doubt, meet with favour. The specimen alluded to is a superbly bound quarto illustrated Bible, in clear pica type, with index, concordance, metrical version of the Psalms, with places, after the register, for the reception of thirty-two *cartes de visite.*

## To Correspondents.

F. Z.—The purpose of albumen is simply to give the paper a better surface, and enable it to render delicate definition more perfectly; it is no aid whatever in securing permanency. Some authorities regard it as one of the sources of decay.

Cornish Chough.—The exposure and development appear to be right. The lighting is also good: with a trifle more reflected light on the shadowed side it would be perfect. The definition is, however, far from satisfactory, and you should not rest content with it. It may be the fault of the lens, in which case, the sooner you get rid of it the better. Before doing this, however, proceed to test it carefully. In the first place, examine your ground-glass, and ascertain if it have a surface sufficiently fine to enable you to see when you have obtained a sharp image. Some of the focussing-screens of cheap cameras are so coarsely ground, that it is almost im possible to perceive when the image is sharp. If you are unable to obtain a sharp image on a fine screen the lens is in fault. If, however, the image on the ground-glass be sharp, and that of the negative defective, the fault may arise from two causes, either the chemical and visual force of the lens are not coincident; in which case you must ascertain the amount of variation, and allow for it; or it is the fault of the camera, in which the sensitive plate does not occupy precisely the same position as the focussing-screen. This you may ascertain either by careful measurement, or by putting a piece of ground glass or a coated plate into the dark-slide, and having placed it in the camera, pull up the slide and open the back, so as to examine the image, which should be as sharp as it was on the focussing-screen. If it be not, the remedy is simple, and consists in a slight adjustment, either of the focussing-screen or dark-slide.

G. F.—A small amount of residue is not a serious objection, and may occur with a sample of pyroxyline in other respects good. If, as you state, the residue is two-thirds of the bulk of the solution, the pyroxyline is worthless. In our practice we frequently have no residue at all. We recently placed in a half-pint bottle the residues of two Winchesters of collodion (a gallon) which had yielded more residue than usual. After standing for a few weeks the residue is not more than half an inch in depth in the small bottle.

F. G. asks, "What is the cause of a bath giving excellent negatives with a plain iodized cadmium collodion and pyro developer, after being in use some time with a bromo-iodized collodion and iron developer, ceasing to give a picture with the former preparations, although working most satisfactorily with the latter? it does not proceed from acidity in the bath, as it has been strengthened, neutralized and acidified in the same proportions as it formerly was. The only thing I can account for the cause is the bromide of silver held in solution, if so, please state how that can be got rid of. This solution of bromide of silver, as I imagine, is most objectionable in the bath for iron development, causing lines and loss of brilliancy I get rid of this for a time by adding five grains of nitrate of soda to each ounce of bath, sunning and a few days' rest." Mr. Sutton holds the opinion that the use of a bromo-iodized collodion in a silver bath spoils it for giving good results with a simply iodized collodion. It has never occurred to us in our practice, however The case described by our correspondent is probably due to the accumulation of organic matter in the bath; and this view is confirmed by the fact that sunning improves matters. Neutralize it with oxide of silver or carbonate of soda, and sun thoroughly, then filter, slightly acidify, and all will probably work well. Bromide of silver is very sparingly soluble in the silver bath, and we see no reason to think that the trace which may be present would in any way injure your bath.

Subscriber to two Copies of the News.—We do not know of any house in London where you can obtain Disderi's portrait collodion. Harvey, Reynold's and Fowler, 10, Briggate, Leeds, are the English agents for it.

Hob-y-deri-dando.—The india-rubber lined baths answer perfectly, so far as we know.—We have one in use without any evil results. The thin sheet india-rubber can doubtless be purchased at any house dealing in such materials, such as Silvers & Co., or Burgess and Key. The price per foot we do not know. 2. Rouch's new tent has not been described in our columns in detail, but will be shortly. 3. The articles entitled "Amateur Mechanic" may possibly be republished, but it is uncertain when. 4. The covering of Smartt's Tent, so far as we remember, is a very stout "twill," which very effectually excludes the light; it is lined with a similar material in yellow. 5. We think it is probable that a camera maker would make you a dark-slide to your camera. Try Mr. Meagher.

T. H. Crampton.—The address of Mr. Bailey is "Chemist, Wolverhampton."

J. G. Lock.—The prevailing fault in your negatives is want of intensity, they are flat and feeble, wanting in contrast. The majority of them would have been good if they had been judiciously intensified. A collodion giving a little more vigour to begin with, would be also an advantage. The prints are all a little over-toned; but it would be impossible to get brilliant prints from such feeble negatives. Some of the negatives are a little over-exposed. An important defect in the portraits arises from injudicious lighting; you have too much diffused light all round the sitter; you require a more direct light from one side, you will then have the lights in the face clearer and brighter, and the shadows more perfectly marked. This would at once give the image relief, and prevent it appearing embedded in the background, and of a similar colour. The portrait negatives also require more intensity. There is a want of perfect definition, but it is uncertain whether it arise from the fault of the lens, or from imperfect focussing.

J. C. H.—So far as we can judge your tents will answer admirably; by the exercise of a little judgment the sitter may be very satisfactorily lighted. In some conditions of light it may be desirable, in addition to the shading proposed, to attach a cone with dark lining to the lens, so as to protect it still more carefully from diffused light.

Tyro.—You may take portraits with a single lens, but it will not give such good results as a portrait combination. 2. For portraiture we should recommend you to use bromo-iodized collodion, and an iron developer. 3. Portraits may be taken in the open air, but it is desirable to secure such a position as will enable you to secure some shadow, as diffused light all round gives a flat feeble image. If you expose rapidly a head-rest need not be used. 4. You must use some judgment; some negatives will need intensifying, others will be sufficiently vigorous without. 5. For card portraits a highly albumenized paper is generally used, its finer surface rendering the delicate definition better. Over print slightly, and over tone slightly, your prints will then, on coming from the hypo, be just right.

Lex Talionis.—Thank you for the offer of a list, the instances of such omissions are, we know, plentiful enough; we would rather not print it, however, the matter is of too limited interest. We do not wish, as you suggest, to "carry the war into the enemy's camp;" and a detail of his blunders or shortcomings would not interest our readers. The article in question did not originally appear in *Cosmos*, it is erroneously quoted from that journal by our contemporary. Appearing in two or three French journals without any acknowledgment of its original source, in the uncertainty thus created we simply accredited the author, not knowing to which journal it really belonged. Our contemporary, probably only seeing it in one credited that one, and made a blunder, as the article originally appeared, we have since ascertained, in *Les Comptes Rendus*. In a letter from the writer referred to, we learn that he had alluded to the matter for entirely another purpose, in no sense as a complaint, and that he regretted the misuse made of his incidental remark.

M. L.—See some remarks regarding the revision of awards on another page. Some of the prints on the screens have faded, but not many. It is on the damp walls the mischief has taken place. The same cause endangered the water-colour drawings in the picture galleries, but was fortunately seen, and precautions taken in time.

W. F.—Declined with thanks. See answer to Lex Talionis. Thank you for the card portrait, which is very good.

C. Scholefield.—The formula for developing given by Mr. H. Claudet, was correctly stated in our columns. An error had accidentally crept into the statement as first given in the *Photographic Journal*. In the present number of that journal it is corrected, as you will see.

A. B. C.—The fault is in your negative; the middle tint, which you say is perceptible, is insufficient for printing purposes. The appearance of the print indicates the use of a simply iodized collodion and under exposure. If you continue the use of the same materials, expose very much longer, and secure a much greater abundance of well marked half tone in your negative; you will then be able, by the same method of printing you now adopt, to secure the class of prints you require.

Youthful Aspirant.—Your error consists in not finding the correct focus of the lens. The negative to be enlarged, and the screen on which the enlarged image is to be projected, should each be a specific distance from the lens, varying with the amount of enlargement required. Thus if you wish to enlarge 3 diameters, with a lens of 6 inches equivalent focus, the negative must be placed 8 inches behind the enlarging lens, and the screen 24 inches from it at the other side. If you have a copy of the Photographic News Almanac, you will find a table of distances. Unless you have the correct distances you will not get an approximation to a clear image.

R. B.—You require, to get good results, to have a little more vigorous negatives, and to print a little deeper. If you then fail to get deep tones in the gold bath try another sample of paper. In order to secure good tones in the finished picture, it is absolutely necessary to tone deeper than is required, to allow for loss in the hypo.

Tit Tat To.—Chloride of silver is not unfitted, by standing in the light, for reduction in the usual way. The reduction is merely partially done when it discolours, as you describe.

W. F. W. W.—The black precipitate, and lustrous metallic film produced on adding acetic acid to your silver solution, indicate that the latter is impure. It is probably adulterated with sulphuric acid, which would produce similar results.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 208.—*August* 29, 1862.

## MR. PONTING ON INSTANTANEOUS PICTURES.*

In the period when success in photography was considered to be largely due to the possession of secret formulæ, it used to be a common remark with a celebrated Daguerreotypist, as a reason for avoiding conversation on his art, that "it was impossible to talk long upon a subject without saying *something*." In a work on the collodion process, by the manufacturer of a collodion of high reputation, but unknown constitution, it will naturally be expected that some part of the secret would ooze out. This secret has been the subject of much speculation and some investigation. One experimentalist evaporates the iodizing solution, and submitting the residue to microscopic examination, finds certain plumose crystals, which do not answer to the characteristics of any iodide he knows. Another, proceeding, chemically, applies the reagents for cadmium, and is satisfied from the result that the iodide of cadmium is used. Another examines and states that he finds cadmium and calcium. Still, amongst amateurs and manufacturers the matter remains undecided.

Mr. Ponting has shown that it was quite possible to write a useful book without divulging his secret, or saying much about the manufacture of his collodion. He has, however, said something, and we learn either from direct statement, or by implication, that it contains an iodide only, and no bromide; that the iodide is not, or at least not entirely, that of cadmium, and that it contains equal proportions of ether and alcohol. Beyond this, nothing is divulged as to the constitution of the iodized collodion, which has long held such a reputation for sensitiveness and stability.

On the working of this collodion, and other photographic operations, there is, however, much valuable information. The details of some experiments on the influence of acetate of silver in the nitrate bath, are very interesting, and well worthy of attention. We shall refer to this and some other parts of the book on a future occasion.

Our especial object at present is to call attention to Mr. Ponting's observations on instantaneous photography, a branch of the art which is of very absorbing interest to most photographers at the present time. It is very satisfactory to us to find that a gentleman who has so long and so successfully manufactured a simply iodized collodion, has, from more recent experience, arrived at a conviction which confirms the position we have always steadily maintained, namely, that a bromide properly used is essentially an accelerator, and that its use is imperative in instantaneous operations. Referring to recent discussions on the subject, he says: "This alleged fact of bromine being an accelerator was quite contrary to my own previous experience, for, in all experiments with this material, I found that it not only retarded the action, but produced a thin weak negative." A series of careful experiments were instituted, the issue of of which is a conviction thus expressed: "These experiments, which have since been fully confirmed in practice, clearly demonstrate that for instantaneous pictures, it is necessary not only to use bromide in the collodion, but a small proportion of nitric acid in the bath." A careful detail of the experiments referred to is given, which we subjoin:—

"Five samples of collodion were prepared as follows:—

| | | | | |
|---|---|---|---|---|
| No. 1, Iodized Collodion, containing 4 grs. of iodide to the oz. | | | | |
| No. 2, the same Iodized Collodion, with | | | ½ gr. of bromide added. | |
| No. 3, | ditto | ditto | „ 1 „ | ditto |
| No. 4, | ditto | ditto | „ 2 „ | ditto |
| No. 5, | ditto | ditto | „ 4 „ | ditto. |

"Three nitrate of silver baths were also prepared, of the strength of 30 grains to the ounce.

"No. 1. This bath was made according to the formula at page 22, with acetate of soda and acetic acid.

"No. 2. To this bath was added a quarter of a drop of nitric acid to each ounce.

"No. 3. This was left neutral, or nearly so, having a very minute proportion of acetic acid to prevent fogging.

"The developer was made with—

| | |
|---|---|
| Protosulphate of iron ... ... ... | 10 grains |
| Glacial acetic acid ... ... .. | 6 drops |
| Water ... ... ... ... ... | 1 ounce. |

"Two negatives were taken with each sample of collodion, one exposed two seconds, and the other four seconds, in the three baths in succession, being thirty negatives in all. A landscape lens with a small stop was used, in order to secure complete accuracy and uniformity in time of exposure, which it would have been difficult to obtain with so many negatives, had a shorter exposure been tried.

"Without wearying the reader with a detailed account of all the negatives, it will suffice briefly to state the results that came out.

"First, as to the baths. With the ordinary iodized collodion No. 1, the bath No. 1, with acetate of soda and acetic acid, was unmistakably the quickest of the three, the nitric acid bath, No. 2, being very slow; this, it will be remembered, is the precise results of the experiments detailed at page 19, except that a bath with nitric acid was not then tried. But with the collodions containing bromide, the No. 2 bath with nitric acid proved to be much quicker than the other two baths, their slowness as compared with the nitric bath increasing as the proportion of bromide in the collodion increased. No increase of sensitiveness was gained by the large doses of bromide; on the contrary, the collodion No. 5, with four grains of bromide per ounce, worked much slower than either of the other samples. The proportion of one grain of bromide to four grains of iodide, gave the best results, larger doses of bromide imparted a wavy appearance to the film that quite spoiled the picture, and no increase of sensitiveness was obtained.

"On comparing the negative taken with the No. 1, on iodized collodion, in the bath No. 1, with the negative taken with bromo-iodized collodion, in the nitric acid bath, the latter was markedly the better. The first was a very intense negative, with strong contrasts of light and shadow, and would have printed hard; the latter was a soft, though a sufficiently forcible negative, giving full details in the shadows, and hardly wanted further development; but, with *instantaneous* pictures, the development will have to be continued by using a weak solution of pyrogallic acid, with a little silver added, say

| | |
|---|---|
| Pyrogallic acid ... ... ... ... | 1 grain |
| Glacial acetic acid ... ... ... ... | 6 drops |
| Water ... ... ... ... ... ... | 1 ounce. |

Solution of nitrate of silver (strength, 50 grains to the ounce), five or six drops, or more if great intensity be required.

The iron developer must be previously washed off.

"These experiments, which have since been fully confirmed in practice, clearly demonstrate that for instantaneous pictures, it is necessary not only to use bromide in the collodion, but a small proportion of nitric acid in the bath; these, with an iron developer as strong as the operator can use, as described at page 30, strengthening by the use of the pyrogallic developer, is all that is requisite in the way of chemicals. But it must be borne in mind that everything must be of the highest degree of purity, and prepared with the utmost care."

* "Photographic Difficulties; How to Surmount them: Instantaneous Pictures; How to obtain them." By T. Cadby Ponting. London: Bland and Co.

On the use of this collodion in the operating room, he adds :—

"The same bromo-iodized collodion, with the nitric acid bath, was also tried for portraiture, and found to effect a considerable saving in the time of exposure; but the use of the two developers, and the long time occupied in the development, is somewhat against it. Where, however, a short sitting is desired, the extra trouble must be put up with; against this must be placed the ease and cleanliness of working with a collodion containing bromide."

As to the value of a bromide in securing immunity from spots, &c., we have testimony even in that part of the book which is devoted solely to the use of iodized collodion; and we are glad to find our own experience as to the marked effect of a very infinitesimal dose in this respect, in reference to which our friend Sutton has charged us with over refinement. Referring to transparent spots being common when using newly iodized collodion, Mr. Ponting recommends the addition to each ounce of from five to ten drops of a 20-grain solution of bromide of ammonium in spirits of wine. Twelve drops or minims of this solution would contain just half a grain of bromide, so that the addition recommended is from a quarter of a grain to half a grain of bromide per ounce. This, it must be borne in mind, is to be added to the collodion sold ready iodized, if used new and producing spots.

Mr. Ponting's book will be read with great interest by all photographers. He divides his work into six parts. These treat of the Chemicals, of the Manipulations, of Failures—their Causes and Remedies, of Positive Pictures on Glass, of Printing, &c., and of Instantaneous Pictures. Perhaps, if any exception be taken to the work at all, it will be to its title, "Photographic Difficulties." It is really rather a useful manual of formulæ and manipulations, than a treatise upon difficulties, which do not occupy a larger space than is customary in manuals. It is quite true, however, that if the photographer follow carefully the instructions given as to precision and care, he will not be likely to meet with many troubles, and in this sense the title may be regarded as no misnomer.

## TRANSPARENCIES ON GLASS.

We have recently received from one of our amateur readers, Mr. Thomas Ratcliffe, of Colne, half a dozen very beautiful stereoscopic transparencies. They are characterized by unusually perfect and delicate definition, fine tone, and atmospheric effect; some of them possessing natural clouds. The tones are chiefly of a purple black, and they are remarkably brilliant and clean. In a conversation with Mr. Ratcliffe we learnt that they were all from dry plate negatives, produced by the tannin process, or the resin process; and that the transparencies were on plates prepared in all respects as those on which were produced the negatives. They were all printed by superposition by gas light, and from the shortness of the exposure both in printing and in obtaining the negatives, it was evident that as dry plates they possess a considerable degree of sensitiveness.

In reference to the printing by gas light, Mr. Ratcliffe referred to a common fallacy in the instructions for conducting the exposure: it is usually recommended if a simple gas flame be used, without a reflector, that the frame holding the negative and sensitive plate should be moved about so as to secure equality of illumination all over the plate. This Mr. Ratcliffe strongly objects to, with very sufficient reason; it is next to impossible, as he asserts, to bring the two rigid surfaces of glass, that of the negative and sensitive plate, into absolutely perfect contact; and such being the case, if the rays of light strike the surface of the negative obliquely, refraction ensues, with a consequent loss of sharpness in the positive. But if the frame be held quite still, near to a moderately large gas flame, the rays reaching the surface of a single stereoscopic picture are so nearly parallel, and impinge so nearly at right angles, that no loss of sharpness is perceptible. Since Mr. Ratcliffe was in London, he has been so good as to respond to our request that he would prepare, for the benefit of our readers, a brief statement of the formulæ and method of manipulating, by which he obtained such excellent results, both in producing negatives and transparent positives. We shall now give his brief but practical description: it will be seen that the operations throughout are very simple, and that the method of using acetic acid in the first washing, dispenses with its use in the silver solution, and permits the use of a bath nearly neutral, and in good condition for wet plates, instead of preserving one for use with wet plates only. Mr. Ratcliffe writes:

"In accordance with the promise made you to forward particulars respecting the way in which I work out the tannin and also the resin process, I shall now endeavour to do so as briefly as possible.

"Tannin Process.

"*Preparing the Plates.*—Clean and dry the plates as usual, affix to plate-holder, breathe on the surface, and while moist pour over a dilute solution of albumen made as follows :—

| | |
|---|---|
| Albumen ... ... ... ... | 1 ounce |
| Water ... ... ... ... | 4 ounces. |

Froth well; then add 12 drops liquor ammonia. Put the solution aside in a cool place for twenty-four hours, then bottle for use. Filter through a small bit of sponge placed in the neck of the funnel, to take out the air-bubbles as you coat each plate; dry rapidly before the fire, and store away the plates for use.

"*Exciting the Plates.*—Coat with collodion (I use Mawson's negative), and allow the film to set pretty well, then immerse in the silver bath, the strength of which is 35 to 40 grains to the ounce, very slightly acid with nitric acid. Allow the plate to remain until arrangements are making for coating another, then remove without draining, into a small dish or tray containing—

| | |
|---|---|
| Water ... ... ... ... | 6 to 8 ounces |
| Glacial acetic acid ... ... | 20 minims. |

Proceed to coat and prepare plate No. 2; when the latter is properly sensitized remove plate No. 1 to another dish containing spring water, placing No. 2 in the acetic bath. Wash well, place on levelling stand, and coat with tannin solution, made 15 grains to the ounce of water, filtered prior to use; let this remain on the plate until you coat and prepare another plate, then stand on one corner to drain and dry spontaneously; when thoroughly dry store away for use.

"*Exposure.*—With a fair light one minute will be sufficient.

"*Lens.*—Portrait combination, 7-16th stop, 4¼ inch focal length.

"*The Developer* is made as follows :—

| | |
|---|---|
| Pyrogallic acid ... ... ... | 2 grains |
| Citric acid ... ... ... ... | 2 „ |
| Glacial acetic acid ... ... | 2 drops |
| Water ... ... ... ... | 1 ounce. |

Moisten the surface of the plate, or immerse in your tray of spring water for one minute, place on the levelling stand, and pour over about three drachms of developer, let this remain a few seconds, then add two drops of silver solution, strength 20 grains to the ounce of water. This is sufficient to bring out all the detail; if the developer becomes discoloured, wash the plate and use a fresh supply, adding four drops of silver, which in most cases is sufficient to bring up the required intensity. Fix with hypo as usual. If any deposit appears on the plate when dry, rub the surface with a little cotton wool prior to varnishing."

Mr. Ratcliffe is equally successful with resin plates, which he finds a trifle more sensitive than the tannin.

"Resin Process.

"Simply add to the collodion ½ grain of common resin to the ounce of collodion. Then proceed exactly as in the tannin process, omitting the tannin, viz.—

"Coat with albumen.

"Coat with collodion.

"Sensitize.

"Remove to acetic bath.

"Then wash well, and dry prior to storing away for use.

"Exposure about the same, if anything, perhaps rather quicker. Develop and fix as before.

"It may be asked, why use the acetic bath at all, why not add glacial acetic acid to the sensitive bath? In reply to this assumed question I have two reasons:—1st. Glacial acetic acid is liable to derange the bath, forming fine, needle-like crystals, which adhere, and spoil the surface of every plate you may immerse; and, 2nd. Using the same bath for wet plates, I prefer omitting glacial acetic acid, in the sensitive bath, and in lieu add pretty freely to developer.

"I am most firmly impressed with an opinion that when albumen is used as a base, the glacial acetic bath plays a most important part.

"Having now given you a description of the preparation and development of negatives, I proceed to the printing of transparencies, which I always accomplish by gas-light, with a good tulip burner, placing the picture within four inches of the jet. I find, according to the density of the negative, that 25 to 50 seconds is quite long enough. When printing, the negative ought to be placed on a stand, or kept very still, if the two plates, are not in perfectly close contact any movement, however slight, will cause, by double refraction, a great loss of definition and sharpness. This, I think, has been overlooked by amateurs generally.

"Develop and fix as in the tannin process.

"A variety of tones may be obtained by regulating the exposure and development of dry plates. Transparencies, should they be rather over-exposed, and have a reddish or brown tint, a very weak solution of hypo and 2 drops of chloride of gold, will bring a fine purple or black tone, which is very pleasing in transparencies.

"I have now given you my method. I claim nothing new, simply careful, clean, methodical manipulation. The specimens left with you are a proof of what might be done, if fully carried out by one having more time at his disposal than I can give to experimental photography."

The colour produced in the specimens of Ratcliffe were chiefly of the purple and black tones, very fine, but perhaps a thought too cold for the taste of some; by the processes described almost any tint, from red to black, could be secured by the modification of exposure and development.

There is another class of tone not so easily obtained, however, by the processes just described. The colour to which we refer is a rich sepia, or perhaps more nearly bistre; and is generally obtained in transparencies printed on albumen. The slides of Messrs. Ferrier and Soulier furnish examples of this colour. Some time ago we received some very fine transparencies from Mr. G. W. Hale, M.A,, of Eastbourne, which had the exact colour of those on albumen, and possessing a richness and depth we have rarely seen surpassed. We were informed, however, that they were produced on Dr. Hill Norris's plates. Mr. Hale has kindly furnished us with particulars as to his method of toning for the benefit of the readers of the News. We now subjoin his communication:—

"Much as transparencies on glass are to be admired, few photographers (amateur or professional) appear to me to know much about the printing of them. All the information I possess was bought by the tedious and expensive process of self teaching. I was not satisfied with the simple development and gold toning, the colour was not to my taste, so I worked away until at last I hit upon a method which produced the sepia colour, which all must admire. I send you a minute description of the way I proceed, and if you think it worth while to publish it, it may save many from trouble and expense.

"The negative must be a good one, to obtain good results, full of detail, not very dense, and with no great contrasts of light and shadow. The dry plate for the transparency may be prepared by any known process, except the oxymel (the colour of which will be black when developed my way); place the negative in a dark slide, and the dry plate on the top of the negative, the two films touching, place blotting paper on them till the pressure is equal all over, when the door of the slide is shut, expose at a shady window, avoid direct sunlight, no rule can be laid down for exposure, it is the essential point, and must be left to the operator's judgment. Having exposed, develop the plate as usual with

| | |
|---|---|
| Pyrogallic acid ... ... ... | $1\frac{1}{2}$ grain |
| Citric acid ... ... ... ... | 1 ,, |
| Water ... ... ... ... | 1 ounce |
| Silver, a few drops | |

Wash well, fix with cyanide or hypo, and wash thoroughly, the picture if properly exposed (it should be rather over-exposed) presents at this stage a feeble appearance, but all the detail showing.

"The plate being well washed from all trace of the fixing solution, take a little of the pyrogallic developer, a few drops of the silver solution, and a few drops of glacial acetic acid, pour it on and off the plate until the picture stands out nearly as much as you require it to do when finished. Wash well, and float the plate with a saturated solution of bichloride of mercury, until it is quite white, even in the deepest shade, the shadows of course whiten last. Wash again thoroughly, next take a 30-grain solution of ammonio-nitrate of silver, and pour it on the plate, it immediately changes to a greenish yellow tint, and gradually darkens; add a drop or two of ammonia, it will hasten the change of colour, and very soon the picture will stand out bright and clear, the brown sepia colour of the picture I send you. Some time after finding out this method of printing them, I read an article in your paper, by whom I forget, recommending bichloride to whiten, and ammonia in water, or cyanide of potassium to effect the change, either will do so I know, but I found the ammonio-nitrate made a much richer colour and gave a sepia tint, whereas plain ammonia and water gave nearly a black tint. Of course it is the ammonia that changes the colour, and I am not chemist enough to say why ammonia-nitrate should give a better colour than plain ammonia, but so I have found it, and I am sure any one else who tries will find I am correct. The transparency I send to you is printed on one of Dr. Hill Norris's plates. The colour can be made the same on albumen as on collodion."

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Potassium Salts* (continued).—*Benzoate of Potash.*—Benzoic acid is occasionally used in photography in conjunction with silver. Benzoate of ammonia is usually employed for the preparation of the silver salt, but we think the potash salt preferable, as it is more stable than the other. Benzoate of potash is prepared by adding the acid to a solution of potash until the liquid has a slightly acid reaction; the solution is then filtered and evaporated carefully over the water bath. Upon arriving at the proper degree of concentration it is allowed to cool, when the potash salt crystallizes out in delicate pointed crystals, which remain dry when exposed to the air. The salt is, however, very difficult to crystallize from water, so it may be preferable to evaporate the aqueous solution to a syrupy consistency, and after drying the salt, which separates on cooling, between blotting-paper, to dissolve it in strong alcohol; from the hot saturated alcoholic solution benzoate of potash separates in needles united in tufts, and sometimes in laminæ having a pearly lustre. The salt has a sharp, somewhat burning taste, and dissolves very easily in water.

*Soda Salts.*—After the detailed description which we have given of potash and its salts, it will be unnecessary to devote much space to the compounds of soda, some of these salts are, however, essentially different in character to those of potash. and a notice of these is, therefore, essential. The caustic alkali has, during the last year or two, been manufactured at our large soda works in considerable purity; this is the most concentrated and active preparation of the alkali, and is an entirely new branch of manufacture introduced of late years for exportation to America and other localities to which carriage is expensive. It is prepared in the Lanchashire soda works from the black ash liquors in which a considerable portion of the alkali is actually present in the caustic state. Upon concentrating the liquor in iron boilers, the whole of the salts present separate in a solid state, leaving the caustic soda with only a few impurities, which may, in great measure, be removed by throwing a little nitrate of soda into the pans. In concentrating the strong alkaline solution considerable annoyance used to be caused by the liquid continually frothing over. This is remedied in so ingenious a manner that a short notice of it cannot fail to be of interest to our readers. At the bottom of the pan in which the operation is conducted a conical pipe of sheet iron is placed, which is open at both ends, and reaches about an inch above the level of the fusing mass. The tube is supported by feet a little distance above the bottom of the pan, so that free passage of the liquid is allowed. Steam being formed at the bottom in contact with the heated iron, the liquid is forced out at the top of the tube, forming an artificial Geyser, similar to those of Iceland, altogether preventing any violent ebullition occurring in other parts of the pan, and effectually putting a stop to the boiling over. Several improvements have recently taken place in the production of this body on the large scale, but as we have referred to these in our recent articles on the photographically interesting chemicals in the International Exhibition, a second notice is not needed. All the impurities which we have already mentioned as being likely to be present in caustic potash, may occur in caustic soda, and may be separated in the manner recommended under the former heading. In the pure state, solid caustic soda forms a white opaque brittle substance of a fibrous texture, fusible below redness, very deliquescent, dissolving in water with considerable evolution of heat, and greedily absorbing carbonic acid. The aqueous solution is a colourless, caustic liquid, which, when concentrated, deposits colourless, four-sided tables of the hydrated alkali.

*Carbonate of Soda.*—The manufacture of this salt, carried on simultaneously with that of oil of vitriol, gives employment to an immense number of hands, many of the soda works in the north of England being amongst the largest chemical manufactories in the world. The carbonate is made from sea-salt, which is first converted into sulphate of soda by treatment with oil of vitriol, which liberates hydrochloric acid. By ignition with lime and coal the sulphate of soda is reduced to sulphide, and upon extracting the mass with water a somewhat complicated reaction takes place, and the liquid contains caustic and carbonate of soda. We need not enter into the details of the purification of this body, but will take the salt as it occurs in commerce, in large transparent crystals known as soda. In this form it consists in great measure of the compound with ten atoms of water. When gently heated it fuses in its water of crystallization, and if the heat be increased the whole of the water goes off. In dry air the salt effloresces, losing several atoms of water, the exact number varying with the temperature. From its mode of manufacture carbonate of soda is liable to contain many impurities; we do not here speak of some crystals which now and then come under our notice, and which, upon analysis, turn out to be little else but sulphate of soda; but the best commercial samples which can be obtained are almost invariably contaminated to such an extent as to be unfit for accurate work until purified. The impurities which may be present are:—*Sulphide of Sodium.*—This may be detected by adding a slight excess of hydrochloric or sulphuric acid, and applying the nose to the carbonic acid, which is evolved; if sulphide of sodium be present as an impurity, sulphuretted hydrogen will be at once evident by its characteristic odour. *Hyposulphite of Soda.*—If this salt be present the addition of hydrochloric acid will cause sulphurous acid to be evolved, which may also be easily recognized by its odour; in this case, also, sulphur will be gradually precipitated. *Sulphate of Soda.*—To detect this, after the excess of dilute hydrochloric acid has been added, add a drop of chloride of barium, if this impurity is present an insoluble precipitate of sulphate of baryta will appear. *Chloride of Sodium* may be detected by supersaturating with nitric acid and adding nitrate of silver, the well-known curdy precipitate will denote the presence of chlorine. *Ferro-cyanide of Sodium.*—To detect this impurity take a little solution of sulphate of iron, which has been allowed to become partially oxidized by exposure to the air, add a few drops of this to the suspected liquid, previously mixed with an excess of hydrochloric acid, the slightest trace of ferro-cyanide of sodium will be rendered evident by the production of the rich blue precipitate or colouration of Prussian blue. *Carbonate of Lime.*—This may be detected by adding a few drops of oxalic acid and then an excess of acetic acid; a white insoluble cloudy precipitate will show the presence of lime. *Carbonate of Magnesia* is, also, sometimes present; it may be detected by adding a considerable quantity of chloride of ammonium, nearly, but not quite, neutralizing with hydrochloric acid, and then adding a drop of phosphate of soda, the solution is then violently agitated, and afterwards allowed to remain at rest for twelve hours. *Potash salts* may also be present, but the detection of this base is attended with considerable difficulty; and, moreover, is of very little importance even if present.

Commercial carbonate of soda may be purified by pounding the ordinary crystals very finely, and washing them with cold water; they are then dissolved in as small a quantity as possible of hot distilled water, and the solution filtered if necessary. The liquid is now rapidly cooled by placing the vessel in cold water, stirring it all the time with a spatula, so that small crystals may be formed. Collect these on a funnel, and after the mother liquid has drained off, wash them with cold water till the drainings, mixed with excess of nitric acid, no longer give a precipitate with nitrate of silver.

# The International Exhibition.

## BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

We have before remarked that the display of apparatus at the Exhibition is not distinguished by any especial novelties; nevertheless, an examination of the respective contributions must prove interesting to photographers, inasmuch as they have an opportunity of inspecting, in close juxtaposition, the best work of the various manufacturers and dealers, and of ascertaining the speciality of each, to which it may be fairly assumed particular prominence will be given in the respective cases.

Messrs. Bourquin and Co. (3047), have long had a reputation for the excellent quality of their French goods. The bulk of their contributions to the present Exhibition consists, however, of articles of their own manufacture. Prominent amongst these are a great variety of photographic albums, of good quality and great elegance of design. An excellent idea is acted upon in many of these, in making the mount which surrounds the picture of a cream tint, by which the fullest value is given to the whites of the photograph, and any slight tendency to yellowness "carried off." Samples in great variety of styles in London—made passepartouts, mounts, and other forms of *entourage* for the photographic picture, are exhibited. Camera stands and cameras of excellent quality are also shown. We may mention amongst the latter a large universal camera, extending from four inches and a half to something like forty inches, and suitable for copying, enlarging, &c., as well as for ordinary work. A "Composition Printing Frame," by Mr. Hart, and some other articles complete the display.

Mr. Cox, of Skinner-street (3064), exhibits a large variety of useful apparatus. Amongst the objects which first attract attention, are seventeen medallion heads, glass positives. These are produced with as many different exposures on one plate, by means of a camera back or dark slide, described as the "Camera shield for producing four *cartes de visite* or seventeen medallion portraits on one plate, and with one lens." The dark slide is made to revolve by a repeating arrangement around the axis of the lens, and is arrested by a catch spring when it arrives at the position where the portrait is required. The improvement in this arrangement over the American Camera shield, is that the collodion plate does not revolve on its own axis, therefore the drainings of the plate will not flow over the picture, the dark slide being vertical at all points of its circuit. The medallion heads are very fine toned and brilliant collodion positives, produced, we understand, with Fisher's collodion, and a developer of protonitrate of iron, containing formic acid.

An ingenious instantaneous shutter is shown by Mr. Cox: it is attached to the central diaphragm, and works in the tube of the lens. It allows any amount of exposure that may be desirable. In its slower movement it works remarkably easy, therefore reducing the vibration to a greater extent than many others. The principle of its construction is this:—Two flaps or shutters of brass are affixed to the diaphragm, and worked by an axle, protruding through the brass tube in which the lenses are mounted, motion being obtained by giving this handle a twist or turn; therefore, if desirable, the flaps are opened and shut as quickly as the fingers can be snapped; but if half a turn only is given to the ivory knob, a slight spring catches the axle, and both shutters are arrested until the spring is released. A very neat, light, and compact binocular stereoscope camera is exhibited. It possesses the advantage of having all its parts attached, thus obviating a difficulty often experienced by the loss of loose parts in the field. This, with three double backs, is stated to weigh only 3¾ lbs., and measures when packed, 7¾ by 5¾ and 5 in. A neat field box, containing the chemicals for a day's use, and also forming a developing box; some portrait cameras; a Sutton's reflecting stereoscope; specimens of glass portraiture, &c., are also exhibited.

Mr. Dallmeyer (3069) has a very handsome display of apparatus generally, prominent amongst which, however, are his various lenses, with cameras especially adapted to the especial purpose for which the lenses are designed, specimens of which are exhibited in the case. A variety of triple lenses of different sizes, for pictures from 7¼ by 4½ to 25 by 21. Examples of the work done by these lenses consists of a number of Wilson's exquisite views, recently noticed in our pages; copies of maps; portraits &c. Amongst the latter we must notice here, as it is the only copy in the Exhibition, a very charming rural study, called "The May Gatherer." A pretty girl in rustic costume reclines upon a grassy bank, surrounded by the heaps of May blossom which she has just gathered. The easy repose of the figure, the good composition, the idylic sentiment, the perfect definition of every blossom and every blade of grass, the atmospheric sky, and tasteful vignetting, all combine to render this as charming a little bit as Mr. Robinson has produced.

Mr. Dallmeyer exhibits his compound stereoscopic lenses for instantaneous views, and several pictures taken with them, the instantaneity of which, and the perfect definition illustrate the excellence of the lens. There are also some new single combination view lenses for stereoscopic work. They are of 4½-inch focus, and of 6 inches focus respectively, and are made so as to give fine definition with very large aperture, and are thus suitable for instantaneous work where the double lenses are objected to. These lenses were, we believe, first constructed to meet the especial wants of Mr. Wilson, and one of his very fine instantaneous pictures is exhibited as illustrating their powers.

Examples of his quick acting portrait lenses, for pictures from card size upwards, are shown, and have their powers illustrated by photographs from the studios of Williams, Lacy, Robinson, Mayland, Hawke, Abbott, and others. We are almost disposed to think that as charming a display of photographs is to be found amongst these specimens, as there is on any part of the building. There is also a new enlarging lens of especial construction. It consists of two double combinations of very short focal length: it gives great intensity, and perfect definition both in the centre and margin of the picture, with freedom from distortion. Mr. T. R. Williams exhibits some fine enlargements produced by this lens.

As regards apparatus generally, the principal features of Mr. Dallmeyer's contributions are most excellent workmanship, simplicity of design, and great adaptation to a given purpose: these remarks especially apply to the new stereoscopic or Wilson camera, combining in one instrument, capabilities for taking stereographs, and also one picture on the full size plate used, which is 7¼ by 4½, when using the No. 1 triple achromatic lens. The central partition of this camera, which is removeable, is at once a simple and ingenious contrivance. Several forms of shutters for instantaneous pictures: the first, a simple flap shutter, which may be said to be sufficient for most purposes, where absolute instantaneity is not an object, such as sea views and the like; this shutter has the advantage of exposing the foreground more than the sky, and may be used to shade off the sky in long exposures. Next, is what is called a roller shutter, by means of which the opening and closing can be effected by one continuous movement, this also gives a greater exposure to the foreground, and is of especial use in the portrait room. The third shutter, invented by Mr. Mann, admits of the most instantaneous exposure, for it opens and closes at the centre, and therefore gives a maximum of exposure in a minimum of time. A description recently appeared in our pages. There are also other contrivances for opening and closing the lenses in the studio, which, however, in principle resemble those just referred to. The Bellows cameras exhibited are on the Kinnear plan, but remarkably steady when the bellows is expanded to the full length by means of the endless focussing screw. The *carte de visite* cameras, for two and more pictures, appear to be simple in construction, adapted to the purpose, durable, and extremely well finished. Among the square or trunk cameras of larger dimensions for the operating-room is a beautifully finished brass-bound camera for plates 12 by 12. This possesses all the appliances for moving the screen or collodion plate in both the horizontal and vertical planes, effected by suitable rack and pinions at the sides; the focussing being effected by screws. There are several well contrived boxes for apparatus, &c., one in tin for stowing away his New Stereoscopic Camera, in which every inch of space appears to be utilised. These and sundry other requisites for the Art, such as glass baths, pressure frames, &c., &c., all of good design and first rate workmanship, complete the contributions.

## THE INUNDATION IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

The next day turned out all that the most fastidious photographer could desire. A smart S.W. wind blew the clouds into compact masses, that arranged themselves into the most fantastic shapes. The sky indeed during our ride would have thrown Stanfield, had he been present, into a most ecstatic state of enthusiasm.

When we got to the works we found that twenty-four hours had been well spent by the busy workers. The

* Continued from p. 401.

panels* were all in position, and they were only waiting for still water to drop them home. This being a very momentous operation, there was an unusual assemblage of engineers and noteworthy personages on the works, and we were fortunate enough to secure two pictures, in which they were all introduced, one gentleman was caught in the very dignified act of blowing his nose. One of the pictures we took was extremely interesting, for one of the navvies is shown in the act of throwing a sack of clay into the boiling waters. The spray caused by the falling sack is just dashed up; and the navy's barrow is still turned upon its side.

Having completed our labours at the coffer dam, we packed up, and were soon on our way for the inundated farm houses. At a way-side inn, where we stopped for refreshment, we were very much amused by the conversation of some men, whose outward appearance led us to think them farm labourers, but whose very learned talk proved them to be Brunels or Telfords in embryo. Had the task of stopping the waters have been entrusted to them, they would have managed it on the first day of the outbreak. The plan of one of them struck us as worth some attention. He would have made one of the now broken bridges the base for his operations, for he would have placed the pile driving engines upon the bridge, and have driven a row of piles on each side, and then having taken off the top of the bridge, he would have filled up the space with sacks of clay. We left these sapient gentlemen to finish the dam with wind bags, and in a short time we reached the breach in the bank. We now lost all traces of human habitation, for we had to travel on a miserable soft road by the side of the bank, and so cut up by cart ruts, that several times we had to get out to lift the unfortunate conveyance out of the deep cuttings. Our progress was so slow that I could endure it no longer, but got out and walked on the top of the bank, leaving the conveyance to follow.

On reaching the farm house, I saw a female at one of the upper windows, who was calling for some one to briug the boat, for it was fastened to the bank, and she was in consequence a prisoner; as her calls were fruitless, for no one put in an appearance to her summons, I volunteered to personate the character of the jolly young waterman for her benefit; an offer which was very thankfully accepted. After some little trouble, for there were no oars in the boat, and nothing to manage it but a pole, I succeeded in making a start, but my next essay was anythiug but a success, for on placing the pole down to propel the craft, I found no bottom, and in consequence very nearly turned a somersault into the water. It turned out I was crossing a drain about 20 feet deep. I found my course, though a short one, very difficult to navigate, for I had no chart. I had to get through a hedge, and then found more dangers ahead in the shape of fruit trees in the garden. Shortly, however, I found myself under the window; and was repaid for all by the agreeable task of assisting a young lady out of the window. I tried to picture myself the hero of a *very small* romance, and a procession of gay cavaliers with rope ladders, gondalas, &c. &c., passed rapidly across the retina, but these were all cruelly put to flight by a gruff voice which proceeded from the governor, who put his head out of the window, and said "are you all right Mary," and on an answer in the affirmative being given, he proceeded to hand down various pails, jugs, &c., for I found that they were going about three quarters of a mile for water. This was indeed a bitter jest. Truly had the picture of Coleridge been realized: "Water, water everywhere, but not a drop to drink."

The wife of this gentleman had made herself quite famous, for when every one else had deserted their homes in terror, she heroically remained, and has continued to do so. The water determined to have the best rooms, but she disputed its claim inch by inch, and finally removed everything portable up stairs, and there she now holds undisputable possession. Every night, when the family are all in the house, the boat is moored to the drawing-room window, and they are secure from all intrusion, except from watery visitors.

Our conveyance had by this time struggled up to us, and I proceeded to prepare for work; but now came a difficulty I had not thought of before. I also wanted water, not to drink, but, at any rate, fit for photographic operations, and not a drop was to be had, but the dirty salt water all around me. After some consideration, during which I saw no way out of the difficulty—time was valuable, for it was near sunset and I could not afford to journey a mile and a half in search of water, if I could help it—I determined, therefore, to try the water near at hand; and tore off a strip from one of my cloths for cleaning glasses, and tied it on my tap so as to serve for a filter. I tried a plate, and found it answer very well. Of course it was impossible to intensify the pictures, I therefore well washed them, and coated them with glycerine, and put them aside for future operations. I noticed that the water produced a very curious effect on the plate when first applied. It appeared to rapidly darken the picture wherever it first touched, but after fixing there was nothing unusual in its appearance. When, however, during the washing of one of the pictures my supply of water failed me, and I could not, in consequence, cover the plate rapidly, I found that it was stained wherever the water first touched it, and that no after washing proved of any avail.

I tried four plates, and certainly they proved faithful representations of a most dismal and melancholy scene, but they were unfortunately not aided by the genial influence of the sun, for he turned sulky and retired to bed early behind a bank of clouds by no means attractive in appearance, and as there was no chance of his condescending to enlighten us any further, we packed up, and after a weary two miles journey, over ground made still more dangerous by the twilight that encircled us, we turned on to the gravel road with a lightened and thankful heart that we had not broken the wheels off, nor turned the conveyauce over, a contingency that seemed probable every moment, until we reached, what to us was *terra firma* viz., the turnpike road. In an hour and a half we were in Lynn once again, and quite tired of photography for that day. Y.B.

* The construction of the dam is very ingenious. Two rows of piles are driven at equal distance from each other, and extended across the stream. Each pile has two companions broader but not so thick, which are placed on each side of it. These are all bolted together, and so form immense groves, into which the panels, formed of thick planks of timber firmly joined, are fitted. These were dropped into the groves, and the space between the two rows filled up with sacks of gravel, clay, &c.

## A SHORT LESSON ON PHOTOGRAPHY.—No. 2.

BY J. TOWLER, M.D.*

The decomposition effected by means of chloride of sodium and nitrate of the oxide of silver, is a very interesting example of a group of similar decompositions, not only with nitrate of silver and any one of the soluble chlorides, but with pairs of other salts, as with sulphate of potassa and the salts of barium, lime, or strontia. Now, I mean by the soluble chlorides such salts, resulting from a chemical combination of chlorine and a metal, as dissolve in water. As a general rule for you, as a beginner, you may regard all true chlorides as soluble, with the exception of *chloride of silver*, *chloride of lead*, and *protochloride of mercury* (calomel). The soluble chlorides are those of potassium, sodium, lithium, ammonium, calcium, magnesium, &c., through all the metals. The chloride of silver produced by the decompositiou of any one of these chlorides is the same when washed as that from the chloride of sodium: it is always sensitive to light; it always changes colour in the same proportion, and is equally insoluble, when thus acted upon, in hyposulphite of soda. You will observe here what an extensive choice we have in the materials for producing the same effect, and will recognise hereafter from this observation a clue to the variety of formulas recommended and used by photographers. I must not omit to mention that hydro-

* From *Humphrey's Journal*.

chloric acid might be used instead in every case where chloride of silver is desired; it is not, however, always practicable in photography; because the materials employed for receiving the chloride of silver would be injured by this acid. But hydrochloric acid is also a chloride; it is the *chloride of hydrogen*. With this introduction to your lesson to-day, let us enter practically upon our duties:—I have here a sheet of paper of a very fine and homogeneous texture, which has been placed in the sunlight, but has undergone no change, as you would naturally suppose; but now observe attentively, and write down carefully, every experiment. Give me that egg. I will separate the white part from the yellow. This white of egg is pure *albumen*. The serum of blood (that thin transparent liquid which is separated from the clot after the coagulation of the blood), is also albumen. Besides this, we have other specimens of albumen, as the serum of milk, obtained by separating the caseine (curds), after the addition of an acid, or of rennet. Weigh out six drachms of the white of egg, and place it in a clean bottle; cork it up, and shake it effectually until the albumen becomes a complete froth, and set it aside to settle for a number of hours. By the by, here are exactly six drachms of albumen which I prepared yesterday. Decant off the thin portion from beneath the froth into a teacup; mix with this two drachms of rain water, or of distilled water, and fifteen grains of chloride of ammonium (sal ammoniac). Let these three ingredients be intimately incorporated, and then poured upon a clean dinner dish, so as to form a uniform layer on the bottom. Remove any bubbles from the surface by drawing over it the edges of a piece of writing paper several times. I will now cut up the sheet of fine paper, that has been lying in the sun, into small pieces; six by eight inches will be a convenient size. You observe I double each corner of each piece like the ears on the pages of a schoolboy's first reader, but with this precaution, that the ears all point in the same direction. Now, taking hold of two ears diagonally opposite, I bend the paper and lay the curved part on the prepared albumen, and then gradually lower each end until the piece of paper lies quite flat and swims on the salted albumen; or we may begin with the right edge of the paper, and lay this first in contact with the liquid and gradually drop the left hand until the same effect is produced. Now raise the nearest right corner, and see if there are any bubbles, which must be broken up by a piece of clean glass rod, after which the paper must be replaced. Take the glass rod in the left hand, raise the farthest left-hand corner with the right hand, and remove all the bubbles in like manner. The paper is now allowed to float or lie on the surface of the albumen for about three minutes; the upper surface of the paper is naturally kept dry all the time, not even a drop of albumen being allowed to come in contact with it, not that in this case it would be injurious, but because it is not necessary, and because you must habituate yourself to neatness in every operation. After the three minutes had elapsed, the anterior right-hand ear of the paper is raised by a pin held in the right hand, whilst the left hand seizes the raised ear; as soon as this is accomplished, the pin is pushed through the ear, and by means of the pin the paper is suspended on a wooden partition, with its lowest extremity just hanging over the edge of a dish beneath, which is placed there on purpose to receive the superfluous albumen. In this manner it is allowed to dry. The rest of the sheets are treated in the same manner.

Whilst they are drying, I will explain to you the philosophy of the chemical part of the operation. You will recollect the experiment in the first lesson, where the chloride was thoroughly washed, and afterwards placed in a teacup and exposed to the sun. This chloride was a white residue; if it had been perfectly dried in the dark, it would have been in the form of a fine impalpable white powder. When this was exposed to the sun's rays, it became coloured, forming a violet coloured layer on a white background. Now, see the analogy in the paper; the fine surfaced paper is equivalent to the white porcelain; it is a white background; the albumen holds in solution a soluble chloride; by draining, the chloride and the albumen, in intimate mixture, are spread uniformly over the surface of the paper, ready to be acted upon by nitrate of silver, so as to produce the double decomposition on and in the albumen, to a certain extent, chloride of silver in a state of very fine division. But before we place the sheets of paper on the nitrate bath, which I will shortly describe, it is certainly an advantage to coagulate the albumen on the dried surfaces, which prevents the solution of the albumen. This coagulation is best effected in the following manner:—The albumenized sheets are folded together into one roll, and then placed in a round tin box much longer than the roll of papers; the box is now dipped into a kettle of boiling water, deep enough for the water to stand higher on the outside than the top of the roll in the inside. In this way the paper is submitted for some time to the heat of boiling water, which renders the albumen in a measure insoluble in the media in which it has afterwards to be placed. The paper being thus prepared, I will now proceed with my experiments.

In this flat dish I have a solution of ammonia-nitrate of silver, which is prepared as follows:—Take an ounce of nitrate of silver and dissolve it in six ounces of rain water; after the silver is dissolved divide the solution into two portions, one containing two ounces and the other four ounces; to the former add liquor ammoniæ, drop by drop, until the brown precipitate which is first formed is redissolved; then mix the two portions together, and add thereto half an ounce of alcohol. This is the ammonio-nitrate bath for albumenized paper. I must tell you here that the ammonio-nitrate of silver forms a chloride which is far superior to the simple nitrate in sensitiveness to light; it is, therefore, on this account, preferable. Ammonia, however, would dissolve the albumen from the surface of the papers; I therefore add a counter-agent in the form of alcohol. This serves the purpose effectually. Now take your bath into a dark room, and place on its surface each albumenized sheet with the same precautions as already prescribed for albumenizing. Let each sheet remain about ten seconds in the bath; this time will be found abundantly sufficient for the purpose. On removing the sheets from the bath, pin up each by one of its corners in such a way as to allow the superfluous fluid to drain off into a dish beneath, and let them remain in this condition until they are perfectly dry. Drops of the ammonio-nitrate sometimes remain on the lowest corner; it becomes necessary in such cases to remove them by a glass rod, or a pad of cotton wool.

This lesson is somewhat longer than the last, I will, therefore, conclude it with a simple experiment, and resume the subject in my third lesson. I have here a leaf which I picked up in the woods; you observe all the chlorophyll has been destroyed, and that nothing remains but the beams and rafters, the reticular skeleton of the leaf. How beautifully minute is each fibre! and how artistic each mesh! Take one of our sensitized sheets of paper, place it on a piece of board a little larger than the sheet; upon this, in the centre, place the decayed leaf, and over this a plate of glass with weights on the corners to keep the paper and the leaf in juxtaposition. Now carry the board and expose the leaf to the sunlight. Observe how quickly the rays of the sun act upon the sensitized paper; in a minute I will remove it into the darkened room. Look, now, at the magic operation. Wherever the rays of light have been able to pass without obstruction, the paper is darkened; wherever the net-like fibres have intervened, the paper is white. This operation is a specimen of what is denominated *sun-printing*, which is divided into two parts: *positive printing* and *negative printing*. Keep the print in the dark room until the next lesson.

## THE STEREOGRAPH AND THE STEREOSCOPE.*

*Displacement of the Cameras (continued).*—Let A and B be the two lenses or the two eyes, and E and F two objects

* Continued from p. 405.

seen from A and B at the distances C E and C F from the plane A B, of which E F is twice C F; but the angle A E C is equal to G F C, therefore G C is double the side A C; hence we see that with a given angle the displacement of the cameras varies directly as the distance of the object. This point is quite manifest in the table. If, on the contrary, the angle varies and the distance remains the same, it will be apparent from the same figure, that the displacement will vary as the tangent of the angle of the parallax. But when both the parallatic angle and the distance change, the range for parallax is from 0° when the object is at an infinite distance, to 180° when the object is directly in a line joining the two lenses or the two eyes, as at C. In the latter case the picture is impossible or hypothetical, and then each lens forms its picture on the same space; there is, consequently, only one picture in every other case, as at D, E, F, and P, each lens forms a separate picture. When the parallatic angle is 0°, the object is at an infinite distance, and is seen by the lens A in the direction A P, and by the lens B in the direction B P.

*Law of the Anterior and Posterior Distances and their Differences.*—In the same figure let K O be a glass screen, and D an object seen by the lenses A and B respectively at the points I and N; it is required to ascertain what circular function the distance I N is, as also that of I K or N O its equal. Now on the two parallel lines A P and C F the angle A D C is equal to K A D; but the former is half the parallax. With the distance A C draw the arc C I K, draw the straight line I K perpendicular to A P, I K will then be the sine of half the parallax; hence the sum of I K and N O will be twice the sine of half the parallax, and will be the difference between the distances of two corresponding points of the photographs taken at the distance C D, and of two corresponding points on the photographs if taken at an infinite distance, or in practice at one mile's distance. As observed in the preceding paragraph, if the object theoretically were at C, the picture taken by the two lenses would be single or on the same space; if the object be gradually removed to D, to E, to F, and to infinity, the pictures of the object gradually separate, that is, the distance gradually increases and becomes a maximum at an infinite distance, and is then equal to the distance between the eyes or the lenses; but we see that I N increases as I K and N O decrease; that is, these qualities are complementary to each other; but the complement of a sine is the versed sine; hence the anterior distance between the corresponding points on the two photographs is equal to twice the versed sine of the parallatic angle.

[The careful reader will observe a discrepancy between the conclusions drawn here and the observations in the second and third paragraphs of this article, on a former page, as also in the note on the same page. The corrections to be made there are, in the first place, to substitute for what there appears: "the maximum distance shall not be greater than that between the centres of the two eyes, &c., nor the minimum greater or less than the difference of the distance between the centres of the two eyes and twice the sine of the parallatic angle," &c. The second correction consists in substituting *increase* for decrease, and *vice versâ*. The correction in the foot-note is simply also an inversion of terms, which will be quite evident to the reader.]

The nearer a lens can approach to the perfection of the eye, the more intimately will be the increment of distance from zero upwards be made manifest, and the better will be the stereoscopic effect of the combined photographs. But many of our photographic lenses are far from being perfectly* corrected either for spherical or chromatic aberration; hence the regular decrease of the distances between the corresponding points on the two photographs, beginning at the distant background is not always, in fact, is seldom maintained; and another reason why it is not observable in the photographs arises from the circumstance that many artists equalize the focus or divide it up, so that all the parts are apparently equally in focus, by focussing upon some points remote from the foreground, or by focussing not in the centre of the lens, but half-way between the centre and the periphery. This plan is probably right for an ordinary photograph; but such a photograph will be devoid of some of the conditions required to produce stereoscopic effect. The most beautiful results are produced by bringing near objects into focus; for they alone appear to the eyes as solid objects, whilst distant objects are projected flat on a distant background, and can be exhibited stereoscopically only by increasing the parallax, that is, by separating the lenses until this parallax be at least half a degree or more; in this case all the objects in front of those thus brought into accurate focus must be excluded from the scene. This last rule must always be observed; for, if the distance between two corresponding points in the mounted photographs be greater than that between two remote points, and this will be the the case where the lenses are not corrected, those points will be projected by the stereoscope on the unassisted eyes into the background; and the consequence will be distortion of relief.

From the preceding paragraph, it appears that the difference between the anterior and the posterior distance (the latter being indefinitely remote) between corresponding points at either station is equal to twice the sine of half the parallatic angle (neglecting the slight diminution by refraction); in accordance with this conclusion we derive the following tables:—

| Distance in Feet. | Equal Conjugate Focus Half an Inch. | Equal Conjugate Focus One Inch. | Equal Conjugate Focus Two Inches. | Equal Conjugate Focus Three Inches. | Equal Conjugate Focus Four Inches. | Equal Conjugate Focus Five Inches. | Equal Conjugate Focus Six Inches. |
|---|---|---|---|---|---|---|---|
| 1 | ·10418 | ·2083 | ·4166 | ·6250 | ·8333 | 1·0416 | 1·2500 |
| 2 | ·05209 | ·1042 | ·2083 | ·3125 | ·4166 | ·5208 | ·6250 |
| 3 | ·03472 | ·0694 | ·1388 | ·2083 | ·2777 | ·3472 | 4166 |
| 4 | ·02606 | ·0520 | ·1041 | ·1562 | ·2084 | ·2604 | ·3125 |
| 5 | ·02083 | ·0416 | ·0833 | ·1250 | ·1666 | ·2083 | ·2500 |
| 6 | ·01736 | ·0347 | ·0694 | ·1041 | ·1388 | ·1736 | ·2083 |
| 7 | ·01488 | ·0297 | ·0595 | ·0892 | ·1190 | ·1488 | ·1785 |
| 8 | ·01302 | ·0260 | ·0520 | ·0778 | ·1041 | .1302 | ·1562 |
| 9 | ·01157 | ·0231 | ·0462 | ·0693 | ·0925 | ·1157 | ·1388 |
| 10 | ·01041 | ·0208 | ·0416 | ·0625 | ·0833 | ·1041 | ·1250 |
| 20 | ·00520 | ·0104 | ·0208 | ·0312 | ·0416 | ·0520 | ·0625 |
| 30 | ·00347 | ·0069 | ·0138 | ·0208 | ·0277 | ·0347 | ·0416 |
| 40 | ·00260 | ·0052 | ·0104 | ·0156 | ·0208 | ·0260 | ·0312 |
| 50 | ·00208 | ·0041 | ·0083 | ·0125 | ·0166 | ·0208 | ·0250 |
| 60 | ·00173 | ·0034 | ·0069 | ·0104 | ·0138 | ·0173 | ·0208 |
| 70 | ·00148 | ·0029 | .0359 | ·0089 | ·0119 | ·0148 | ·0178 |
| 80 | ·00130 | ·0026 | ·0052 | ·0077 | ·0104 | ·0130 | ·0156 |
| 90 | ·00115 | ·0023 | ·0046 | ·0069 | ·0092 | ·0115 | ·0138 |
| 100 | ·00104 | ·0020 | ·0020 | ·0062 | ·0083 | ·0104 | ·0125 |

The equal conjugate focus of a lens or of a combination, is half the distance between the object and the picture, when these two are exactly of the same size. This focus is by far the best for practical photographers by which to compare the powers of lenses; for it is not an easy mattter to find

* Do not imagine that I wish to disparage the productions either of this country or of Europe. We have lenses manufactured in both continents that do great credit to the practical opticians engaged in their manufacture, and vast improvements have been made within a few years in this department, but the same amount of refinement which is expended on microscopic combinations has not yet been brought to bear on photographic lenses, because it would be altogether too expensive an operation. Besides this, as far as our present knowledge extends, suppose that the utmost corrections be applied to the various lenses used, that is, supposing the lenses are corrected for spherical and chromatic aberration, as far as can be effected by a limited number of combinations, the sum and substance of the expression is, that with such lenses a picture can be taken of objects, situated in the *same plane*, in a similar conjugate plane, and free from the spectral colours. Such lenses as these will never produce pictures like those which the eyes give in the retinæ, and never can do so until the combinations have the same focal length for *near* and *distant* objects. The nearer these focal lengths coincide, the better the lenses for field work, other things remaining the same. That certain combinations are better than others, that the focal lengths for near and distant objects more nearly coincide in some lenses than they do in others will be admitted; but we must at the same time admit that we do not exactly know the physical and mathematical properties that produce this approximation at will. Before I have finished this monogram I shall have to return to this property of *focal depth* or approximation of extreme focal lengths, and shall endeavour at least to give a reason for my believing that it is impossible to devise any combination of lenses that will give a picture so accurately as that which is produced by the combined action of the eyes on the nervous expansions of the retinæ.

the principal focus of a combination, from the fact that it is not easy to find the optical centre of a combination, that is, for those who are not mathematical opticians; it is true we may approximate to the principal focus by finding its equivalent principal focus to that of a single lens; this is effectuated by finding a single lens, double convex, with a very small stop, that will produce a picture of the moon, for instance, of the exact same size as that produced by the combination, and then measuring the distance to the surface of the double convex lens from the picture; to the quantity thus obtained, add half the thickness of the lens if it is equally convex, and this will be the principal focal length of the lens and the equivalent focal length of the combination. If opticians and photographers, however, would use the *equal conjugate focus* for comparison, as I here propose, the difficulty of this comparison would be removed.

*Application of the preceding Table.*—Suppose a lens, whose equal conjugate focus is half an inch, produce a picture of an object that is five feet distant, then the difference between the distances of two corresponding points of this object on the two photographs, and two corresponding points in the distant background will be ·0208 of an inch, or about one-fiftieth part of an inch. Suppose now we wished to use a lens, whose equal conjugate focus is six inches, and were desirous to have the same difference ·0208 to exist, the object then would have to be removed to the distance of sixty feet, because the power of the latter lens is twelve times less than that of the former, or its focal length is twelve times greater; hence twelve times five produce sixty. This being the case, then we shall find the same difference opposite sixty feet with the latter lens, as opposite five feet with the former lens.—*Humphrey's Journal.*

## ON THE STUDY OF THE ELECTRIC SPARK BY THE AID OF PHOTOGRAPHY.*

BY PROF. OGDEN N. ROOD, OF TROY, N.Y.

*Form of the Positive Spark when Drawn from the Prime Conductor by a Short Thick Metallic Rod.*

The positive electrical spark under these circumstances consists of a combination of two figures, viz., a star and one or more rings. The relation which they hold to each other is modified by the distance the spark travels in the air; that is, by the tension of the electricity. The two figures are usually arranged with a considerable degree of symmetry. The very marked difference in these two components, and the fact that the annular form is, as I shall show, characteristic of the electrical brush, seems to indicate that each simple spark consists of two or more successive discharges of different intensity. The woodcuts showing the forms of the spark were executed from photographs enlarged nine diameters; in them them the bright portions of the spark are of course represented by dark shading, &c.

Distance of the brass ball from the sensitive plate $\frac{1}{10}$-inch. The most general form is that seen in diagram 2, at .1. The starlike figure is very distinct. One of the rings is included within its area, and faintly indicated by a deeper shade: the other ring is sometimes seen circumscribing it.

$\frac{2}{10}$. 2. The rays are larger and the external ring is plainly visible.

$\frac{3}{10}$ and $\frac{4}{10}$. .4. The rays increase in size, and the ring is well developed.

$\frac{5}{10}$. Like the above except that the rays begin to grow irregular.

$\frac{6}{10}$. Rays quite irregular; both rings distinctly visible.

$\frac{7}{10}$, $\frac{8}{10}$. $\frac{9}{10}$, $1\frac{1}{10}$, $1\frac{2}{10}$. The star loses its regularity, and the rings are no longer symmetrically disposed.

$1\frac{3}{10}$. No spark passes over: it is replaced by the electrical brush, or rather by discharges intermediate between the brush and the true spark, *fig.* 2, 1.

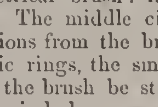
* Continued from p. 404.

These produce a strong impression on the plate, and yield intense sharp figures, consisting of three parts:—An external sharply defined circle, within a series of dots arranged in a circle; and finally, innermost of all, a broad ring

Fig. 2.

which may pass by delicate gradations into a star. This would indicate that the partial spark consists, under these circumstances, of at least three successive discharges of electricity of different tension. The circles on the plate seem to have exactly the same diameter they possess in the air. This is strongly suggested by the following experiment:—If the plate is held obliquely the partial sparks generally pass near its surfaces for some little distance before actually coming in contact with it, and their path is marked by comet-like tails (see *fig.* 3). The diameter of these tails

Fig. 3.



is the same with that of the circles. This is also true of the brush.

*Electrical Brush.*—When owing to distance or the use of a pointed wire these partial sparks become reduced in intensity we have the electrical brush: its form is slightly removed from the last. The middle circle of dots vanishes as well as the projections from the broad inner ring; and we have two concentric rings, the smaller one being most strongly marked. If the brush be still further reduced in intensity, the external circle becomes very faint, and finally disappears, and but a single circle is left.—*Fig.* 2. III, IV.

Electricians have long since arrived at the conclusion that the electrical spark passes by insensible gradations into the electrical brush, and I find that photography furnishes a beautiful confirmation of this view. Thus the figures I, II, III, IV, *Fig.* 2, are selected from photographs forming the first members of a series which would illustrate the gradual conversion of one of these forms into the other, and the other members could easily be added.

We have seen that while the electrical brush is characterised by the annular form, electricity of higher tension generates star-like figures, the rays being larger in proportion to the tension up to a certain point. Now the constant occurrence of a combination of these two forms, in the photographs of *bright sparks*, points out, I think, clearly, that these sparks consist also of more than one discharge; moreover, the ring, where it cuts the rays of the star, can often be traced under them, as though superposition had taken place. Again, when the bright spark travels some distance the ring is generally not symmetrically placed, as though the discharge producing it had followed a slightly different path. Indications are constantly observed which lead to the idea that even the star itself is produced by the overlapping of two stars, having rays of different size and different intensity.

The wet collodion film offers, of course, a certain amount of resistance to the passage of electricity over its surface, and thus furnishes uo with the different indications above described.

Finally, as the researches of Reiss, Kirchhoft, Helmholtz, and Feddersen, have shown that the electrical discharge is oscillatory and wave-like, I am the more inclined to regard these photographic figures as produced by a series of consecutive discharges of different intensity.

Before passing on to the next point of interest, I will allude to a curious modification which the positive partial spark undergoes if the machine be turned rapidly, so that a large number of them fall quickly on the same spot: see V, *fig.* 2. Many of the partial sparks are arranged rapidly around the point under the brass ball, the pointed portion being turned outward.—*American Journal of Science and Art.*

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 27th August*, 1862.

From the multitude of suggestions for new or revised formulæ in the various photographic processes, a sanguine person might conclude that we are fast approaching the goal of perfection and infallibility. If in a multitude of counsellors there is much wisdom, then photography is singularly fortunate, for surely no subject that ever engaged the mind of man can show a more formidable array of counsellors pregnant with experience and wisdom. It would seem to be very easy to take rank as an inventor or discoverer in photography, honey or treacle may serve your turn, but unhappily the glory thus acquired is very short-lived; and it behoves the ruling genius of the hour to make the most of his opportunity, for raspberry-vinegar may be looming in the future, and quickly terminate honey or treacle's existence.

I see by our Journals that the resin benzoin has been brought into action by an ingenious operator. He puts it into his collodion, and he puts it on to his positive printing paper, with what result I cannot yet inform you, as I have not had leisure to repeat his experiments; but as there may be something in it, I proceed to quote his formulæ.

First, as to the benzoinized collodion, take

| | |
|---|---|
| Ether ... ... ... ... | 100 parts |
| Alcohol ... ... ... ... | 50 ,, |
| Pyroxyline ... ... ... | 1 ,, |
| Iodide of cadmium ... ... | 0·5 ,, |
| Iodide of ammonium ... ... | 0·5 ,, |
| Bromide of ammonium ... ... | 0·1 ,, |
| Bromide of cadmium ... ... | 0·1 ,, |
| Chloride of cadmium ... ... | 0·3 ,, |
| Benzoin ... ... ... ... | 0·4 ,, |

His sensitizing bath is composed of

| | |
|---|---|
| Water ... ... ... ... | 100 parts |
| Nitrate of silver ... ... ... | 8 ,, |
| Acetic acid ... ... ... | 10 ,, |

The plate being sensitized, it must be well washed and dried. It will be nearly twelve hours before the plate becomes dry.

The exposure required is a little less than that required for the Taupenot process. Four minutes for a stereoscopic plate, 5 to 10 for a plate 10 by 12. Upon removal from the camera the plate is immersed in a dish full of water. The water employed for washing the plate will answer. When the film is thoroughly moistened, the picture is developed with pyrogallic acid, just as with wet collodion. The development must not occupy more than five minutes. The fixing is performed with hyposulphite of soda. Any wet collodion that gives good negatives may be employed in a dry state, by adding 0·27 of benzoin to 100 of collodion. This collodion succeeds very well when employed in the wet state; it yields very intense blacks.

The method of printing positives does not differ in principle from the ordinary process with chloride of silver, but only in detail. The paper is first prepared with the following solution, in which the paper may be wholly immersed, or floated.

| | |
|---|---|
| Alcohol at 36° ... ... ... | 100 parts |
| Benzoin ... ... ... ... | 10 ,, |
| Chloride of cadmium ... ... | 5 ,, |

It is more expeditious to immerse the paper than to float it. The sheets are hung to drain and dry in the usual manner, and they dry very rapidly; they may be dried by a fire if time presses.

The improvement effected by the benzoin is in closing the pores of the paper; air and moisture cannot penetrate the proof, which is thus protected from the chief, if not the only cause of its destruction. The benzoin also gives a gloss to the surface of the paper, but not so much as is given by albumen.

The paper thus prepared may be preserved for a long time: it is sensitized in the following bath, as with albumenized paper.

| | |
|---|---|
| Water ... ... ... ... | 100 parts |
| Nitrate of silver ... ... ... | 15 ,, |

In printing, this paper requires less exposure under the negative than albumenized paper.

Another operator recommends the following variations in the tannin process, as yielding the best results.

*Solution of Tannin*—

| | |
|---|---|
| Distilled water ... ... ... | 500 parts |
| Tannic acid ... ... ... | 4 ,, |
| Alcohol rect. ... ... ... | 25 ,, |

Dissolve and filter. The sensitizing bath consists of

| | |
|---|---|
| Water ... ... ... ... | 1000 parts |
| Nitrate of silver ... ... ... | 60 ,, |
| Acetic acid ... ... ... | 10 ,, |

The same collodion as employed in the wet process may be employed; if a little bromidized it will be preferable.

*Manipulation*—After the plate is sensitized, it is carefully washed in distilled water, allowed to drain for a moment, and then the tannin solution poured on. It is dried out of the reach of dust, and the edges of the plate covered with picture varnish.

The exposure in the camera is 10 to 15 times longer than when operating with wet collodion; but by warming the plate before the development, the exposure may be greatly diminished.

*Development* solution—

| | |
|---|---|
| Water ... ... ... ... | 500 parts |
| Pyrogallic acid ... ... ... | 5 ,, |
| Acetic acid ... ... ... | 50 ,, |

The plate being washed, a little pure solution of pyrogallic acid is poured over it, drained off, and again poured on, first adding a few drops of a solution of nitrate of silver of 3 per cent. The picture is fixed with hyposulphite of soda.

## PRINTING AND TONING DIFFICULTIES.

Sir,—Entertaining an utter aversion to all secret dodges, which only tend to retard the healthful growth and progress of our fascinating art, I willingly respond to your invitation by freely devoting a few of my limited moments of leisure to a further consideration of the subject on which I treated somewhat briefly in your last number; and as I purpose entering fully into the various windings of that apparently intricate and hitherto perplexing subject, I shall endeavour to simplify and arrange the various causes which produce the evils there spoken of. In order that I may accomplish this self-imposed task more effectually, it will be necessary for me to discuss the subject of printing and toning by pausing to make a few remarks as I enter upon each of the several stages pertaining to those interesting processes, avoiding unnecessary prolixity. I shall advance many arguments which have a tendency to support the new theory of surface impediments, I have launched into the photographic world, and if, by my humble efforts, one stone is added to the noble and fast growing structure of photographic art, my labours will be more than amply repaid.

Commencing with paper. Oh, what a mass of learned arguments has been advanced on this topic! but still photographers despairingly cry, "When and where shall we find a paper vendor honest enough to deliver us from this rapidly growing evil?" A great difference, I will admit, exists in the various papers now in the market, and known as albumenized papers, some samples of which are totally unfitted for photographic purposes; this may be attributed to an ignorance of the conditions required, rather than to any feelings of dishonesty on the part of the dealers; to remove this ignorance, I will now proceed to give the views I entertain on this subject.

The texture of paper employed in printing should be as fine and even as it is possible for art to make it, in order that the substances employed in the production of the picture may be retained without a flaw upon its surface; the more perfectly this can be accomplished, the more perfect will be the print produced, for a coarse absorptive texture is not only the most prone to mealiness, but I have known it to cause distortion in the image, when by long soaking the pores have distended, and, whilst drying, have twisted themselves into a different position. The importance of the above remarks will be more clearly shown in the following hints on albumenizing. When a thin solution of albumen is used on which to float paper of coarse and irregular texture, the quantity of that substance which remains on the surface of the paper, when dry, will be very uneven, the most absorbent parts contain the thickest layer of albumen, and consequently a larger share of the chloride used, and when sensitized it will evidently contain a double share of silver; this last, after reduction by light, when placed in the toning bath, will act as an impediment, which will mar the beauty of the print, because the adjacent portions of the paper, which contain less silver, will be thoroughly toned ere any visible effect has been produced on the parts which contain a double portion of silver and albumen, hence the cause of red spots, known as uneven toning; proof of this may be found in the fact, that, be a paper ever so good, if a wave of albumen should be allowed to accumulate near its edges, those portions of the paper will appear the colour of red lead; this red appearance is but the results of contrast, for if this portion be separated from the perfect parts of the picture, it will be readily perceived that it has undergone a partial change from the effects of toning. Another proof may be advanced, in the fact of an highly albumenized paper requiring a much longer time to tone than a more thinly coated sample; but I believe I have said sufficient to show the importance of my remarks on paper. I would just add in conclusion, the greatest care should be exercised by paper albumenizers, in order to secure a perfectly even surface on the papers used; and if a material of coarse texture is used, let it be made use of in a plainly salted condition. I shall next week (with your permission), have a few remarks to make on the silver bath.—I remain, yours respectfully,

A Photo's Assistant.

P.S.—An error, which doubtless was my own (as I have to write in haste), appeared in my last letter; speaking of 'toning after printing by diffused light,' it should read, 'a mere alkaline reaction is all that is required.'

## Photographic Notes and Queries.

### Free Nitrate in Toned Prints.

Sir,—In a recent number of the *British Journal*, in an article on Toning, George Dawson, Lecturer on Photography, at King's College, in speaking of the first washing, says:—

"The importance of thorough washing cannot be too strongly insisted on, not merely because it facilitates the toning, and prevents mealiness, but because, in the after fixing bath, free nitrate of silver is certain to generate sulphuric acid, to the permanent detriment of the pictures."

Now, though I perfectly agree with Mr. Dawson as to the importance of thorough washing, I think you will agree with me, Mr. Editor, that his chemistry is quite at fault, when he gives as a reason that "free nitrate of silver is certain to generate $SO_3$ in the after fixing bath," for I cannot perceive how any free nitrate of silver can pass through the toning bath of chloride of gold and acetate of soda without being decomposed; and if it be decomposed, how can it be present so as to generate sulphuric acid in the hyposulphite bath?—Your obedient servant,

W. W.

*Bristol, August 4th*, 1862.

[Free nitrate of silver would be decomposed in the toning, even without excess of alkali, and unless a very large excess of silver were present, it would not be likely to reach the hypo in the form of a nitrate. The sentence has probably been written thoughtlessly, for we believe Mr. Dawson is a good chemist.—Ed.]

### Angle included by View Lenses.

Sir,—In your note to my letter "On the Angle included by View Lenses" in the last number of your Journal, you say that "to test the lenses properly it would be necessary to use a triple of an equivalent focus, the same length as that of the single lens, to try each lens with the same sized stop, and to use a plate larger than they were intended to cover." You must allow me to say that I consider these conditions to be by no means necessary. In my experiments I did use the same sized stops, and I found that both lenses being of precisely the same focus as measured from the back lens of the triplet, the single lens included about one-seventh more subject on the *same* surface of glass than the triplet, consequently the angle was so much larger in the former.

My subsequent observation was to the effect that it was unfair to measure the focus from the back lens of a combination, but that the equivalent should, in all cases, be given. Such equivalent will include, I believe, precisely the same angle as that included by a single lens of the same focus and *no more.*—I am, sir, yours very respectfully, Baynham Jones.

*Cheltenham, 25th August*, 1862.

[On a little reflection you will see that your experiment is entirely fallacious. You used a single lens of shorter focus than the triple; and, therefore, from the same point and on the same sized plate necessarily included more subject with the short focus than with the long one. But no argument of any kind is thence desirable as to the respective capacities of the two lenses as to angle of view. It is unquestionably a very erroneous plan to state the focus of any compound lens as measured from the back glass. But, notwithstanding that you condemn the practice, you follow it in making your experiment. We repeat it that to make the results fairly comparable, lenses of similar *equivalent* focus should be used, and that it is desirable to work on glasses larger than the lenses are intended to cover, to facilitate examination of the exact extent of satisfactory definition in each.—Ed.]

## Talk in the Studio.

"Muggy Weather."—To most persons this particular kind of weather is most oppressive, not fit to do anything upon; but a photographer takes a very different view of it. He calls that weather "muggy" which is the best adapted for taking a person's "mug."—*Punch.*

Photographic Festival.—On Tuesday week Mr. Mayall entertained the whole of the persons employed in his establishments at a magnificent banquet at his residence at Pinner. Meetings of such a kind between the employer and the employed are always interesting, and indicate the existence of that good feeling which they are calculated farther to promote.

Balloon Observations.—Mr. Glaisher, whoso name is known to most of our readers as an accomplished photographer, as well as Superintendent of the Magnetic and Meteorological Departments of the Royal Observatory, at Greenwich, has recently, in company with an experienced aeronaut, made several balloon ascents, for the purpose of observing and recording meteorological observations, the result of which will, we believe, be reported at the forthcoming meeting of the British Association for the Advancement of Science, at Cambridge. The *Daily Telegraph* recording one of these ascents speaks in glowing terms of the exquisite cloud effects seen. It says:—"At about twenty minutes to eight the earth was entirely hidden; and at this time the cloud scenery was of a character to which Mr. Ruskin alone, in his very happiest moments, could have done justice. As the balloon went on its solitary journey, the clouds were breaking up, and in long swathes and folds of a ghostly white, their fragments passed dimly. By an optical illusion which will be easily understood, not the clouds, but the balloon itself, appeared to rise and fall; and suddenly, when it had passed through an aerial valley, a glimpse was caught of the upper plains of the sky. The contrast was marvellous. It was like passing from the obscurity of a churchyard into the glare of a conflagration. Close—so close as almost to seem palpable—clouds of the purest white, rose and fell like waves upon a sea of snow; and far away, over their level range, there was a glory of scarlet and gold, changing every instant, but only to become more varied and intense. In another minute this glorious sight was to be seen no longer." Would it be impossible to preserve some record of these effects by means of the camera, and has Mr. Glaisher opportunity for bringing photography to bear during these journeys? The results would be interesting.

Photography on Mont Blanc.—We find in the *Moniteur* an interesting description of an ascent of Mont Blanc, effected on the 11th inst., by M. Bisson, an eminent photographer, who had already performed the feat last year, but was desirous of completing his collection of views. His progress as far as the Grands-Mulets was not marked by any particular incident; he took various views from different points, and then proceeded to the Passage des Echelles, where he and his party crossed the ravines, some 300 feet deep, crawling on horizontal ladders, one by one, on their hands and feet. Their further progress to the Dôme de Goutté was, however, impeded by an unforseen incident. A bridge of ice and snow, which had hitherto served as a passage to the Grand Plateau, had broken down, and they found a yawning abyss, from 45 to 155 feet in width, before them. No other passage seemed possible, and M. Bisson was on the point of giving up the adventure, when he was hailed by three of his men, who, unperceived, had sought a convenient place, and with their hatchets hewed out a path, by which they had succeeded in gaining the icy crest of the Mont Maudit. They soon descended the rocks on the other side, and threw ropes to their comrades, by which the luggage was hauled up. M. Bisson and the rest of the party followed the new but dangerous path, which brought them two hours sooner to the Grand Plateau. There new difficulties awaited them; they had to hew 800 steps, and ascend the side of the corridor, which, in some places, had an inclination of 50 degrees. On reaching the end of the corridor, they were assailed by an icy-cold wind. On arriving at the summit, after some further labour, M. Bisson found to his regret that the silver of his plates was crystallized, the temperature having suddenly fallen 10 degrees centigrade, although it was exactly noon. At 2 p.m. he descended from the summit, but visited it again on the 14th, and returned to hamounix on the 15th without further accident.—*Times.*

M. Disderi's Work.—The recently issued volume by M. Disderi, entitled "L'Art de la Photographie," regarding which we have had several enquiries, may be had, we understand, of Messrs. Harvey, Reynolds, and Fowler, of Leeds, who are M. Disderi's English agents.

## To Correspondents.

*** Any of our readers having Nos. 41, 91, 101, and 104 of the Photographic News to dispose of will confer a favour on the Publisher by forwarding the same to this Office for exchange or purchase.

One in Difficulty.—The deposit of which you speak is unquestionably a form of fog. The addition of a trace more nitric acid to your bath, or of acetic acid to your developer may probably prevent it. The addition of a few drops of tincture of iodine to your collodion will sometimes prove a cure. If these fail, neutralize your bath with bi-carbonate of soda, or freshly made oxide of silver, and then sun it. Afterwards filter and faintly acidify, and it will probably work well.

W. H. H.—The presence of acetate of silver in the bath (formed by the addition of acetate of soda) will not, that we know of, be injurious to tannin and honey plates. The only probable effect will be increased density in the picture. 2. The bromo-iodized collodion of any respectable maker will answer. Thomas, Ponting, Rouch, Keene, Mawson, Perry, and others. It is probable, however, that all of them may, for tannin plates, require the addition of about a grain of bromide to each ounce of collodion, more than they already possess. 3. We cannot promise immunity from mealiness with any paper we know. It sometimes occurs with all. We recently used some very good from Bourquin. 4. You will find the last communication on photography in the natural colours, in an article entitled "Heliochromy," by M. Neipce de St. Victor, in the Photographic News, No. 182, Feb. 28th.

R. G.—We do not know any one who undertakes professionally to paint clouds on negatives for photographers. Those of Mr. Bedford, to which we recently referred, are done by himself.

Triplet.—In copying engravings, much depends on their character as to whether it is desirable to use iron or pyro for development. Since the time of exposure is not an object, it is as well generally, especially with good light and in warm weather, to use pyro, whereby you gain intensity at once, without intensifying. In a dull light or cold weather, or with a subject possessing much delicate gradation, it is better to use iron and then intensify. 2. The table of distances given in our Almanac is applicable either to the triplet or any other lens.

W. G.—The best material to apply to the edge of the tannin plate, when a tendency exists for the film to loosen, has, in our hands been Hughes' black varnish Agitating the collodion with a little bicarbonate of soda, and then letting it settle will make the film adhere better; but in that case the bath must possess sufficient acid to prevent fog. If your collodion were made according to the formula we give, you have probably failed to have the temperature sufficiently high, in making the pyroxyline, or the film would not readily leave the glass. Take care to leave the plate to soak a few minutes before commencing to develop and that will often help you.

W. W. S.—Your distilled water is most probably at fault. The turbidity you describe on adding the distilled water to the strong solution was right enough. It was merely a precipitation of iodide of silver which is less soluble in a weak solution of silver than in a strong one, and was in excess for the quantity of solution. The discolouration was altogether wrong, and, with the other effects you name, probably indicates impurity of the distilled water. Take all the solutions made with the water, and first neutralize them by the addition of a little bi-carbonate of soda—a few grains will be sufficient—then expose for a few hours to bright sun. The blackened matter will precipitate, and after filtration, and the addition of a trace of acid, the bath will be in working condition.

W. F. W. W.—In our answer to your queries last week there was an error. For "latter" read "former." It was to the acetic acid we referred in stating that it was probably adulterated with sulphuric acid. This would produce a sulphur compound with the silver, and cause the black precipitate, and might also cause the greasy metallic film on the surface of the solution.

W.—Distilled water is by no means always pure. Mr Barber's suggestion of getting rid of the impurities by neutralizing, or rendering alkaline the new bath, and then sunning, is always worth attention when there is any doubt of the purity. Some photographers do this with common water, never using it distilled at all. Of course there is a little loss of silver in such cases. Mr. Barber recommends neutralizing with freshly precipitated oxide of silver.

M. F.—There is no reason why you should not seal small glass positives to dark coloured glass, by means of Canada balsam. Such sealing was once the subject of a patent, but it is not now in force.

G. L.—Spirit varnishes generally require heat in their application. Too high a temperature, however, especially if the alcohol of which the varnish is made be very highly rectified, will cause the collodion film to be dissolved. Spirit varnishes are generally best adapted for negatives giving the hardest surface.

Positive.—Collodion positives receive less attention in our pages than negatives, because they are produced by fewer persons, and there is consequently less interest felt in them. We admire a good positive very much, the chief drawback is the fragile substance upon which they are produced. Those on enamelled iron plates, patent leather, &c., generally lack brilliancy, and are heavy looking. The proto-nitrate developer gives the most silvery white picture. Proto-sulphate of iron and acetic acid generally gives a more creamy tint. Backing with marone velvet gives a warmer tone to the shadows than black varnish. 2. Not at present.

R F. G.—Vignetting may be effected either by means of vignette glasses, or by an aperture in a piece of card, and fringed with cotton wool. The latter plan is in so many respects the best, as it permits less formal shapes, and more variety. Print in diffused light when using the latter, so as to avoid definite outlines to the graduated image. It is decidedly permissible in landscapes, and often valuable.

Ozone.—Thank you for the pamphlet. The subject is an important one, and shall have our early attention.

J. Losh.—The finish produced by your rolling press appears very excellent, from the samples enclosed.

Glasgow.—We do not know of any method of hardening bee's wax without adding some other substance to it. 2. If spermacetti be stirred briskly whilst melted, until it cools, the crystalline appearance will be largely removed.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 209.—*September* 5, 1862.

## PHOTOGRAPHIC PAPER.

Paper is unquestionably one of the most important substances used by the photographer: and printing is out of all proportion the most important operation. It is, indeed, as Mr. Hughes once aptly observed, if not the *be-all*, at least the *end-all* of photography. "All our other processes," he remarked, "are but preparatory steps to printing." For that we make our pyroxyline, prepare our collodion, purchase our apparatus, and rack our brains to produce perfect negatives. With this object before us we travel over land and water, climb glaciers, face water-falls, on mountain top, in sheltered valley, on open heath, in deep forest or dark glen—wherever or to whatever we point our lens, this is the consummation we have always in view—"the reward for all our labours." However important may be the mode of preparing paper, the proportion and age of the albumen, the quantity and base of the chloride, and the skill in albumenizing, it is quite certain that the material, texture, and sizing of the orginal paper exercise no inconsiderable influence on all operations upon it, and on the finished result.

Here is the photographer's great difficulty, he is performing a delicate chemical operation with a substance as to the nature and preparation of which he is ignorant. He may know the formulæ of his albumenizer: but he knows nothing of the processes of his paper maker. He does not know what enters into the composition of the orginal pulp; he does not know with any certainty the composition of the size on the surface. What is more and worse than this, from the out-cry which has arisen of late years, it would appear that whilst everything else in connection with photography has been progressing and improving, both in apparatus and chemicals, and in the knowledge of how to use them, paper has been growing worse. At one time an impression prevailed, that the use of the alkaline gold toning processes had introduced many of these evils as some drawback to their benefit in other respects. But we have recently received several letters from printers who have been trying the old bath of hypo and gold, and have experienced similar difficulties to those supposed to belong solely to the alkaline gold processes, thus pointing to the fact that much of the paper in the market is of unsuitable quality for giving good photographic results by any process.

We believe that paper is the only material used in photography, at the present time, that is not manufactured with an express view to the wants of photographers. We do not mean to intimate that paper is not manufactured with a view to photographic use; but that it has been simply paper of the ordinary manufacture, selected with a surface as perfect as possible. There has never been, that we are aware of, any searching enquiry, or any carefully instituted series of experiments in the manufacture of paper, with a view to ascertain what materials, and mode of using them, would yield the best photographic results. That such an enquiry is necessary there cannot be a doubt, and that the results would repay the effort seems very probable. Such enquiries have often been contemplated, and sometimes even promised, but there the matter has ended. We remember that about a year and a half ago, Mr. H. G. Bohn mentioned at a meeting of the Photographic Society the name of a manufacturer whose paper he thought would meet the wants of photographers; and shortly afterwards Mr. Hardwich, Mr. Sutton, and ourselves, waited upon the manufacturer in question, to ascertain if he would enter upon a series of experiments, with the assistance of photographers. He furnished us with samples of the paper he thought most suitable for the purpose, but did not undertake to try experiments. The samples he furnished proved on trial to be considerably less suited to the purpose than almost any in use. At a subsequent meeting, Mr. Bohn introduced another manufacturer, Mr. Busbridge, who expressed a deep interest in the subject, and promised to make any effort, aided by photographers, in producing a perfect paper. We were subsequently furnished with some samples of the paper he proposed for photographic use, and regret to say, that it turned out the very worst we ever printed upon. No further experiments, that we heard of, were undertaken, and so far as we know, there the matter ended.

M. Ernest Lacan, editor of *Le Moniteur de la Photographie*, from whom we had the favour of a recent call, during a hasty visit to London, furnishes us with some information, from which we hope that photographers may anticipate that an effort is really about to be made to supply them with a paper manufactured expressly with a view to their requirements, and in which the utmost care to secure the right conditions will be given at every stage of the operations. M. Canson, the manufacturer of a French photographic paper, which had at one time considerable reputation, but of which we have not heard much recently, has, we understand, entered into a treaty with certain gentlemen interested in photography, of whom we believe M. Lacan is one, to institute a careful investigation as to the conditions required in paper for successful printing by the processes at present in use. M. Pierre Petit, one of the ablest of Parisian portraitists, has undertaken to test the samples of paper produced, and pronounce upon their fitness for photographic purposes. We have a strong hope, from the high position of the gentlemen interested in the project, and their peculiar fitness to give it effect, that it will issue in the production of a higher class of paper, of a more definite and known composition and quality, than has before been offered to photographers. We hope shortly to be able to publish further information on the subject.

## CARD PORTRAITS.

We have before us a large accumulation of examples of card portraiture forwarded by different readers for our examination and opinion. Many of these are very excellent indeed, whilst there are others to which silence is the most favourable criticism we can award. In examining the various specimens, we are struck, however, as we have been before, with the increase of many good qualities which card portraiture has rendered imperative upon photographers. The photographic qualities are better, the manipulation is more careful, and there is at least some attempt, if not always successful, at artistic arrangement.

Amongst the most pleasing examples of card pictures we have seen at any time, is a series of vignetted specimens by Mr. T. B. Parkinson, an English artist residing at Dieppe. In the whole treatment there is a freshness and individualism, which at once arrest attention and command interest. It is one of the singular facts about photography, and one which gives great force to its claims to recognition as a fine art, that notwithstanding the apparently mechanical character of the operations, the artist *does* stamp his character upon his work, and just as much so in portraiture as in landscape, and other branches of photography. No one can have failed to notice that whilst all the sitters of one photographer may appear to be vulgar people, another artist, from the same sitters, would produce the portraits of ladies and gentlemen—using those terms in their best acceptation. Others again, without conferring vulgarity on their sitters, seem to produce an inevitably conventional and commonplace effect, in which characteristic their sitters all seem to possess a family likeness; whilst another artist, with the same sitters, would secure pictures in which every portrait was marked with more or less of individuality and distinctive character.

Amongst the latter class we must place Mr. Parkinson. All his pictures have excellent photographic characteristics, they are well-defined, round, delicate, clean, brilliant, well printed and of excellent black tone; but beyond all this, and arising from a combination of causes difficult to specify, is the freshness and individual interest of each portrait, which seizes the attention, and causes the exclamation, "That must be a good portrait, I fancy I must have seen the original somewhere." It is the living, thinking appearance every face possesses which thus arrests attention, and almost gives a look of recognitiou to the expression. Good photography is necessary to this result, but it is chiefly due to fine judgment in selecting the arrangement and pose best suited to each face, and especially to the management of lighting required to give a pleasing and natural effect to the features, and harmonise with the pose selected. A good deal depends also upon the manner, temper, and feeling of the operator re-acting upon the sitter.

In accordance with our custom, we always endeavour to obtain the particulars of manipulation for the benefit of our readers, when we meet with pictures which we consider to possess peculiarly good qualities. It often happens that there is nothing essentially new in the method, but it is always interesting to read a clear statement of the particular practice of any good photographer, and such statements often serve as encouragement to others, who may be at the time unsuccessfully using the same formulæ. We subjoin, therefore, some extracts from a long letter on his mode of working with which Mr. Parkinson has favoured us:—

"Regarding the mode in which I manipulate, there is nothing new in it; but I have used the same formula these last four years, and have never known it fail; whenever I experiment with other plans I never succeed so well, consequently I am always glad to get back to my old friend. The collodion I use is a mixture of Thomas's and Ramsden's, the former I add as I require density: when requiring to be very quick I use Hardwich's, which is prepared by Burfield and Rouch, and an even mixture of Thomas's negative, and Mawson's positive (this is the collodion that was always used by Lacy). It is curious that a mixture of so many collodions is so good; but, singular enough, I have never known it fail, although you could not work with any one singly, yet mixed they answer admirably, and I am sure no operator will ever regret having them on his shelf.

"As regards the silver bath, it is of the usual 30 grains strength, iodized with iodide of potassium. Prepare thus:—

| | |
|---|---|
| Nitrate of silver ... ... ... | 480 grains |
| Distilled water ... ... ... | 4 ounces. |

Dissolve.

| | |
|---|---|
| Iodide of potassium ... ... | 4 grains |
| Distilled water ... ... ... | 1 ounce. |

Dissolve.

Add these two together, well shake and filter; then add 100 grains of oxide of silver, well shake and then allow it to settle, carefully pour off the clear solution, leaving the residue of oxide in your stock bottle, filter. Add a few drops of a solution of—

| | |
|---|---|
| Nitric acid ... ... ... | 6 drops |
| Distilled water ... ... ... | 1 ounce |

until the bath works clear.

"A plan I always adopt is to keep enough solution in my stock bottle for two baths, thereby having one at work and one in the bottle, to which I again return it every Saturday evening, filtering and adding my acid on the Monday, the oxide of silver always remaining at the bottom of the stock bottle. The present bath I have, of course with additions, has lasted me two years. I develop with iron of this strength—

| | |
|---|---|
| Protosulphate of iron ... ... | 20 grains |
| Acetic acid ... ... ... | 20 drops |
| Distilled water ... ... ... | 1 ounce |
| Alcohol ... ... ... ... | 40 drops. |

"I vary the strength of this developer, but never exceed 25 grains, as it is so difficult to get the solution over withf out staining the plate. It is for that reason I use plenty o. spirits of wine. Bring the picture out fully with this Well wash and deepen with

| | |
|---|---|
| Pyrogallic acid ... ... ... | $1\frac{1}{2}$ grains |
| Citric acid ... ... ... | $\frac{1}{2}$ grain |
| Distilled water ... ... ... | 1 ounce |

to which is added a few drops of nitrate of siver solution, 20 grains to the ounce.

"Should the picture not be deep enough after fixing, pass over it a saturated solution of bichloride of mercury, and you will have the required density. With these two deepeners I can get almost any density I like, without fogging the shadows, or destroying the half tones.

"My prints are *papier Rive*, excited in an 80-grain silver solution, and toned with gold and carbonate of soda. I have tried nearly every description of toning, and find none preserve the whites so necessary in vignettes as the carbonate. My paper is always prepared the same day as it is used, and I forgot to add that there are a few drops of acetic acid always in the silver solution. I have thus given you my process just as I am in the habit of using it; but still, with the best of processes, if you have not a good arrangement of light and good apparatus, you cannot succeed.

"The new glass house I have built I will shortly describe, and have sent you some few pictures that I have taken in it, that you may judge of the light arrangements. It is 60 feet long, 15 feet wide, 8 feet high at sides. I have 14 feet of glass each side on the top, 18 feet at the sides, the first 3 feet nearly touching the ground, the rest about a foot from it. To this I have added curtains, so that with a screen to move about, I can secure nearly any light I like. You will see by the rough sketch, that I have about 8 feet covered in, which I use for my backgrounds, so by advancing or retiring you can get a good many shades with the same background. The lens I use is a French $\frac{1}{2}$-plate, with focus of 8 inches; but there is no name on it, and sometimes I use a pair of French stereo twin lenses, likewise without name, though exceedingly good.

"I use also a camera made for me by Francis, which is so good, and answers so many purposes, that I will describe it. It is large enough to take a plate $6\frac{1}{2}$ by $4\frac{3}{4}$, and by having the front to slide, to which is attached the lens, I am able to take two *cartes de visite* on the same plate; by removing the slide and putting in another, to which is attached my twin lens, it answers stereoscopic purposes, or two *cartes de visite;* again, by removing the inner division and putting in the larger lens, it will do for $\frac{1}{2}$-plate portraits or views. It is quite a *multum in parvo* camera. Another good plan it has is that the focussing glass has two hinges at the bottom, so that it lifts up and down, and does away with having to lift it in and out; and when travelling you can fit your dark slide on behind, which prevents your breaking the focussing glass; you can also pack your lens in the inside, and it will not make a parcel more than eight inches by ten or twelve inches.

I think I may lay some claim as being the introducer of the vignette *carte de visite.* I have sent them out of my *atelier* in large quantities these last two years; when there was none seen about in Paris or London; however, it is a dangerous thing nowadays to claim any priority of pictures or processes, so I only just mention it to you as perhaps you may know more about it than myself. I think Mr. J. R. Williams produced the first *vignettes* of the day when I was in England, but I do not know if he applied it to the *cartes de visite*."

The next series of card pictures which came under our attention, are by Mr. F. R. Window, with whose contributions in the columns of the Photographic News our readers are familiar. The specimens before us consist chiefly of portraits of theatrical celebrities, of which Mr. Window recently produced many thousands, for the dramatic fancy fair held at the Crystal Palace. The first point which strikes us is the prevalence of artistic feeling, as displayed in the great variety of pose, each one graceful, and the absence of a crowd of meretricious accessories. In this respect Mr. Window's pictures remind us of those of the late Mr. Lacy. Mr. Window aims at, and produces the utmost amount of force and brilliancy compatible with delicacy; and great crispness and perfection of definition, which he is very successful in obtaining. His pictures are all very striking, moreover, as portraits; lighting, general arrangement, and expression, all conducting to the desired end, a striking likeness, as well as a pleasing picture. Mr. Window uses a collodion containing a full proportion of bromide, iron development, and intensification after fixing, by means of bichloride of mercury and iodide of potassium. He works with Dallmeyer's No. 2 B lenses.

A series of card portraits by Mr. G. W. Hale, M.A., of Eastbourne, display many excellent artistic and photographic qualities. They are very round and forcible, well modelled and solid, exquisitely defined, well arranged, carefully lighted, and the printing and toning are very successful. Some of the prints are very tastefully vignetted. Altogether they are very far above the average of card pictures which we have seen.

A series of card portraits by Helsby and Co., of Liverpool and Valparaiso, claim attention for their great brilliancy, vigour, and roundness. There is, moreover, considerable, skill and taste manifested in the posing, albeit there is a little stiffness and formality occasionally in the accessories. The manipulation is careful, the definition fine, and the printing good. We have no particulars of their production, except that a Ross's ordinary portrait lens for 5 by 4 plates was used.

Mr. Bannister, of Carlisle, sends us some very good specimens, in which the portraiture seems happy, and the photography is very good, full of detail, and, at the same time, vigorous. The arrangement, generally, is good, but there is, to our taste, a little overcrowding with accessories, which distracts attention from the principal figure, and destroys subordination.

We have received from Messrs. Harvey, Reynolds, and Fowler, a portrait, they publish, of the Rev. J. B. Reade, with whose name photographers are familiar as associated with the early history of photography. The portrait is very excellent, but a little lacking in illumination at the lower part of the picture.

Some other specimens have not sufficient merit to warrant a specific notice.

## Scientific Gossip.

In these days of microscopic sharpness and collodion photography on glass, the subject of paper photography seems almost to have been lost sight of, except in its adaptability to translate the glass negative into a picture. This must be a subject of regret to all who remember the great things of which paper used to be capable, and the magnificent, and, even now, unequalled artistic landscapes and views which were familiar to the frequenters of photographic exhibitions of former years. It must be admitted by most that there is a peculiar breadth and charm about a picture from a good paper negative when of any size, which is wanting in one from glass, and every one must admit that the "belongings" of a peripatetic "paper" man are nothing in comparison with the bulky and heavy paraphernalia of a "glass" photographer, wet or dry. In spite of these positive advantages, the subject of paper negative photography seems almost dying out, and would e'er long vanish from recollection, like a badly-washed positive, were it not for the care and attention which it receives from a few experimentalists, who have not ceased in their endeavours to bring this branch of our art nearer to perfection, as regards sharpness and rapidity, without sacrificing the advantages of portability and artistic effect. It was only natural to suppose that paper photography should be more especially fostered by those whose avocations brought them in constant contact with this material, or whose business enabled them to experiment on its preparation on the large scale, and we are not surprised, therefore, to find that one of the most ardent and enthusiastic devotees of this branch of photography is M. A. Marion, the well-known manufacturer of photographic paper. This gentleman has recently made several useful and important discoveries in connection with negative photography on paper; they will shortly be published in the form of a pamphlet, and as we have received full details of several of these improvements from Mr. Marion himself, we think our readers will be pleased to have a brief outline of them. One of the chief mechanical improvements introduced, is that of albumenising and salting positive paper by machinery. It is well known how difficult this operation is, and what minute precautions are necessary to ensure success. It is almost impossible for even the most practised hand to avoid occasional failures, when so many obstacles constantly recurring are to be guarded against, such as dust, air-bubbles, fermentation, or filaments in the albumen, &c. In order to obviate these inconveniencies M. Marion has devised machinery which performs all the operations of albumenising and drying photographic paper without once requiring it to be touched by an assistant. The paper is 22½ inches wide, and may be obtained in continuous lengths, a hundred yards long if needed—so that practisers of panoramic photography need not concern themselves about one little difficulty in their way—that of obtaining proper paper on which to print their panoramas. To the ordinary photographer, the advantage of this kind of paper will be the perfect uniformity with which it is prepared; [and its freedom from dust, spots, and everything injurious.

The most important step which has been made in paper photography for some time, is undoubtedly the discovery of applying collodion to paper, and forming, in this way, a surface which may be iodized and sensitized beforehand, with scarcely any trouble, and then used with the facility of the waxed paper process. By M. Marion's process, somewhat of the rapidity and sharpness of collodion is communicated to paper, with the advantage of its being easier in manipulation, and more certain and uniform in its results. The collodion is prepared by dissolving in 1000 parts of good ether, 10 parts of collodion and 1000 parts of cerolein; 20 parts of iodide and 5 parts of bromide of potassium are then added, and 2 parts of iodide of cyanogen. When all are dissolved, add 20 parts of liquid ammonia. The iodides and bromides should be ground up in a mortar, in order to effect their solution, and the liquid should be filtered, and allowed to stand for twenty-four hours. When required for use, the collodion is poured into a porcelain dish, and the sheets of paper completely plunged in, and then drawn out again almost immediately. The liquid will be found to have thoroughly penetrated the paper; and it can then be hung up by one corner to dry. When dry, it may be passed through a cylindrical press to improve the surface. The paper in this state will keep good for any length of time, if away from damp; indeed, it is said to improve by keeping; pictures taken when it is a month old being very superior to those on new paper. The sensitizing process is very simple. A bath is prepared, containing 7 parts of nitrate of silver, 10 parts of acetic acid, and 100 of water. This is poured into a flat dish, and the collodio-iodized sheets floated on, and then immersed completely, and allowed to remain there for five minutes; they are then to be removed, and immersed in distilled water several times renewed. After this washing, they must be carefully dried between sheets of blotting paper, which must only be used once for this purpose, but which may, however, be set aside for ordinary blotting off and drying. The dessication of sensitive collodionized paper may be hastened by changing the place several times, and when it is nearly dry, it may be shut up in a preservative apparatus, which will absorb the still remaining moisture. The paper, when thus enclosed, will keep for several days, and even weeks, in a state of perfect sensitiveness. When washing the sheets, several may be put into the same dish; but not more than one sheet must be sensitized at a time. After exposure (which will not be so long as in the waxed paper process), the sheets may be returned to the preservative case to await development. The developing solution consists ot saturated gallic acid, to every ounce of which add two or three drops of sensitizing solution. In this bath immerse the exposed sheets, and watch the progress of development. From half an hour to one or two hours will be required for this operation to be completed. The development need not be pushed to so great an extent as in the ordinary paper process, as the fixing bath does not lower the tone of the picture. The development will have proceeded long enough when the sky is of a perfect opaque black, the lights and shades having assumed dark tints proportional to their intensity, and the shadows, represented by white portions, having preserved their vigour and original transparency. When properly exposed, the operation will proceed rapidly, and very little, if any, aceto-nitrate of silver need be added, beyond that put in originally. The hyposulphite bath for fixing should contain 40 per cent. of the salt; it can, indeed, be used saturated without fear, for, far from weakening the dark parts of the picture, as in the old process, the hyposulphite communicates to them a greater intensity, without injuring the white parts. When fixed, the negative must be washed in abundance of water, and then dried, and subsequently waxed. The wax and ammonia which are added to the collodion give the film a great aptitude for uniting with the paper, and preserve it better in the dry state after sensitizing. In our own hands, collodion on paper has proved all that could be desired in a negative paper process, and we confidently recommend those of our readers who are not wedded to glass to give it a trial.

A sample of glass has been forwarded for examination in the stereoscope, by Frederick D. Davis. We are unable to report favourably upon it. It is one of the light yellow glasses which so frequently come under our notice; allowing abundance of active blue rays to pass through, and being altogether unreliable for the collodion process, except in a very dull light.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

Mr. Sebastian Davis (3071) exhibits a small but complete tourist's equipment, consisting of his stereo manipulating chamber, and the requisites for its use on the field. Mr. Davis, as most of our readers know; is an enthusiastic and able amateur photographer, and the exhibition of his clever tent or manipulating chamber is solely for the advantage of photographers, as he his not a manufacturer or dealer, to whom profit might accrue from publicity. Whether the equipment be manufactured at all for sale by any house we do not know; but as it is neat, light, portable, convenient and efficient, we append for the benefit of new readers a description which appeared in our fourth volume:—

"The special object of the stereo manipulating chamber, is to enable the tourist to produce stereograms by the wet collodion process without the incumbrance of heavy or inconvenient apparatus. This invention essentially consists of a portable and commodious folding chamber, and a light, cone-shaped camera, with rising front to carry the lenses.

"The chamber is capable of carrying the camera when packed in its interior, and has an aperture in front equal to the size of a stereoscopic plate, over which the cone slides when ready for use. Upon the internal side of this opening a frame is fixed, having silver rests for supporting the sensitive glass, and a shutter is hinged to the back to enclose it in darkness. Immediately beneath the frame is a longitudinal stop, glazed with yellow glass, and fitted with slides, in order to regulate the admission of light. Beneath this, and through the bottom of the box, a cloth bag is suspended to hold the nitrate of silver bath; over which a lid shuts for the purpose of excluding dust, light, or chance impurities. Upon the edges of the top and bottom of the box are hinged two flaps, each half the height of the box, the upper one supports the black covering free from the hand, and the latter constitutes the table for the developing tray, and the two, when closed, protect the contents.

"The developing dish is made of tin, and holds over its centre a piece of wood, which retains the damp glass without slipping when at a considerable inclination. By this arrangement the plate can be developed without fingering, until it be thought necessary to examine it by the transmitted light admitted through the opening immediately facing the operator. At the right-hand side the box has an arrangement for holding three glasses to contain the developing fluid, water, and the fixing solution. The stereo manipulating camera is fastened in the usual manner to the top of the ordinary stand, and its elevation can be regulated to the height and convenience of the photographer. A curtain, which is attached to the box, answers the purpose of the focussing cloth, the completion of a light-tight chamber when secured round the waist, and an outside wrapper to cover the whole when closed.

"The camera is accompanied by a novel plate box, which has been designed as a convenient arrangement for carrying wet plates without the risk of displacing the film. The box is made internally equal to the length of the plate, but about three-eighths of an inch wider. Upon the longer sides four pieces of wood are to be attached, a quarter of an inch distant from the ends; these pieces serve to retain a series of loose slips, having raised corners against the shorter sides of the box. By placing the wet plate face downwards, upon a pair of these slips, it will be kept steadily in its place, and will rest simply upon its four corners; additional slips and plates can then be arranged alternately in like manner, and a number of positives can thus be carried with complete security, and without the chance of the wet film being displaced by friction."

The advantages of the manipulating chamber as regards facility in operating must be very apparent. The plate, when removed from the bath is at once placed *in situ* for exposure, without the necessity of any dark slide, which is entirely dispensed with. Altogether, the arrangement is ingenious and convenient, and well worthy of the attention of the amateur.

Mr. G. Hare (3086) contributes an excellent display of cameras for the tourist, and for use in the glass room. Amongst these we may especially name a handsome panelled trunk camera for the studio, 12 inches square, with swing back and endless screw focussing arrangement; and a landscape camera, 8½ by 6½ on the same plan, but without swinging back. In these cameras the part of the body which carries the lens travels out at the front. Inside there is another body, which, like the outer body, remains fixed; the arrangement entirely prevents any light entering. A well and firmly made Kinnear bellows camera with various improvements; the focussing screen being so arranged as not to require removal from the camera. A light portable binocular camera in leather case, with three double and one single back, screw for focussing from the back, &c. The central partition for dividing the two stereo lenses is moveable, so a view may be taken $7\frac{1}{2}$ by $4\frac{1}{2}$ with a suitable lens. Amongst other stereo cameras is one which, with three double backs and a single one, is fitted in mahogany case, the outside measurement of which is $8\frac{3}{4}$ by $6\frac{1}{2}$ by 6, and the weight $5\frac{1}{2}$lbs. An instantaneous shutter, on Mr. Window's roller principle, and some other matters, complete the display. The whole of Mr. Hare's contributions seem characterised by excellent material and workmanship.

## THE INUNDATION IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

The day following was, unfortunately, one of the many we have had this summer—a glorious beginning, raising high the eager expectations, only to be dashed down, and swallowed up in the gloom that too surely follows it.

During the ride to the dam, the day had put on its best dress, and shone out radiant in blue and silver; but before we had exposed two plates, like a fickle maiden, and troubled with a bad temper withal, black looks had swept away all the sunny expression, aud the end was downright sulkiness. We had then uo alternative but—

"To learn to labour, and to wait;"

we, therefore, drove down to the break in the bank, and leaving the conveyance, started off ou an exploring expedition. We found the water a few inches lower, and were enabled, in consequence, to walk along the gravel bank, now just above its surface.

It was a strange sensation we experienced whilst walking on this very narrow path out into the centre of the water. Its narrowness was made still more apparent by the contrast against the immensity of water which hemmed us in all round, and though the road was as strong as gravel and long use could make it, it seemed to have all the insecurity of a plank bridge.

During our walk we picked up a prize as souvenir of the Fens. It was a fine specimen of the constructive genius of the aborigines of these parts—I mean the genuine thoroughbred Fenmen—and bore some very remote resemblance to the paddles frequently dug up in this district, but did not possess the merit of age. It had evidently been made by some clodhopper to meet his new requirements, and had probably been lost in his first essay to propel one of many cranky and rotten boats, uow so numerous, that one might think that they were some kind of marine fungus, for they have sprung apparently from nowhere with the rapidity of mushrooms. The sight of this quaint contrivance, which was but a piece of board roughly nailed on to the end of a splint of wood, would have immensely tickled the fancy of a genuine son of Neptune, and it would have been a sight worth seeing to have watched his face could he have seen the first efforts to use it.

We returned once more to our conveyance, tired and disappointed, for the day held out no sign of relenting; but as we had made up our mind to remain until after sunset we made a couch of the side of a hovel of straw, one half of which was in the water; and we were endeavouring to practice a little Mark Tapleyan philosophy, when our attempts at jollity under adverse circumstances were interrupted by a venerable man, evidently a clergyman, who, after commonplace remarks about photography, adverse weather, &c., informed us, with a most unchristianlike grin, that ill became his face—at least, so I thought—that some of his friends, who had occasion to unroof a hovel not far off, were astonished at the sight of an immense colony of snakes, and that on further inspection the hovel proved a secoud Noah's Ark, for it was peopled with rats and all kinds of creeping things. After malaciously watching the spasmodic start, and the alacrity with which we left our hitherto cozy couch, he wished us good luck and went on his way chuckling. Our stock of patience had evaporated in company with our Tapleyan philosophy, and we disconsolately drove off home, our journey being by no means enlivened by the consciousness that the day had been spent in vain.

We determined to try no more from the Lynn side of the water, and therefore took the train for Wisbeach. This journey, usually of 16 miles, was now stretched out to nearly 50, for we had to go round by Ely and March, iu consequence of the desire of Neptune to hold the line for his own purposes. Soon after our arrival we were joined by two or three photographic friends, and were soon ou our way for the Smeeth Road station. We here left our conveyance and took a boat for a sail in search of the picturesque. We started with hearts full of hope, and our boat full of apparatus, for one of our friends had a ponderous equipment, sufficient to load au elephant; but after we had got fairly started, I noticed with some uneasiness great masses of black clouds gathering on the horizon. I turned, therefore, to our boatman, for his opinion of the weather. He was an odd fish, of the salt water breed, who had knocked about the world all his life, and had evidently got well cured, for his face presented a strong resemblauce to a smoked haddock; his roving appetite was also satisfied, for he had anchored at Wisbeach, and had determiued "to go no more a cruising." When, however, the inundation first startled Wisbeach, his desire for a little excitement could not be quenched without gratification, so hoisting his boat on to a truck, he started on his adventures, once more, and took possession of the new sea. He has had no reason to regret the step, for the feverish desire for novelty tempted hundreds to have a sail over cornfields, and he has in consequence been doing a thriving trade. I had to wait some time for his opinion, for his little grey eyes looked out keenly from under his shaggy brows, as he slowly turned himself to all the points of the compass. At length the oracle spoke. "Mayhap we shall have a drop or two from the tail of the storm, but nothing to signify." Reassured we went on our way, but before we got two miles we clearly saw we were in for it, and therefore pulled with all our might for a barn about half a mile off, and which appeared to offer a welcome shelter. Our efforts were thrown away, for the gate was fastened, and in our attempt to get to the leeward we run upon a gravel road just under water, and all our labours to move the boat proving unavailing, we had no alternative left but to brave out the storm. V. B.

* Continued from p. 414.

## DIRECT COLLODION POSITIVES ON GLASS.*

BY DR. SABATIER.

### *Direct Transparent Positives.*

After having shown that the light in the camera, and diffused light, give rise to two different colours and combinations; that the first yields a negative, and the second a positive, we are naturally led to enquire what takes place wheu we cause diffused light to intervene at the moment of the formatiou of the negative. Does the pyrogallic acid—the action of which is subordinated to the kind of light which has acted upon the film—continue to interrupt the work of reduction to form the combination determined by diffused light? Solicited simultaneously by two forces acting in opposite directions, which will it obey? If it yields to diffused light, the latter can then be employed as a substituting agent, and the superiority of this new agent over nitrate of silver, the alkalies and their subsalts, is unquestionable: as, henceforth, without washing or baths of any kind, we may transform a negative in course of formation into a positive; it suffices to inundate it with light, by opening the window or door of the operating room.

I must confess that it was not without emotion that I approached this touchstone, that I made my first proof, and I verily believe that my hand trembled when I opened the

* Concluded from p. 390.

door to admit light into the room. My eyes were fixed on the plate, and saw nothing beyond. Two, perhaps three, seconds, which appeared to me interminably long, elapsed before the collodion film exhibited the slightest change; but at the expiration of this time, I saw in twenty places at once, even the whitest spots become black. Like the liquid which has not yet attained its level, gradually ascends. invading the lower portions, following all the sinuosities, infiltrating itself into all the fissures of the negative: so all the white portions of the film became black, and the black portions appeared to become white. The diffused light had accomplished its work: in the interior of my imperfect negative, it had designed the most beautiful direct positive I had ever seen, such a one as it only could design.

Repeat this experiment. I know nothing more curious: it is extremely simple, as it consists merely in opening the window while the pyrogallic acid is making its negative. Do not fear a failure. Whatever be the duration of the exposure, or the nature of your collodion, you will certainly succeed: you will always succeed, provided,—

1. That at the moment when you admit the diffused light, your negative has not arrived at a perfect state, that is to say, is not completely finished.
2. That your sensitizing bath be perfectly neutral.
3. That you take for a developing agent pyrogallic acid, with the addition of acetic acid and no other.

The alkalies provoke the formation of the positive, energetic acids oppose it. And by energetic acids, I understand not only nitric, sulphuric, or hydrochloric acids; the presence of citric acid is sufficient for the production of the positive. The commercial sulphate of iron always contains a little free sulphuric acid, and that is the only reason which renders it unsuitable for the development of the positive.

A most surprising and astonishing thing, and worthy of fixing the attention, is that all the iodide of silver which, in the camera escapes the luminous impression, is not acted upon when the negative takes its bath of diffused light. The positive combination which develops itself takes place only at the expense of the iodide previously impressed, and which the acid has not yet reduced at the moment of opening the door or window. So that, in this case, the part played by the light is limited to changing the action of the acid upon the iodide, to substituting one combination for another.

If there was no objection to leaving, in the collodion film, the iodide remaining free. from the negative positive, we should have an image visible at the same time, both by reflection and as a transparency: but it is always best to remove this iodide, and spread upon the collodion film a white protecting varnish, translucent without being transparent.

By virtue of the intervention of the light admitted into the laboratory, to complete the work begun in the camera, the positive, not now obtained from a negative, but direct and really heliographic, will henceforth be one of the simplest and easiest things in the world to obtain; five minutes will suffice to produce a picture which four-and-twenty hours of assiduous care could not produce by other means. Art will certainly lose nothing, as, in skilful hands, the new method will give results equal, if not superior, to the finest that have been obtained up to the present time.

The only difficulty that presents itself is that of seizing the precise moment at which we must lift the shutter in some way, to give access to the diffused light; but a few experiments will soon point out the way of surmounting it. If the positive appears only in those places which ought to be the blackest, it shows that the light has been admitted too late; if it be so decided that the object you desire to represent is lost in the shadows, it shows that the light has been admitted too soon. Moreover the limit which separates the *too soon* from the *too late* is not so extremely precise, but that we may, with a little more or less, still obtain a satisfactory picture. According to the objects to be represented, and the effects to be obtained, we may arrive at the best results by making the formation of the negative predominate over the positive, and reciprocally. Experience is, of all masters, the one who most readily comprehends the lessons, and to whom they are most profitable.

For the production of a direct positive, either by reflection or transparency, any kind of collodion will answer. Still it is advantageous to add two iodides to the collodion, one of which is acted upon slowly by the light, and the other rapidly; such, for example, as the iodides of cadmium and potassium, because with this kind of collodion the negative appears to attain its perfection, while there yet remains in the collodion film sufficient impressed iodide to respond to the necessities of the positive, and there is then less risk of giving an ill-timed access of diffused light.

The negative not requiring to be so strong as when it is to be employed for printing from the time of exposure may be much reduced with advantage. If with the collodion employed twenty or thirty seconds of exposure are ordinarily required, then give only five or eight. This brevity of exposure, I am persuaded, will end in becoming instantaneous by the direct positive much easier than by any other way. If the exposure has been too long, the negative develops more rapidly, and stops quicker upon access of light. When the exposure has been too short, it develops slowly. The work must not be hurried.

It is scarcely necessary to add, that with a direct transparent positive we can produce a negative which will serve as a type for reproduction, nor that the collodion process is applicable to albumen. This every photographer will understand.—*Moniteur de la Photographie.*

## STUDY OF THE WET COLLODION PROCESS.

BY E REYNAUD.*

### 2. *The formation of Streaks, Specks, &c., in the Collodion Film.*

THE last of these accidents is caused solely by the imperfect collodioning of the plate; irregular motion, jerking, suffice to produce it; it is, therefore, useless to seek for any other cause than want of skill in the operator.

Specks, as well as streaks, are always caused by too great a proportion of water in the collodion. This water may be due to the ether or to the alcohol, or by rinsings left in the bottles. The bottles into which collodion, or the materials with which it is prepared, should always be rinsed with ether, or at least with alcohol.

The quantity of water contained in the ether is ascertained by the density of that liquid. This density should be at least 62° of Cartier's areometer, as I have before stated: the density of the alcohol must be 50°.

By using alcohol and ether in these conditions only, and taking all proper care in the preparation of the collodion, we may always avoid these streaks and specks, which destroy the value of the negatives whenever they appear.

### 3. *Spots in the Film produced during Sensitizing.*

These spots are most frequently produced under the following circumstances:

By too great a proportion of iodide in the collodion.

By too great an excess of iodine in the collodion.

By a too strong sensitizing bath.

Let us repeat in this place that the proportion existing between the iodides and the collodion containing them, must be 1 to 1½ per cent. If these proportions are exceeded, marbling specks make their appearance in the collodion film during sensitizing. An attentive examination of these specks proves that they are the result of an unequal action exercised by the silver bath upon dissolved iodides. These inequalities are produced by the veins which are inevitably formed at the moment the plate is immersed in the silver solution.

* Continued from p. 398.

Too great an excess of iodine also produces the same results by the same causes. We know that the presence of iodine in the collodion is betrayed by the tint which this metalloid communicates to the liquid; this tint should never be deeper than orange yellow. A silver bath in a too concentrated state will also cause the formation of spots in the collodion film, and by the same cause, that is to say, by a too vigorous action, by a too prompt decomposition of the iodides. To avoid this mischievous result, the silver bath must never contain more than 8 grains of crystallized nitrate of silver to 100 grains of distilled water.—*Moniteur de la Photographie.*

(*To be continued.*)

## A SHORT LESSON IN CHEMISTRY.—No. 2.*

The names of the elements of matter are in general arbitrary, being those which they had before chemistry was a science; and consequently there is nothing in them to indicate system or classification: such are sulphur, gold, lead, arsenic, &c. Those bodies that have been discovered lately, that is since chemistry has been developing into a science, have received appellations either in accordance with a rule, or indicative of their origin or constitution: such are platinum, iridium, &c., which take the termination *um* in imitation of the Latin termination for metals; as in *plumbum* (lead), *aurum* (gold), *stibium* (tin), &c.; whereas oxygen, chlorine, &c., are words compounded of Greek roots. But the moment we leave the elements and begin to deal with their compounds, the names of the combinations have been appropriated in strict subserviency to rules emanating from the science. In this way each compound receives a name which classifies it into a group, and carries with it certain specialities that individualize it in this group; that is, the very name tells almost all that a chemist wishes to know about the substance primarily. For instance, iodide of potassium, sulphide of silver, chlorate of soda, are very explicit terms and quite intelligible if the rules are thoroughly commited; that is, those rules in accordance with which they have been given. It is, therefore, necessary to teach you something about those rules by which all chemical combinations are named.

The simplest combinations are what are called *binaries* or combinations of pairs of elements. Such combinations take place either between the metals and the metalloids, or between pairs of different metalloids, but not between pairs of the metals. In such combinations one of the elements is regarded generally as the base of the compound, and is denominated as such; the other is an epithet or qualifying term, which takes the generic termination *ide*, accompanied sometimes by certain prefixes; for instance, the compounds of chlorine and lead, bromine and cadmium, sulphur and arsenic, sulphur and carbon, oxygen and iron, oxygen and nitrogen, are respectively called chloride of lead, bromide of cadmium, sulphide of arsenic, bisulphide of carbon, oxide of iron, protoxide of nitrogen, and peroxide of nitrogen. In each of these examples the metal is regarded as the base. Where the combinations exist entirely in pairs of metalloids, the rule is more frequently modified, because the bodies that result from such combinations are modified; in fact they are distinctly different from the preceding. The difference alluded to is *acidity;* for many of the binaries, arising from pairs of the metalloids, are *acid* or *sour* bodies; whereas those from pairs of metalloid or metal are seldom so. By a second rule in chemistry, it has been agreed upon to denominate all substances possessing an acid reaction, by the generic termination *ous* or *ic*, attached to one of the elements, together with certain prefixes, which indicate either the *degree* of acidity or simply the other element. Thus the compounds of oxygen and sulphur, oxygen and chlorine, oxygen and silicon, oxygen and carbon, hydrogen and fluorine, hydrogen and sulphur, hydrogen and selenium, &c., have an acid reaction, and are denominated, sulphurous acid, sulphuric acid, hyposulphurous, hyposulphuric, &c.; silicic acid, carbonic, hydrofluoric acid, hydrosulphuric acid, hydroseluic acid, &c.; again, oxygen with certain metals forms acid compounds; as for instance, with gold, iron, manganese, giving rise to auric acid, ferric acid, and permanganic acid. The termination *ous* indicates a less degree of acidity than *ic;* the prefix *hypo* or *sub* (under), diminishes both *ous* and *ic*, so that hyposulphurous acid contains a less quantity of acidifying material, or at least a less quantity of one of the elements than sulphurous acid; and hyposulphuric than sulphuric. The prefix *per*, or *hyper* (over), increases the intensity of acidity, or the quantity of one of the elements both of the *ous* and *ic* acids; for instance, perchloric acid contains more oxygen by weight in reference to the chlorine than chloric acid. The acids containing hydrogen as one of their elements, are very unique in their appellations, the prefix being *hydro* (for hydrogen), whilst the termination is *ic*, and the epithet between them indicates the base; that is the other element, whether simple or compound. The latter form is exemplified by hydrocyanic acid, &c.

The *ide* binaries are modified also by prefixes, these prefixes being *proto* (first), *bi*, *bin*, or *deut* (second), *sesqui* (one and a-half), *ter* or *trit* (third), *quadri* (fourth), *penta* (fifth), *per* (highest or last), snd *sub* (less or under); these prefixes indicate an increase or decrease in one of the elements; that is, of the metalloid, according to the expressions used; as, for instance, protochloride or mercury, sesquioxide of uranium, &c. Now in these two rules all binary compounds are comprehended, with the exception of a few substances that have long been known by common names, and which still retain their arbitrary appellations; as, for instance, *water* (protoxide of hydrogen), *ammonia* (nitride of hydrogen), *steel* (carbide of hydrogen). Now let us sum up the instruction of this lesson: Binaries are either *acid* or *non-acid* substances, of which the latter are distinguished by the termination *ide*, or have arbitrary names; the former by the termination *ous* or *ic*, accompanied with prefixes.———*Reservation.* . . . Not all acids are binaries, as I will show you hereafter.

*Examples:*

Bromine combines with cadmium, iodine with lithium—what are the names of the resulting compounds?

*Ans.*—Bromide of cadmium, iodide of lithium.

Carbon combines with hydrogen, phosphorus with hydrogen, arsenic with hydrogen, selenium with hydrogen—how are these compounds denominated?

*Ans.*—Carbide of hydrogen (carburetted hydrogen—old name), phosphide of hydrogen (phosphoretted hydrogen—old name), arsenide of hydrogen (arseneretted hydrogen—old name), selenide of hydrogen (seleniuretted hydrogen—old name).—*Humphrey's Journal.*

* Continued from p. 405.

## ON THE STUDY OF THE ELECTRIC SPARK BY THE AID OF PHOTOGRAPHY.*

BY PROF. OGDEN N. ROOD, OF TROY, N.Y.

*Form of the Negative Spark when Drawn from the Prime Conductor by a Short Thick Metallic Rod.*

The production of Lichtenberg's figures has been considered as indicative of a real difference between positive and negative electricity. Riess, who has examined this subject with great care, found that in addition to the marked difference in the two forms, the diameter of the positive figure is to that of the negative as 2·77 is to 1. The same physicist has lately made an elaborate examination of Priestly's rings, which are formed when a large number of sparks strike on polished plates of metal, and arrived at the conclusion that

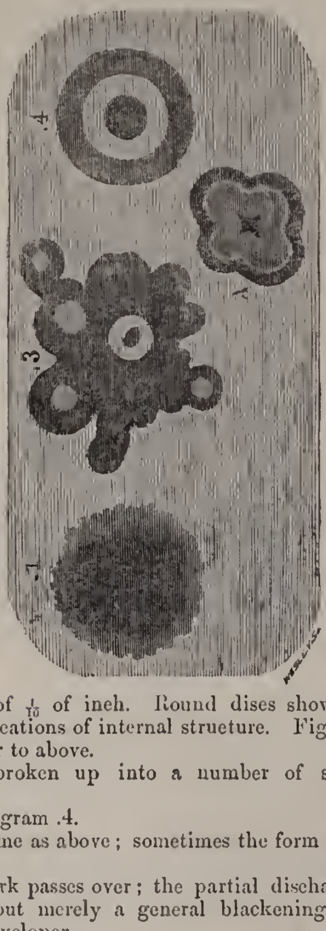
* Concluded from p. 418.

the set of rings generated by negative electricity is quite different from that produced by positive.* It consequently becomes very interesting to ascertain whether such difference also prevails between the photographs of the two sparks.

The apparatus was arranged as before, and sparks of negative electricity fell on the sensitive surface.

The form of the negative spark was found to be quite different from that of the positive: it was destitute of rays, circular in shape and often made up of a number of minute circles placed without symmetry. For short distances it was much larger than the positive spark, and never nearly so well defined.

Fig. 4.



Distance of $\frac{1}{10}$ of inch. Round discs showing by their shading indications of internal structure. Fig. 4, .1.

$\frac{2}{10}$. Similar to above.

$\frac{3}{10}$. Discs broken up into a number of small circles. See .3.

$\frac{4}{10}$. See diagram .4.

$\frac{5}{10}$. The same as above; sometimes the form at A is produced.

$\frac{6}{10}$. No spark passes over; the partial discharges produce no figures, but merely a general blackening of the plate under the developer.

If the sensitive plate be placed on the prime conductor charged with positive electricity, and sparks be drawn from the surface of the plate, the negative figure is produced; if the plate rest on a conductor charged with negative electricity and sparks be drawn from it the positive form is obtained; and finally, if the plate be coated on both sides with collodion, and insulated with a brass ball before and behind it, one of them being also insulated, while the other is in communication with the ground; if now a spark of either kind of electricity be allowed to pass from the insulated ball to the plate, and from the plate to the second ball, we obtain, as would be expected, on the opposite sides of the plate, the negative and positive images by development.

It is well known that when the knob of a jar, charged with positive electricity, is touched to a thin plate of pitch, a yellow star-like figure is produced by sprinkling the plate with a mixture of powdered sulphur and red lead; while if negative electricity is used a rounded red figure is formed. These figures bear the name of their discoverer, Lichtenberg. The method employed by Riess is much better calculated to give accurate results than the common one just mentioned: a small square plate of copper is coated thinly with black pitch on one side; the point of an insulated metallic rod touches the centre of the pitch surface, while the other side of the plate is in metallic connection with the ground. If now a spark from a jar charged with positive electricity be allowed to pass over to the pointed rod, and the latter still insulated be removed, then by sprinkling the pitch with a mixture of sulphur and red lead the star is generated in great purity: very perfect red negative figures are of course formed in a corresponding manner.

In repeating these experiments after the manner of Riess, I was struck with the resemblance existing between the red negative disc and the photographs of the negative spark. There is also much general resemblance between the positive yellow star and the photographs of the positive spark: this is greatly heightened if the yellow positive figures are produced in the following ways; the pitch plate is held at such a distance from the ball of the prime conductor, that no spark can pass over, the machine is turned, and the brush is allowed to strike it for an instant; on powdering the plate a multitude of small yellow stars, very much like the photographs, appear. They are often surrounded by small red circles, such portions having become negative by induction.

The results obtained with Leyden jars, and in a partial vacuum, as well as by the use of metallic plates, I propose to detail on a future occasion.

* Pogg. Annalen, vol. cxiv. No. 10, p. 193.

## AMERICAN PHOTOGRAPHS.*

The pencil of the artist was never more fancifully employed than when it delineated those battle scenes of the last century, which delighted the courts, and decorated the palace walls of France and Germany. But it must be admitted, nevertheless, that the object of giving an idea of what "a battle is like," which is a legitimate and universal bit of curiosity among men and women in all ages, was then more successfully accomplished than it is likely to be by means of photographic processes, so far as we know of them at present. When we gaze on the acres of canvas in Versailles, Munich, Berlin, or Petersburg, covered with the semblance of masses of men and serried squares and lines of infantry, clouds of cavalry and smoke, we know that the figures, with a few exceptions of prominent individuals, whose versimilitude is in proportion to the painter's skill, are purely imaginary, and that the wounded man in whom we take such an interest, or the dashing squadron leader heading his surge of horse against the rocky square, never existed at all in the world military, but, with the little drummer who is beating his *pas de charge* so manfully in the advance of his column, were picked up from the "models" of the day. The photographer who follows in the wake of modern armies must be content with conditions of repose, and with the still life which remains when the fighting is over, but whatever he represents from the field must be real, and the private soldier has just as good a likeness as the General. Barring faults of manipulation and artistic power, the likenesses must be like, and they must be real if the mechanism is of moderate goodness. When the artist essays to represent motion he bewilders the plate and makes chaos, and so far as we have yet gone, a photographic "charge" is an impossibility. Mr. Fenton was probably the first photographer who ever pitched his camera-stand under fire, but Mr. Simpson was out before him in the Crimea, and it is no disparagement to the former to say that the scenes in the trenches were much more interesting than the likenesses or groups, or other works of the photographer, though they were more ideal or less actual. It was considered something remarkable when Mr. Fenton succeeded in fixing on his plate the puff of smoke from a distant gun. After him, and perhaps with greater opportunity, certainly with greater success, came Mr. Beato, who has since been with the British armies in India and in China, reaping a golden harvest, whose reproductions of Oriental architecture were wonderfully good, but gave far less pleasure than the sketches of Mr. Lundgren, who was engaged

* From the *Times*.

for Her Majesty. The photographer, however, could multiply his copies as fast as he pleased, and every one could send home his image in jackboots, beard, dust, and topee for a few shillings. The artist could barely colour his drawings by working incessantly. The French had recognised photographers in attendance on their army in Italy, and for purposes of natural history, for architecture, and still-life, their work is not to be excelled. America swarms with the members of the mighty tribe of cameristas, and the civil war has developed their business in the same way that it has given an impetus to the manufacturers of metallic air-tight coffins and embalmers of the dead. The young Volunteer rushes off at once to the studio when he puts on his uniform, and the soldier of a year's campaign sends home his likeness that the absent ones may see what changes have been produced in him by war's alarms. In every glade, and by the roadsides of the camp, may be seen all kinds of covered carts and portable sheds for the worker in metal acid and sun-ray. Washington has burst out into signboards of ambrotypists and collodionists, and the "professors" of New York, Boston, and Philadelphia send their representatives to pick up whatever is left, and to follow the camps as well as they can.

We have before us a collection of photographs by one of the best known of American photographers, Mr. Brady, of New York, which includes, however, not merely the war scenes to which we have alluded, but a number of interesting portraits of the most eminent Americans, and of some strangers. First, there are two plates of the *Monitor*, one showing her deck, which seems raised a vast distance above the water, whereas it is only a few inches, and the cupola or revolving tower, with the shot-marks upon it from the *Merrimac's* guns. It is not too much to say that an Armstrong or a good solid shot gun would have destroyed such armour and such a fabric as the plate represents. There are but four marks on the armour, and those of the feeblest character. The other represents the crew on the deck in easy groups, which are creditable to the skill of the artist—a set of stout brawny fellows, in no particular uniform, and rather unkempt—of whom a few have the air of the genuine "old salt." For guns and the like the lens is well adapted in experienced hands, and here we have a striking "picture of the effect caused by the bursting of a 100lb. shell" on board the Confederate gunboat Teazer, which was captured by the Federals, deck stove in, iron stanchions gone, a great crater in the hold, machinery torn into ribands, but at best the craft, with its engines exposed on deck, and frail scantling, was a perilous thing to put a gun into. Mr. Brady's artist went down to Richmond, and has sent us some views which are of interest, but generally the sun of Virginia was too powerful, and the appearance of snow is produced on most of the photographs, and an excessive whiteness of colour diminishes the effect. Groups of wounded out in the open sun at Savage's Station, on the railroad to Richmond; "the house where Washington wooed his Martha," burnt by the Federals when they abandoned the line of the Pamunkey; Virginian farmers' wooden houses; the balloon and its *modus operandi*; the Confederate works at York town; the ruins of Hampton, destroyed by Magruder, with its venerable—for it was the oldest edifice of the sort in the States—church; batteries of artillery, horses and all, which would be a very curious subject of study to our Horse Guards, as they might get an idea of what the Federal cavalry are like, by examining the appearance, seat, equipments, and horses of the field artillery, which are unquestionably the best part of the Federal army. These, and the like, are all very worthy of attention. It can be seen from them that the work executed by the Confederates at Yorktown was very slovenly, but that nothing that was ever seen of the most slovenly European soldiery can equal the utter want of military smartnes in the Federal artillery. Men with unbuttoned coats, and open collars, and all sorts of head gear, are seated, with their overalls gathered half-way up the leg, in their saddle, with an attempt to dress in line, which renders their shortcomings more obvious. The most agreeable subject in the volume, perhaps, is one of a Confederate Lieutenant of the Washington family and name—for all the representatives of the *Pater Patriæ* are, and were, Secessionists—who was taken prisoner, sitting beside his college friend and relation, Captain Custis, of the United States' army, while a negro boy, barefooted, with hands clasped, is at the feet and between the knees of his master, with an expression of profound grief on his shining face. The Confederate, in his coarse grey uniform, sits up erect with a bull-dog fighting face and head; the Federal, a fair-haired, thoughtful looking man, looks much more like a prisoner; the *teterrima causa belli*, who appears to think only of his master, is suggestive enough. We can see here that the houses in which the better sort of people live in this part of the old dominion would not content the humblest of our tenant-farmers or yeomen; that the Federal soldiery do not improve in appearance during the war; and that their attention to uniform is of the smallest, and we form some idea of the difficulties of fighting in such a country, when we observe that every view is fringed by woods.

Turning to the volume of portraits, the eye is first arrested by Mr. Lincoln, sitting, in company with an ink-bottle, at a table, which does not conceal that foot, which he is so often said by the papers "to put down" on various questions—an odd, quaint face, sagacious notwithstanding the receding brow, and kindly despite the coarse heavy-lipped mouth, but with such capillary arrangements, that, in combination with the long-limbed, narrow body and great extremities, there is a gorilla expression produced by the *ensemble*. Next is Hannibal Hamlin, Vice President, who is chiefly interesting on account of what he might become. Turn over, and Mr. Stanton gives a sitting for his head alone, the lines of which do not stand comparison very well with the clear outline of Mr. Seward's features next to it. Why did not Mr. Brady give the full face of Mr. Seward, so that one could see his eye? In other respects the likeness, though it does not convey that air of "cunning and conceit," which Prince Napoleon's attaché attributed in his *feuilleton* to the Secretary of State, is characteristic and true. Pass over Mr. Bates, and we come to Mr Chase, who is standing with one hand outside his coat, over his breeches pocket, and the other on a plaster-of-Paris pedestal, looking as though he were waiting for some one to lend him a little money, and expecting it, too. He has one of the best heads among the Cabinet, though one cannot help remarking he has a defect in his eyes, and, oddly enough, so has General Butler, and so has Mr. Jefferson Davis. It is not too much to say that any stranger would be struck by the immense superiority of the heads and expression of Mr. Davis, of General Polk, of Beauregard, of Stonewall Jackson, and Lee, to most of the Federal chiefs, of whom few are at all striking in any way. M'Clellan looks small, and anxious, and unhappy; Blenker stands like a soldier and has the air of being one; and Burnside seems calm, and self possessed, and capable, ; Halleck's head is intellectual, but the face is dreamy and the lower jaw feeble; Pope, a stout, florid, sanguine-looking man, is like a German bass-singer in fine condition; and there is no other to speak of, excepting perhaps Meagher and M'Dowel, in the list of soldiers worth looking at a second time, after we have passed Banks, the unhappy recipient of Stonewall Jackson's favours. The few naval men in the book contrast advantageously with many of the soldiers, but some of the best of the latter are not here. "Stonewall" Jackson's likeness is something like that of Ney—a remarkable head, but without the beetle-brows, shaggy, and overhanging the full eye, attributed to him. From the Confederate soldiers there is but the thickness of a card-board to the Federal journalists, of whom the most remarkable thing is that they all seem to be above the age for liability to conscription. Literary men follow a group of the clergy, and the fine faces of Longfellow and Motley are among the best in the collection. Jefferson Davis, who comes after a batch of Federal politicians, is back to back with Jerrit Smith, and Mr. Stephens, the Vice-President of the Southern Confederacy, supports Mr. Charles Sumner. The portrait of Chief Justice Taney attracts one not merely on account of the air of the venerable old man, but because it is the likeness of the Judge who will, in all probability, prove the last that ever sat on the bench as head of the Supreme Court of the United States, and in whose person was signally demonstrated the complete worthlessness of that boasted palladium of the American Constitution, when the storm arose and the sword was unsheathed by violent and unscrupulous men. *Place aux dames!* In the photograph of Mrs. Lincoln, the loyalty and skill of Mr. Brady are as conspicuous as his gallantry, in adapting the focus to the subject; but he has treated the wife of the President, who is, of course, the "first lady in the United States," much better than he has Miss Lane, who did the honours of the White House for President Buchanan, and who won such praise for her discharge of them. The women's portraits, which are almost at the end of the volume, are not many.

Admitting many merits, and some very good specimens of the art in this collection, it does not appear from it that American photographers, among whom Mr. Brady occupies the highest place, have attained to that beauty of finish and fidelity which distinguish the better European artists, while they are immeasurably behind them in landscape. If one uses a magnifier to most of these subjects, it will be seen the paper is fluffy and the photograph spoilt by a sort of dustlike covering, such as we were familiar with here some years ago. But the portraits are of lasting attractiveness, although we are too apt when looking at them now, to forget that we are scanning the features of men who will be famous hereafter as actors in the greatest drama which the world has seen in these later ages.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 3rd September*, 1862.

M. Adolphe Martin has made a communication to our Photographic Society on the employment of pyrogallic acid for the development of instantaneous pictures. On a previous occasion he communicated the result of his researches, which had for their aim the giving to sulphate of iron the qualities possessed by pyrogallic acid, as a reducing agent. He now proposed to solve the inverse question—to give to pyrogallic acid the same energy of reduction as possessed by sulphate of iron—which would permit our obtaining, by its employment, satisfactory proofs after a very short exposure.

He had proceeded very far in his task, when M. Collin, a skilful photographer, informed him that by substituting a pinch of alum for the dose of acetic, or citric acid, usually added to the pyrogallic acid, he obtained the result M. Martin aimed at. As to ascertaining the quantity of alum to be added, and the complete study of the process, M. Collin left the matter entirely in M. Martin's hands, and generously permitted him to publish the facts.

M. Martin applied himself to the task, and he soon discovered that there were two extremes to be avoided, *viz.*, the adding too large or too small a quantity of alum to the pyrogallic acid. If too little be added, a reaction takes place on the plate, on removal from the camera, between the nitrate of silver and the pyrogallic acid; a black mud covers the film, and the silver is reduced in the body of the liquid, to the detriment of the picture. If the dose of alum be too strong, a reaction takes place between the nitrate of silver and the alum; a white precipitate carrying down the silver is formed, and no image appears.

It was necessary, therefore, to keep within certain limits, wherein the reaction takes place between the three bodies, so that the equilibrium between the tendency to the first reaction (pyrogallic acid and nitrate of silver), and the tendency to the second (nitrate of silver and alum), be broken only by the action of light upon the impressed portions of the negative. We imagine from this, that the dose of alum employed will vary with the degree of concentration and acidity of the layer of nitrate of silver, which still moistens the plate at the moment of development, and that the nearer it may be to the state of equilibrium indicated, the less need be the time of exposure.

This process, as communicated to M. Martin by M. Collin, did not admit of the addition of nitrate of silver to strengthen the proof, and it is in the "Treatise on the Tannin Process," by Major Russell, that the solution of the difficulty was found.

After this lengthy preamble, M. Martin gives the operative process:—

A solution of 25 parts of alum in 500 parts of water is prepared in advance. Mix with 20 parts of this solution 380 parts of water free from salts of lime, and 10 parts of ordinary alcohol. Then shake the mixture and leave it to settle, until the air is completely expelled from the mixture of alcohol and water. Then add 1 part of pyrogallic acid. Develop by pouring the liquid on the surface of the film, without the addition of nitrate, and when the image is well out, pour on it a fresh quantity of the solution, to which a few drops of a solution of nitrate of silver of the strength of 3 per cent., to which, also, from 3 to 5 per cent. of citric acid is added.

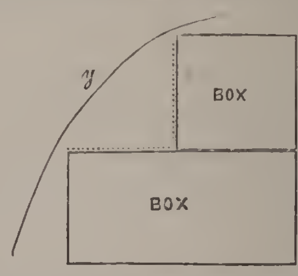
The solution of pyrogallic acid has the inconvenience of not keeping good more than four-and-twenty hours; but we can prepare before-hand large quantities of solution No. 2, in which the pyrogallic acid can be dissolved as required.

### RAPID DRY PROCESS.

Sir,—We have to apologise for not sending you the following sooner, but the pressure of business has prevented us, we trust, therefore, that you will excuse our tardiness.

In furnishing you with the details of our method of preparing "Fothergill" plates, we do not claim anything as new, but simply that we have adapted to this process many useful hints which have appeared in your pages (to which we are largely indebted). Some of the details may, perhaps, appear unnecessary to those who are already well skilled in manipulating dry plates; but where the results seem to depend on the fact, that all the minute particulars are carried out, it becomes difficult, if not impossible, to omit the smallest matter, without destroying the utility of the rest of the operation.

Before commencing operations, we light a good coal fire in our dark room, and place before it a rack for drying the plates, which we extemporise out of two empty boxes, one larger than the other, the larger one serving as a base, and forming a ledge for the plates to rest on whilst drying; on the bottom and sides of this ledge we place plates of glass, as recommended by Mr. Keene, to prevent the moist plates receiving any stain from the wood; these glass plates we cover with blotting-paper, on and against which the plates may rest, and over all we throw a sheet of yellow paper, to prevent any actinic effect from the blazes of the fire; the arrangement will be something like the following figure:—




The dotted lines being the glass plates covered with paper, the upright ones placed as vertical as possible, the line *y* being the yellow paper thrown over all. The plate being ready, is coated with Keene's wet process collodion, which we always iodize a few days or a week before using; it is sensitized in the usual 35-grain negative bath, which may be neutral or slightly acid with acetic acid; on removal from the bath it is rested on one end to drain on a piece of blotting-paper, and the back wiped with another piece. A pneumatic holder is attached, and 4 drachms of distilled water is poured on to it, scattering it as much as possible, similar to the manner of pouring on the developing solution; the water is worked round and round for about a couple of minutes, until it flows evenly and is thoroughly mixed with the moisture on the surface. It is then poured off, and is ready for the albumen solution, which is composed as follows:—

| | |
|---|---|
| Albumen ... ... ... ... | 1 part, |
| Distilled water ... ... ... | 2 parts, |

with about 6 grains of muriate of ammonia, and 4 or 5 drops of strong ammonia to each ounce of the dilute albumen; the solution is filtered through paper just before using, and is very much better when prepared some time—a month at least ought to be allowed before using it—what we are now using was prepared last September, and is now in excellent order.

As there are two of us, one performs all the preceding portion of the preparation, and after pouring off the water, let it drain an instant or two. The second operator takes hold of the pneumatic holder with a piece of paper, to avoid soiling the hand with the silver solution, keeping the plate inclined in the same direction, to prevent any solution flowing backward; about 1½ drachm of the albumen solution, for a stereo size, is poured on at the top edge, making it flow in one even wave till it reaches the bottom, it is then worked round and round for a minute or two, and poured off. The plate is then placed in a flat dish and washed, by shaking it in not less than three changes of water, too much cannot be used, as the plate will keep better if well washed, finishing with a fourth quantity poured over the plate from end to end; this may remain in the dish, and serves for the first water for the next plate. The water we use is the ordinary water supplied to the houses here, it is moderately soft, but contains a little lime and some chlorides, and we find it answers quite as well as rain water; we, however, take the precaution to filter it. After washing, the back is dried with a piece of blotting-paper to prevent too much water running down on to the drying rack, and also to assist in drying it quick. It is now placed on the rack (previously described), which is set as near the fire as safety will permit, and is frequently moved, so that it may not rest long in a pool of wet, and when it *looks* dry it is finally dried by taking it between the finger and thumb, and holding the back to the *clear* fire, as if for varnishing, until the back of the hand can no longer bear the touch of it. It is then placed in the preserving box, and may be kept almost any length of time; we have used them over seven months old, and found them work clean and well.

The exposure of the pictures we sent you, was given with a twin-pair of Lerebour's compound lenses, stopped in front to an inch opening, having a focus of 4½ inches, measured from the back lens to the ground glass. How long the plate will keep after exposure we are not able to say, as we usually develop within a day or two. To develop the plate we first wet it by plunging it in water, and then place it on the levelling stand, with a little water on it, four or five minutes, after which it is covered with a 2-grain pyrogallic solution, without acid or silver; the picture soon begins to show itself, and it is at this point that the greatest care is required, as if too much detail be allowed to come out at this stage the picture will be flat; on the other hand, if it be stopped too soon, you get a chalky picture, deficient of detail in the shadows; and, indeed, we believe, that by using a weak developer, and having patience enough, a good picture may be got with any short exposure. We have tried warm water to soak the plate, and warm developer, and find it very much quickens the operation; but we have found, hitherto, that it induces a tendency to fog.

When the picture is sufficiently out, 8 or 10 minims of a solution of citric acid is placed in the bottom of the developing cup, and the pyro solution is poured off the plate into it, and immediately returned on to the plate; this immediately stops the development. The solution of citric acid we use is—

| | |
|---|---|
| Water... ... ... ... . . | 1 ounce |
| Citric acid ... ... ... ... | 32 grains |

so that every 20 minims contains 1½ grains of acid; and we prefer citric to acetic as being more manageable, not being volatile, and giving blacker deposits. The remainder of the development is conducted as usual, by adding a few drops of a 10-grain nitrate of silver solution (which we keep for this purpose) to the developer, adding more and more, or using fresh pyro solution when it becomes discoloured, until the required density be acquired. We use no alcohol in the developer, the solutions flowing sufficiently well without it.

In conclusion, we attribute the sensitiveness we have succeeded in acquiring to the following causes:—First, a good and suitable collodion; second, the addition of muriate of ammonia to the albumened solution; third, the method of drying and *heating* the plates; fourth, a quick lens; and lastly to the method of development for which we are indebted to Mr. Wade, as communicated in your pages. We have prepared an experimental plate, with the addition of carbonate of soda, on Mr. Bartholomew's principle; should it prove successful, we shall be happy to communicate the result.

H. and J. Walter.

*Lyme Regis, Dorset, Aug. 28th*, 1862.

## PRINTING DIFFICULTIES.

Sir,—Whilst perusing that portion of The Photographic News dedicated to perplexed and despairing correspondents, the thought has often suggested itself, that if these anxious ones would only practise self-reliance, and seek out for themselves the causes of their troubles, what rapid strides would our art make towards the goal of perfection; for I believe these investigations, if persevered in by every practitioner of photography, would bring to light much useful knowledge pertaining to that art, which patient, untiring research alone is able to conquer? But whilst urging on the timid and irresolute to cultivate habits of self-help, I cannot overlook the fact, that many of the more fortunate ones are as ignorant of the causes of their success, as their less favoured brethren are of the causes of their numerous failures; hence it is a neglect of this study renders the numerous formulas so uncertain in their results, and seem to be launched into existence only to perplex and bewilder the admiring votaries of the black art. We will take, for instance, the case of A, who, having a sample of infallible paper, after numerous attempts to produce the vigorous and ivory-like prints promised in the advertisement, at length, in a fit of desperation, plunges a portion of it into a bath containing some twenty per cent. of silver; with a due sense of his presumption he hastily withdraws and dries it, then places it on the varnished surface of his faultless negative, closes the frame and exposes; the printing effected, then follow washing, toning, and fixing." Hurrah! victory!" Never was such a print seen. Adieu for evermore to printing difficulties, the secret is in the bath, and the bath is mine. Happy "Photo," enjoy your brief moment of bliss, for already are the clouds of adversity peering above the horizon; the sample of paper is expended, a fresh supply is ordered and received, bath the same strength, the same precautions duly observed; but, horror of horrors, the beauty of the finished print is found to be completely destroyed by the most virulent attack of mealiness that albumenized paper is heir to; the paper, its maker, and vendor are wished in a certain hot region, and an order is sent to another house for a fresh sample. Now, had he investigated the cause which gave him success, he would have had no difficulty in meeting the requirements of the undeservingly abused second sample of paper. The first sample contained a large proportion of a chloride, say of sodium, and, consequently, required a long floating on a weak bath, or a short floating on a strong one; failing to meet the requirements of the former, he hit upon the latter, and succeeded. The second sample of paper contained a comparatively small portion of the chloride, and required a weaker bath; by floating on a strong solution it speedily became saturated with the chloride of silver produced by double decomposition, a large portion of free nitrate in solution adhered to its surface, rapid drying made matters worse, the water was evaporated, but a stubborn impediment in the shape of nitrate of silver was left behind, which, after being exposed to the magnetic influence of the sun's rays, was the unsuspected cause of mealiness.

In my next letter I shall endeavour to provide a remedy for the evil our "Photo" friend was subjected to.

A Photo's Assistant.

## Talk in the Studio.

Decorations for Photographers.—The "Star of the Legion of Honour" is about to be accorded to meritorious French photographers; two artists are to be selected, we understand, for the decoration. M. Lacan informs us that he had endeavoured to give effect to the claims of M. Claudet, but he feared that the long absence of that gentleman from France had weakened the recognition of his claims. M. Bisson is mentioned as certain to receive one of the decorations, whilst, for the other, a variety of names are mentioned. In this country, Government is not in the habit of awarding honours of this kind; but it has recently been suggested, notwithstanding the dissatisfaction felt with the Exhibition medals, that an award by the Photographic Society might be made valuable in giving impetus to the art in some directions. A distinguished amateur informs us that he has intimated to Dr. Diamond his willingness to contribute £10 towards a medal for the greatest artistic excellence in photographs at the next winter's exhibition. He further suggests, that the establishment of a cup, or shield, which should become the property for one year of the most artistic photographer, and be competed for from year to year, might be found to act as an incentive to the production and exhibition of pictures of great excellence. We shall be glad to hear opinions on the subject.

Accident in the Photographic Department of the Exhibition.—A singular accident occurred in the British Photographic Department of the International Exhibition last Saturday morning, by which one of Mr. Breese's stands of stereoscopes, with eight of Cutts, Sutton, and Son's achromatic stereocopes, containing the exquisite instantaneous transparencies which have received so much admiration, were entirely destroyed. From carelessness or neglect of whom we will not undertake at present to state, the skylight by which the room is lighted had been left so insecure that, without any apparent cause, beyond, probably, a passing gust of wind, several of the sashes or frames near the entrance fell with a sudden crash; breaking off the table top, knocking the stereoscopes into fragments, and shivering the slides into a thousand pieces; the top of the case containing Mr. Sebastian Davis's manipulating chamber was also broken; but with this exception, the mischief was confined to Mr. Breese's stand. It is matter for profound thankfulness that the accident occurred at seven o'clock in the morning. otherwise the consequences might have been very fearful, for at no period during the hours when visitors are present, would less than a dozen persons have been crowding round the stand in question, and the falling sashes, which descended with sufficient force to smash a firmly made walnut table, would surely have maimed many, and probably killed some of those upon whom they fell. We believe arrangements are pending by which the Commissioners will replace the stand and stereoscopes, when Mr. Breese will replace the slides. One stand remains uninjured.

German Gymnastic Society.—We have received a copy of a group of the members of this Society, assembled in the grounds of the Crystal Palace, on the occasion of their recent festival. The photograph was taken by Messrs. Negretti and Zambra, on a 12 by 10 plate. Notwithstanding that the group consists of some hundreds of persons, the portraits of the majority are quite distinguishable, especially those of the most active and distinguished "Turners." It is an interesting memorial of an interesting occasion, as the first festival of the Turner Society will probably be the means of turning increased attention to gymnastic games in this country.

Photographic Exchange Club.—Members of the Exchange Club will please note, that the address of the Secretary will, in future, be as follows:—Mr. Frank Howard, 10, Lansdowne Road North, South Lambeth. We may here mention that several members of the old Stereo Exchange Club inform us that they have many exchanges due to them. We feel sure that the memory of defaulters only requires jogging to induce them to clear up all debts. We hope they will take this hint.

## To Correspondents.

*** We have to claim the indulgence of some of our advertizing friends, whose announcements are compelled, from the pressure on our space, to be omitted this week.

N.—To each ounce of collodion add 3½ or 4 grains of your iodide of potassium, or, better still, if you have it, add 2 grains of iodide of cadmium and 2 grains of iodide of potassium, and from half a grain to a grain of bromide of cadmium. The constitution of your plain collodion must determine in what proportion of alcohol these will need dissolving. It is impossible to give the exact proportions for an iodizing solution without knowing something of the plain collodion and its constitution.

Bewitched Bath.—We remember once meeting with such a difficulty as you describe: the lower end of the plate, that is, the end at the bottom of the bath, was covered for an inch or two into the plate with a dense, white, opaque deposit in every plate. The bath was a new one; and before we had time to examine carefully for the cause, the result disappeared of itself, or rather, apparently, as the consequence of using the bath a few times. We are still uncertain of the cause. In your case try making the bath a little weaker, and a little more acid. Take especial care that the inner frame and wire corners are well varnished, as minute traces of organic matter touching the corners of the plate will sometimes cause the evil of which you complain. Try another lot of water as well as fresh silver the next bath you make. 2. Your collodion will only contain, according to the formula you give, 2 grains of pyroxyline to the ounce, which is scarcely half enough. If you use all the alcohol of a sp. gr. of 805 the film will be probably very repellant. You may probably add one or two drops of distilled water to each ounce of collodion with advantage, and this, besides making the film less repellant, will make it still less contractile. Use your iron developer weaker, and try the result. Your second letter has arrived, but no plate.

R. H.—Shellac varnish will answer your purpose, or, perhaps, better still, the cement recently described in our pages by Mr. Window in his articles on apparatus. It consists of equal parts of beeswax, common resin, and powdered brick, and is used hot. This is not acted on by silver solutions.

Diamond Dust.—The slight black flocculent precipitate in your toning solution is probably a little gold thrown down; beyond slightly weakening the solution it will not do any harm. 2. Add a little tincture of iodine to your positive collodion. That will give it some of the good qualities of age, without materially interfering with its sensitiveness.

Old Photo.—No: certainly not. There is not the slightest necessity for publishing your name. It is enough for us, and the writer of each letter, to know that the intimation that the letters proceed from our own pen is an untruth; one or more from the same quarter. Suspicion is said to be the result of intense self-knowledge, and from the intimation here given we gain a glimpse of the probable habit of fabricating correspondence in our contemporary's pages. For the rest, he simply works out and proves your propositions, explaining "the reason why," which was not a matter of importance. Whatever might be the reason, the fact remains; and as the adage runs, "He who follows must ever keep behind." It is not worth while to contradict the assertion about the notices of apparatus, since a reference to our pages will show that they were promised by us weeks before the subject was named in our contemporary. You take the abuse more to heart than we do: the scurrility to which you refer is to us rather amusing, as a display of impotent anger; but is not worthy of notice.

Photos.—From the appearance of your pyroxyline, and its behaviour when dissolved, we should suspect that you had scarcely attained a sufficiently high temperature in making it. Are you quite certain that your thermometer registered correctly? They are not unfrequently slightly inaccurate. In any case a higher temperature with the acids you have, or a few drops of water at the same temperature, would give a cotton yielding a more limpid collodion. We have just dissolved 4½ grains of the sample sent in an ounce of equal parts of ether and alcohol. It dissolves perfectly and gives the right consistency, but the film is a little coarse, and possesses too much texture. We prefer for use with a bromide and iron development, a cotton which gives the right consistency with 5 or 6 grains to the ounce; but have produced very good results with 4 grains to the ounce. The formula we give may be modified by either a slight increase of temperature or a slight addition of water, or both, judiciously done, and will then, even with cadmium, give a very fluid collodion, without appreciable loss of sensitiveness.

Nil Desperandum.—The unsatisfactory colour of your prints arises from the imperfect character of your negatives. They do not possess sufficient vigour. To get better tones you must have more forcible negatives, which allow of much deeper printing. A good toned and brilliant print cannot be obtained unless the negative permit a slight approach to bronzing in the deep shadows of the proof without the rest being too much done.

B. 41—The lenses to which you refer are of French manufacture.

W.H.H.—The address of Bourquin and Co. is Newman Street, Oxford Street.

H. B. Y.—In attempting to albumenize your own paper, you will find the least difficulty with *Saxe* paper, which you can obtain of any respectable dealer. 2. You can use your portrait lenses for the magic lantern. You will find a good deal of information in our former volumes on the subject; we may especially refer you to Vol. V. p. 53 (No. 126), and p. 71 (No. 127). 3. We are generally at the office on a Thursday afternoon, but are uncertain at other times. If you will call we will advise you on the subject of your enquiries.

John Burns.—Your prints are very fine indeed, and it would be, as you think, undesirable to change your process. The only mode of avoiding the rapid discolouration of the paper, is to guard against having the bath too decidedly alkaline, and keep the paper in a very dry place. It does not always happen that a slight change in the paper injures the finished print, as the slight discolouration often disappears in the hypo.

A Constant Reader writes:—"Would any good Samaritan who has a copy of No. 76 of the Photographic News spare it? as the number seems hopelessly tardy in reprinting." If a single number only were out of print, it would soon be reprinted; but the demand has been so great recently, for completing sets, that very many numbers are out of print, and the question of reprinting a few scores of numbers is too serious to be undertaken hastily. The publisher is at the present time anxious to receive many back numbers at full price in order to complete sets. It has been suggested that readers unable to complete their sets might reproduce single numbers by photography, on a reduced scale, getting two pages in one.

Fred. Davis.—You will find a report upon your glass in the usual place. We have more than once stated where good samples of glass upon which we reported had been obtained; but there is no certainty of receiving exactly the same quality at another time.

Enlarging.—Mr. W. H. Warner asks us in reply to several enquires respecting his advertisement, to state that it is to enlarged *negatives* his terms apply, not to simply a print therefrom. The kind of negative required to enlarge from is one which is perfectly sharp all over, delicate, soft, and full of detail, and free from spots, defects, or texture in the film.

A. Gauss.—We will write.

H. R. Nichols, J. G. Lock, and several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

VOL. VI. No. 210.—*September* 12, 1862.

## TONING EXPERIMENTS.

WE have recently been making some experiments for the production of mealy prints, and have succeeded in obtaining them at will. This, to some of our readers, with whom such prints are not uncommon, may probably seem an insignificant, if not an objectionable feat. As, however, in our own practice we had very rarely met with such results, it afforded us much gratification to be able to identify one of the causes by which they could be unerringly produced. The causes of irregular toning may be, and doubtless are, numerous; many of them have been pointed out from time to time in our pages, by a "Photographer's Assistant," and other intelligent contributors and correspondents. There is one cause, however, which we have long thought to be a much more common one than was suspected, and to which we have before referred; but have not, until recently, had opportunity of verifying it by satisfactory experiment. We refer to the use of a newly-mixed gold solution.

Recently devoting a day to printing, we tried two or three samples of albumenised paper, fully anticipating from the prevalence of recent complaints, that we should meet with mealiness in some of them. The silver bath was an old one, strength about 40 grains to the ounce, which was replenished with an equal quantity of an eighty-grain ammonia-nitrate bath, and when so mixed was just neutral, or slightly inclining to alkalinity. The paper was floated about two minutes on an average, in some cases longer, without any material difference in the result. Various iron portrait negatives were exposed, some requiring long printing and some very little, some in direct sunlight, others in diffused light. They were then, at the close of day, all washed for a few minutes in common water, that is, water from the New River, prior to toning. The gold solution consisted of—

| | |
|---|---|
| Chloride of gold ... ... ... | 2 grains |
| Acetate of soda ... ... ... | 60 grains |
| Water ... ... ... | 12 ounces. |

It had been mixed between two and three months, and had been used before. A very slight purple deposit existed at the bottom of the bottle, but beyond that there was no sign of decomposition. The prints placed in this solution toned very slowly indeed; but on adding about half a drachm of a two-grain solution of chloride of gold, which would contain about one-eight of a grain of the salt, the toning action was set up and proceeded most satisfactorily. To be certain that no trace of acid should enter the hypo bath, seeing that the toning solution had not been first tested as to its entire freedom from acidity,* each print was placed for a few minutes in a solution of carbonate of soda prior to fixing. They were then immersed for fifteen or twenty minutes in a fresh solution of hypo, one ounce in four of water. Every print turned out perfectly good and brilliant, with the various tints of purple brown and black, suited to each picture, which we had designed to produce; but in no case was there any mealiness.

We now proceeded to experiment with a few prints reserved for the purpose, which had been treated in all respects up to the toning, in a similar manner to those just described. A couple of prints were placed in the same toning solution and left until about half done. Observing first, that there was no sign of mealiness, we now added to the toning bath an equal bulk of a fresh solution of chloride of gold, one grain in four or five ounces of water, but without any acetate or other salt of soda.

* We found on subsequent trial that it was quite neutral to test paper.

The toning then proceeded very rapidly, but the prints in a few minutes became intolerably mottled and mealy, and remained so after they were fixed and finished. We next repeated the operation, cutting the print into two portions; one half, toned in the old bath, was all right; the other half, immersed in the bath with the fresh chloride of gold, was very mealy. We then made a fresh bath with the original proportions of gold and acetate of soda, and this on being used at once gave mealiness. Finally, all the solutions, old and new were mixed, and a print tried; mealiness was still the result, but in a modified degree. The solutions were then put away for subsequent use.

We believe there are other causes of mealiness; some there are undoubtedly, where the evil may be observed before toning at all. But we believe the cause we have indicated is a more common one than is suspected. We have before urged preparing the gold solution with either phosphate or acetate of soda, at least forty-eight hours before use, and with chloride of lime a still longer period; but from the experiments we have related, it appears that the former solution may be kept for weeks or months with advantage. Some portraitists we know who use the acetiate bath prepare it at least a fortnight before it is used. If it appear inert, a few drops of a fresh solution will commence the toning action, which appears to be continued by catalysis. The plan is a simple one. decreasing rather than increasing trouble. The method of testing the matter is also very easy, and we recommend those of our readers interested in the matter to repeat our experiments and prove to themselves that there is one method of producing mealiness at will, and this knowledge will be an important step towards avoiding it at will.

Since writing the above, we have read in the *American Journal* an interesting article by Professor Hime on toning, which will be found in another page. He notes the fact, which he has observed, that a bath which had stood until it had lost its toning properties, at once regained them and became active on the addition of a little hydrochloric acid. and then neutralizing it with carbonate of soda. The action set up, whatever it may be, appears to be similar to that produced by adding a trace of fresh chloride of gold. This fact is an important and interesting one: we recommend photographers to verify this for themselves, as we have recommended them to verify our experiments. Once assured of the fact by personal trial, it will prove of essential service in future toning operations.

## PHOTOGRAPHS IN NATURAL COLOURS.

THE Jurors in Class XIV of the International Exhibition had an opportunity, not afforded to the general public, of inspecting a series of photographs in natural colours, each tint in the original being reproduced in the photographs. They were produced by M. Niepce de St. Victor, by his method described in a memoir presented to the Academy of Sciences some months ago, and given on page. 100 of the present volume of the PHOTOGRAPHIC NEWS.

A dozen of these, on plates described as about the size of a playing card, were forwarded carefully sealed up from the light, and were opened in the presence of the Jurors. They consisted of reproductions of prints in which the figures were clothed in draperies of various colours. The colours produced were very bright but without gradation, various tints of red, blue, and yellow; green, purple, and orange were shown, all perfectly pure and vivid. Some of the colours, vanished almost as soon as they were brought into the light, whilst others continued for some hours; none, however, remained permanent. The pictures were valuable and interesting as illustrations of the possibility of reproducing some natural colours, and giving them a short tenure of duration. The problem of photography in natural colours remains still, however, for practical purposes, unsolved.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Soda Salts* (continued).—The great similarity between potash and soda renders it needless for us to pass the various compounds of this latter alkali in such careful review as when we were discussing potash compounds. Some few soda salts, however, from their different physical or chemical properties, or from the fact of their being easier obtained in commerce, require a short notice. Among these latter we may take the salt *acetate of soda.* This is obtained by neutralizing acetic acid with carbonate of soda solution, evaporating the liquid until it is ready to crystallize, and then setting it on one side to cool. After the dish has remained undisturbed for several hours, the mother-liquor is poured off, and the crystals well drained. They are then dissolved in a small quantity of distilled water, and re-crystallized. The salt is then freed from the water of crystallization, by being heated in a dish with constant stirring. In this way it loses six equivalents of water, and becomes white and pulverulent; it easily fuses, and sustains, according to Thomson, a heat of 288° without decomposition, and does not begin to char till it is heated to 315°. A curious phenomenon occurs if the dry salt be fused, and left to cool in a large platinum spoon: while still fluid, it suddenly separates from the side of the spoon, becomes crystalline in the middle, and covers itself with a crust, through which a number of nacreous crystals shoot out from the interior, a quarter of an inch long and broad, and having a great number of sharply defined faces. These become dull and powdery on exposure to the air. This experiment does not always succeed, and when a portion of the salt has once exhibited the phenomenon, it does not show it again, or at least only imperfectly, if melted a second time, and the property is only restored by solution in dilute acetic acid, and evaporation. Acetate of soda crystallizes in transparent oblique prisms, which have a saline bitter taste, effloresce slightly in the air, and melt below the boiling point of water. The salt dissolves in three parts of cold water, and in 1·7 parts of water at 48°; it also dissolves in twice its weight of boiling spirits of wine, and is precipitated from the cold solution, by the addition of ether, in the form of a crystalline powder.

*Tartrate of Soda.*—This salt and the corresponding bitartrate differ considerably from the potash salt. It is obtained by neutralizing tartaric acid with carbonate of soda, and crystallizing. The crystals are permanent in the air, and melt in their water of crystallization when quickly heated. The *bitartrate* is formed by dividing a solution of tartaric acid into two equal portions, neutralizing one with carbonate of soda, and then adding the remaining tartaric acid. It crystallizes in transparent colourless prisms, which have a very sour taste, and dissolve in nine parts of cold water, and in 1·8 parts of boiling water. This great solubility offers a striking contrast to the corresponding potash salt. It will be remembered, that in our article on bitartrate of potash, we stated that it was of very slight solubility. This distinction is constantly made use of in chemical laboratories, to detect the presence of potash; a solution of tartaric acid being, according to Pettenkofer, a more delicate re-agent than bichloride of platinum, inasmuch as tartaric acid is capable of detecting a solution of potash in 700 to 800 parts of water.

*Carbazotate of Soda.*—This is another salt which differs greatly from the potash compound. It is formed by mixing carbazotic acid with soda, and evaporating down to the crystallizing point. It forms long silky needles, which are tolerably soluble in water, and are frequently used in chemical laboratories as a test for potash; the addition of a solution of this salt to one containing potash, immediately causing the precipitation of the slightly soluble carbazotate of potash.

*Lithia Salts.*—Of late years, lithia has become tolerably abundant, owing to the employment of it in medicine having created a demand for it; and we have, on several occasions, had under our notice collodion and iodizing compounds in which this element played a conspicuous part. As, however, the preparation and properties of lithia compounds are not generally known, we propose to notice them in detail. Lithia occurs in a few minerals only of the mica and felspar species in tolerable quantities, and until the recent spectrum discoveries, it was looked upon as a very sparingly distributed element. Now, however, it has been shown to occur in almost every source of the commoner alkalies, potash or soda, and must not, therefore, be regarded as rare. Its extraction from the minerals containing it is an operation requiring considerable chemical knowledge and skill in manipulation, and could not, therefore, be undertaken without the conveniencies of a well stocked chemical laboratory, even supposing the operator possesses the necessary experience. In preparing the salts of lithia, it will be advisable to start from the carbonate of lithia, which can be obtained at most operative chemists in a comparatively pure state. The carbonate of lithia is a white powder, which has a slight but distinctly alkaline taste, and turns reddened litmus paper blue. It crystallizes in small prisms or cubes, on slow evaporation, which effloresce slightly in the air. It fuses at a low red heat to a clear liquid, solidifying on cooling to a transparent crystalline mass. The fused salt is dissolved with great difficulty by water, but more easily when powdered, especially if the water is hot. Carbonate of lithia differs materially from the other alkaline carbonates by its sparing solubility in water, one part of the salt requiring about 100 parts of cold water for solution. It is insoluble in alcohol.

*Sulphate of Lithia* may be formed by neutralizing dilute sulphuric acid with carbonate of lithia, shaking the powdered carbonate into the acid until it is neutral, or nearly so, to test paper. The solution is then filtered, if necessary, and evaporated at a gentle heat over a water bath; when a crust commences to form upon the surface, the liquid must be removed, and allowed to cool; the salt, after complete deposition, must be well drained from the mother-liquor, redissolved in distilled water, and recrystallized. In these operations, it must not be forgotten that lithia is a somewhat expensive compound to be working with, and therefore the mother-liquors must be carefully saved and worked up afresh. Sulphate of lithia forms shining rhombic prisms; the crystals are slightly efflorescent, and are very soluble in water, although not more so in hot than in cold; they are also easily dissolved by alcohol, which is a rather remarkable property, and may be used to separate lithia from potash, soda, and many other accompanying bodies. When heated, the water of crystallization goes off, and the anhydrous sulphate of lithia is left behind as a white mass, fusible with difficulty, unless gypsum is present; in this case, however, it melts below a red heat. Its taste is purely saline, without bitterness.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

The corrected list of awards is now published. The modifications in Class XIV. are not very extensive; a few names which were omitted before are now added, a few others which were included by mistake are now struck out, and in one or two instances the reason for the award or the phraseology in which it is expressed is corrected; but in no instance, we are assured, has the decisions of the Juries been modified either as to award or its reasons, the revision having consisted simply in the correction of errors arising from hasty copying in the former edition; the revised list being a strictly correct record of the final decisions of the various Juries. We regret to say that even now, on a cursory examination of the revised list, we find it not entirely free from error, misspelling of names in some instances occurs; in one case, where the name of Mr. J. Savage, of Jamaica, was omitted in connection with his award for a valuable series of photographs of the fish of the island, a blank occurring in the first edition of the awards—which blank was, by the way, filled up in a contemporary with the name of the preceding exhibitor, Captain Sellon—in the corrected edition the blank still remains. In another column we give a list of the corrections and additions made.

Whilst on the subject of awards we may refer to a circumstance to which our attention has been repeatedly called. Some exhibitors, it is stated, are making a somewhat unfair use of the awards of the jury, appending a notifications of honours to contributions who have not received them; in one instance, a card with the word "Medal" is attached to a case of apparatus to which no such award has been given. In another, we find a card with "Honourable Mention" appended to some very poor pictures by an exhibitor, none of whose contributions have received the slightest mention from the Jury. Whatever protest against the decisions of the Jurors exhibitors may have a right to make, they can scarcely be justified in thus misrepresenting them, and thus doing injustice to more scrupulous contributors. We now resume our notices of apparatus.

Mr. S. Highley (3095) exhibits a variety of photographic appliances, which display much ingenuity. Amongst these we find a photo-micrographic camera, with appliances for taking enlarged pictures of mounted or living microscopic objects. We cannot do better than append Mr. Highley's own description of this instrument:—

"It has a focal range of two feet, a frame to carry plates four and five inches square, a spherical arrangement to carry achromatized microscopic lenses of various foci, is fitted with a stage to carry the object; this stage has coarse and fine adjustments, and a micrometer head for determining the difference between the visual and chemical foci in the low powers; a tube carries the illuminating apparatus, which may be either a flame or a concave mirror, or an achromatic condenser. On an adjustible board attached to the end of the stand (which also forms the packing case for the camera) is fixed the light collector, which is similar to a solar microscope arrangement, only the long plane mirror is made of a polished slab of enamelled glass, this is used in connection with the achromatic condensors, the adjustments being made by aid of a racked wheel, and a pinion worked by a lever arm, of course the various light condensers are brought into play according to the requirements of the object under treatment. An arrangement is also made for taking living objects (such as expanded zoophytes) when in their most favourable aspect for a photograph, by viewing them through a yellow glass shutter hinged behind the lens mount, and another yellow glass in the back of the plate frame (the opacity of these glasses to actinic rays being tested by the spectroscope), the exposure being made at the right moment by raising the balanced shutter placed behind the lens."

We next find a novel looking instrument, described as a Photographer's Actinometer, the plan of which is ingenious, but we fear too complicated for general use. Its object is to determine the amount of exposure required by any object of any colour, or combination of colours, by any process, with any lens, at any hour. Mr. Highley intends to explain its use fully during the forthcoming session of the societies, so we will not at present do more than indicate the principle upon which it works. In the first place a test object is prepared, which shall consist of a variety of colours. That exhibited consists of a frame of moulded bars, between which are strips of various colours, such as blue, yellow, red, &c. This is the object to be photographed. What is termed a "mercurial shutter" is then attached to the camera in front of the plate to be exposed. This consists of a reservoir containing mercury, which decends into a glass cell in front of the plate at a given rate. It will be seen that as the mercury ascends in the cell, the light is shut off from the plate, which thus receives a graduated exposure, and enables the operator to ascertain the exact time of exposure received by each part of the plate, and determine the time required. We have, as we have before said, an impression that "trying a plate," and using a little judgment, is a better plan than the use of any actinometer we have seen. We shall be glad, however, to hear more of Mr. Highley's invention.

Mr. Highley also exhibits some examples of the application of photography to book illustration, one of which was issued in the *Quarterly Journal of Microscopic Science*, as early as April 1853, which was probably the first such application of photography in this country; our American brethren having, we believe, taken precedence of us in that matter. A series of transparencies of scientific and educational subjects for the magic lantern; a dropping bottle we have before described; a photographer's travelling lamp; an improved pneumatic plate holder, giving great control over the plate; a developing stand; and some other articles complete the contributions of Mr. Highley in this class.

Hockin and Wilson (3097) exhibit some excellent apparatus, prominent amongst which is Hockin's tent for working the wet process in the field. This, when packed up, measures 20 by 18 by 5 inches, and weighs, with its complete equipment of bottles, trays, chemicals, bath, tripod, &c., about twenty pounds. When expanded for working, the interior space is about 20 by 18 by 18 inches. A japanned tin tray fills a large portion of the table which forms the bottom of the tent; a recess in front of this, covered with a lid contains a series of bottles, holding the various chemicals; the bath rests in a bag dropping through the bottom of the tent, and is protected by a lid from light and splashes. A window with two thicknesses of silver flashed glass, one of which is hinged so as to open in a dull light, leaving one thickness only, is in front of the tent, and beside it, a small door to open and facilitate ventilation. The bottles hold sufficient chemicals for a dozen 12 by 10 plates, which size, or smaller, the tent is intended for working.

In an ingenious instantaneous shutter exhibited, the aperture, which is diamond shaped, opens from the centre, and gives an equal illumination during the exposure, to all parts of the plate. The rapidity of the motion is controlled by the amount of tension given to a vulcanized india rubber spring. An argentometer, for ascertaining the amount of silver in a solution by the quantity of a standard solution of chloride of sodium required to precipitate it. A chest containing a complete equipment of apparatus and chemicals, packed so as to occupy little space, together with some other articles, and the chemicals we have before noticed, complete the display.

## REVISED AWARDS.

The following is a list of the corrections in the revised edition of the awards, consisting of names before omitted, the suppression of names erroneously included, &c. A prefatory note, by Dr. Lyon Playfair, thus explains the former causes of error:

### NOTE TO THE SECOND EDITION.

The first edition of the Book of Awards was prepared under great pressure. The juries terminated their labours on the 26th of June, and the Award Books had to be copied for the printer and passed through the press, so as to be ready for the state ceremony on the 11th of July. By working all through the nights for a week, the Book of Awards was ready on the appointed day. It was necessary, however, to take the List of Awards as they had been prepared by the juries, without verifying them by the Minute Books. This verification has now been made, and various awards found in the Minute Book, but by mistake not copied into the List of Awards, have been added. Not a single instance, however, occurs of any new award having been made. L. P.

MEDAL.

United Kingdom.

| Name of Exhibitor. | Objects Rewarded and Reasons for the Award. |
|---|---|
| Caldesi, L. ... ... ... (Instead of Colnaghi & Co.) | For a valuable series of large photographs of antiquities, copies of cartoons, miniatures, &c. |
| Ross, T. ... ... ... ... | For the *excellence* of his photographic lenses (instead of for the *superiority* of his photographic lenses). |

New South Wales.

| | |
|---|---|
| Dalton, E. ... ... ... (omitted before) | For excellent photographic portraits of the aborigines. |
| Freeman, Bros. ... ... (omitted before) | For an excellent collection of photographs. |

France.

| | |
|---|---|
| Duriette and Romanet ... (Name before misspelled.) | Photographs. For excellent architectural views of Amiens cathedral. |

HONOURABLE MENTION.

United Kingdom.

| | |
|---|---|
| Joubert, F. ... ... ... (omitted before) | For photography on glass in vitrifiable colours. |
| Macdonald, Sir A. K., Bart.... (omitted before. The adjacent number, that of F. S. Beatty, receiving the award in error). | For excellence of landscape photographs. |

New South Wales.

| | |
|---|---|
| Gale, F. B. ... ... ... (omitted before). | For portraits of aborigines on glass. |
| Hetzer. ... ... ... ... (omitted before) | For excellent photography, especially his studies of trees. |
| Wingate, Major ... ... (omitted before) | For his panoramic view in the colony. |

South Australia.

| | |
|---|---|
| Camfield, Mrs. ... ... (In place of Rev. — Hall.) | Ethnological studies of the aborigines. |

France.

| | |
|---|---|
| Gaillard, P. ... ... ... (omitted before) | For excellent landscape photography. |
| Mathieu-Plessy ... ... (omitted before) | For excellence of photographic chemicals. |

Sweden.

| | |
|---|---|
| Carleman, C. V. G. ... ... (omitted before) | For general excellence of photographs. |

Sprosser, Wurtemburg, and an Exhibitor not identified, in the Zollverein, are now struck out.

## THE INUNDATION IN THE FENS FROM A PHOTOGRAPHIC POINT OF VIEW.*

To sit tamely in the boat, and endure all the fury of the relentless elements, was no part of our programme, therefore one of our crew jumped overboard, for the water was not up to the knee, and our united efforts proved successful, and the boat was soon over the road and into deeper water again. We had scarcely got fairly on our way again when a long and reiterated peal of thunder gave us fair warning to look out for squalls. Peal after peal followed, each one growing louder, and on glancing round, for I was at the oar and had my back turned to the wind, I saw at once that the storm would be of unusual fury. The view at this moment was one of the grandest it has ever been my lot to witness, and though it cost me a thorough drenching, I still consider it cheap at the price.

In the direction of the storm, which was now not half a mile off, nothing was to be seen; a black curtain of whirlwind, and hail, and rain, with an occasional fringe of lightning, shut out everything beyond; but in front of us, far away, was an opening in the gloom, through which could be seen but a glimpse of the glorious weather now so far away. This little aperture was now the only source of light, and was right out in the horizon, and the waves in consequence presented an appearance indescribable. Their crests were of silver whiteness, but the hollows were black as ink, and this extraordinary contrast gave to the water a solidity I had never seen before. Could the camera have snatched the scene at this moment with lightning rapidity, so as to retain the crispness of the waves, the picture would have strongly resembled a newly-ploughed field with the tops of the furrows tipped with snow. In a few moments the whole scene was changed. The last glimpse of fine weather was shut out from us, and gloom and murkiness hemmed us in all round. A cold shiver swept over the scene, as though all nature shuddered at the coming crash, and down came the storm in an avalanche of fury. Rain, hail, and lightning shooting out a hundred forked darts all around us, each one, possibly, on an errand of death and destruction, whilst the thunder not only deafened us, but gave forth a grating, crashing, rasping sound, as though the whole universe was split into fragments. In much less time than it has taken me to describe I was wet to the skin, not only so, but my boots were filled with water. At one moment I really thought our skulls—I mean our heads, not the oars—would be beaten in by the solid pieces of ice that came pelting down upon us. The boatmen and I pulled with all our might, but we were powerless, for the fury of the waves had driven us back again upon the road. Our companions had disappeared. They had collapsed in the most mysterious manner, and were safely stowed away under the seats in the stern, and buried under great coats. After shouting for some time, for we wanted help, and I was anxious that they should see something of the awful sublimity of the scene around us, a white face, with eyes dilated by terror, peeped out from under the covering, but an unusually large piece of ice maliciously hit him at the identical moment upon the nose, and he disappeared once more.

In ten minutes the whole scene was again changed. The storm was off on its mission of destruction to other parts, and we were left with hearts thankful that we had passed through it all, and were scatheless. Our companions once more resumed their proper proportions, and we were soon on our way rejoicing. There was no possibility of drying our clothes, so we kept to the oars, and as the sun shone out once more with more than usual brightness, we hoped, with its genial influence, aided by the fiery ardour that burns in the breast of all enthusiastic photographers—and we were enthusiasts—and assisted also by a S.W. wind, which was blowing quite bracingly, that by the time we had bagged our pictures and had packed up, our clothes would retain but little trace of the soaking they received, but would have resumed their normal condition.

We were by this time near the Mission House, a church establishment, having schools combined with a place of worship, all under one roof. The group of buildings would have furnished a picturesque subject, but there was not a spot of dry land really available for our operations. There was one of the many tunnel bridges, so plentiful in the fen district, just peeping above the water, but it was much too close. This quiet spot, usually so trim and pretty, with its neatly-kept little farm establishment, was now forlorn and melancholy. No piping voice chirping out the childish hymn came from the open door. Nothing but strife and contention was to be seen within. The sullen waters were angrily tossing the seats about, for they were all afloat and helpless.

Our boatman, pointing to the flag-staff—for in these parts, where the houses are so widely scattered, they do not employ a bell to call the rustic congregation together, but hoist a flag for a summons—said, with a contemptuous jerk of the head, "There's a pretty thing to call a flag-pole. Now, when they were going to put it up, the parson came to me, and ax'd me about it, for he know'd I knew summut about these things. I told him, if he left it to me, I would just put up the right thing, and make it all taut and square like, but arter he got all he wanted to know, he went and did it hisself, and a pretty job he's made of it. No, I reckon it a shame to call it a flag-pole. It's only just a tree stripped stark naked." After laughing heartily at his undraped simile, we started on our voyage again, and in half an hour reached the Middle Level bank, at our old point of operations.

* Concluded from p. 425.

All was now bustle with my amateur friends, for the task of building up their complicated photographic edifice was no light one. Three persons were not found sufficient, so the boatman was pressed into the service.

I hurried on my own preparations, for the fine weather I clearly saw would not last an hour, I succeeded, however, in getting one really good result, introducing a trace of the stormy sky, and a very fine effect of sunlight on the angry water. This picture was just snatched in time, for in five minutes afterwards all was black and gloomy again. My friends were unfortunate, for they attempted to intensify their negative, and as the water was salt, when they applied the pyro and silver to the plate, they produced a charming effect of curds and whey, but unfortunately for them this did not tend to improve the appearance of their picture.

We disconsolately packed up and started for home; having now a fair wind we hoisted sail, and were soon dashing over corn fields at the rate of six or eight miles an hour.

Our stock of patience was now fairly exhausted, for the weather obstinately refused to second our efforts, we therefore took the train, and leaving the Fens in their desolation behind, were soon a hundred miles away. V. B.

## M. BISSON'S SECOND ASCENT OF MONT BLANC.

M. Bisson's first ascent of Mont Blanc, accomplished about a year ago, was not entirely satisfactory to him; desiring to complete the collection of views he then made, each of which forms a stage in his ascent, he has resumed his rough and perilous enterprise. We follow with deep interest the details of this journey over mountains and precipices, which, thanks to the energy and coolness of M. Bisson, and the devotion of the men who accompanied him, was attended with the happiest results. The little party had not, this time, for its leader the usual guide of these ascents, Balmat, who has gained notoriety from being the first to plant his foot on the summit of Mont Blanc. His absence, however, did not deter M. Bisson. At 9 o'clock on the morning of the 11th of August he set out from the village of Chamounix, with the intention of operating the same day below the Grands Mulets, on the glacier of Bossons, near the junction of the two glaciers. He reached this spot at two o'clock, and planted his apparatus. His first essay was successful, he obtained a beautiful view of the Grands Mulets, which forms a very charming picture. This task accomplished, he wished also to obtain a view of the *Passage à l'échelle*, but it was not possible till the next morning, on account of the effect of the light. He then retired to his couch under a tent, having above his head blocks of ice from 200 to 250 feet in height, which at any moment might fall and crush him if the sun happened but to shine out. To make the tent warmer during the night, he had five young men sleeping near him, and sent the others to sleep at the Grands Mulets, because there was not room enough for them in his tent. They made the best of their accommodation. At 9 o'clock M. Bisson made tea for his companions, after which they went to sleep upon a beautiful bed of ice. At six o'clock on the morning of the 12th the men descended from the rock of the Grands Mulets, and rejoined M. Bisson and his party, rejoicing to meet each other again in safety.

M. Bisson then took his view of the *Passage des échelles*; the result was a complete success. His men figure in this landscape. He next sent them to pose under the blocks where they had passed the night, in order to make a picture which should commemorate that event. Our skilful photographer had the pleasure of succeeding in his task. He next crossed the *échelles*, in order to erect his tent on the cakes of ice, where he took two other types; namely, a new view of the *Passage à l'échelle*, but different from the first, inasmuch, as the ladder being too short, it was necessary for him to climb large blocks of ice to the only accessible place. At the first passage they were obliged to pass one by one on the ladder, which is horizontal, on their hands and knees. Thus, suspended at more than 100 yards above enormous crevasses, the passage was accomplished without accident, all his companions being at a certain distance from each other, and strictly observing his regulations, for fear of disturbing an avalanche of the blocks that surrounded them. M. Bisson next took a new view of the dome of the Goutté from a near point. He had now obtained his five typical views. At six o'clock in the evening they reached the Grands Mulets, proposing to ascend higher if the weather kept fair. The night was serene; they removed their gaiters and snow boots, and partook of soup and tea, and were comforted. The barometer was steady. At midnight M. Bisson decided to start again, and bravely and joyously, by moonlight, at two o'clock in the morning, they descended the rock of the Grands Mulets to ascend afterwards the dome of the Goutté and the little plateaux.

All attached to each other at seven feet apart, they travelled on for two hours, when an incident presented itself. A bridge of ice and snow, which crossed one of the large crevasses to the great plateau, was found broken. A crevasse, fathomless, and 17 yards wide, was before them; there were at least 60 yards above them. No other passage appeared possible. M. Bisson thereupon examined his position, to see what could be done, when three of the most desperate of his porters, to whom he had paid no attention, appeared more than 16 yards above him, having cut steps with an axe in the almost perpendicular wall that impeded their progress, up which they were able to ascend easily; they called out, saying that they had reached a bridge, which would doubtless permit their proceeding and crossing the crevasse. M. Bisson, unable to see them, hailed them. They came at all risks, and to get out of their position, made a leap of a dozen yards on to a plateau of snow, which the foot of man had never before trodden, and sought a new passage in order to reach their comrades, two of their number remaining on the spot. M. Bisson sought for them in vain. After the lapse of a quarter of an hour, they perceived Edward Ballin, whose elder brother was with M. Bisson, and very uneasy; they saw the figure of the young man appear upon the edge of the ice of Mont Maudit, alternately using his axe and straddling across the ridge, and standing out in relief against a sky almost black in the depth of its blue; making him a sign to wait, they descended the rocks, and threw cords to their two comrades to hoist them up by, and which served afterwards to haul up all their baggage.

M. Bisson could not help saluting and applauding him, and, preceded by his brother, who seemed to have but one wish, that of rejoining him, he descended in his turn, and like them, had the happiness to cross this dangerous passage, which enabled him to arrive two hours sooner at the grand plateau. Here new difficulties awaited them. They had to make eight hundred steps, and mount the side of the corridor, which had an angle of 50 degrees, in order to reach the summit, where a most violent icy wind surprised them. After occupying nearly an hour and a half overcoming these difficulties, they arrived. They had to mount the side. The German guide declared that his feet were frozen; unfortunately, this was true, for on the return to Chamounix he could not walk; the great toe of the left foot was black and swelled. Another four or five hundred steps had to be taken. The wind, which raised the snow in clouds, caused them some annoyance. However, M. Bisson, despairing of being able to operate on the summit, wished—but not alone, it is true—to attain it on this occasion.

All the young men, braver than might have been expected, reached the summit two hours afterwards, where they hoped that M. Bisson would have been the first to plant foot. It demanded all their energy to erect the tent, which was twice blown down. The artist, nevertheless, attempted two operations; to his great annoyance, he found the silver crystallized upon the plates, the temperature having suddenly fallen 10 degrees. After several hours' working, the men could endure the cold no longer; they struck the tent at two o'clock, the summit having been attained at noon

The echo of a canuon fired in honour of the intrepid photographer here reached his ears. At two o'clock they retraced their steps; they had to grope their way, as the wind had covered up their first footprints with snow. At length they reached the dangerous passage, and there pitched the tent upon a shelf two yards square, and where M. Bisson had the good fortune to obtain the sixth picture, the triumph of the expedition.—*Moniteur*.

## A SHORT LESSON IN PHOTOGRAPHY.—No. 3.

BY J. TOWLER, M.D.*

The prints that are produced by the action of the sun on materials imbued with the chloride of silver are either positive or negative. The mode of printing, and the ingredients used in printing either a positive or a negative on paper are exactly the same. The question, then, will naturally arise: what is a positive print?—what a negative print? You know what is meant by lights and shades; the sun shines on one-half the earth, it is light: on the other side it is dark, this hemisphere is in the shade. If you stand with the right side of your face next to an open window, the right cheek, the right eye, the right ear, aud, in fact, all the right side, will be suffused with light, while the left side will be comparatively dark—in the shade. Beneath the brim of your hat, the prominences of your eyebrows, behind the helix and lobule of your ear, or any irregular projection, you observe also a diminution of light, a shade, a shadow. The contrast, therefore, is produced by light and shade on all objects; pictures, to be natural, must have the same contrast as the objects: to be agreeable, there must be a proper gradation between the lights and shades; but the lights and shades must also be in their proper place. Now suppose you have a picture in which the lights and shades are found exactly in the same place as on the object from which the picture was taken, such a picture is called a *positive* picture; whereas, if shades exist in place of lights, and the gradations are exactly the reverse order, then the picture so formed is a *negative* picture. Besides this, in a photographic sense, the very outlines of a picture are all inverted laterally, that is, east becomes west, and west east; or a soldier parrying a blow with his right hand is represented in the negative as left-handed, and everything else laterally is equally interchanged. Now let us examine the print we made of the decayed leaf—is this a negative or a positive? To be natural, the paper, which is the background, ought to be white; the spaces between the fibres ought to exhibit the white background beneath; and the skeleton of the leaf ought to have a grayish appearance. Our print, you observe, does not exhibit these characteristics; these are, in fact, inverted; the lights are where the shadows ought to be. The print is therefore a negative. Hereafter I shall have occasion to refer to this subject much more extensively.

If I were to take the print and expose it again to the light, the whole paper would be darkened, and the picture would disappear. The print, indeed is utterly useless unless we can render it permanent. Now let us examine the condition of the paper as it exists at this moment. It is albumenized paper, containing originally chloride of ammonium, which, when the paper was floated on a bath of nitrate of silver, was converted into chloride of silver, and when the paper was removed from the bath, the surface was covered also with nitrate of silver. As soon as it was exposed to the light, the chloride of those parts upon which the light could play, was converted into the *insoluble* violet-coloured chloride; but the nitrate on the surface assists in blackening this chloride under the influence of the sun, and in connection with the organic substances of the paper and albumen, whilst the chloride on the shaded parts has undergone no change. We have, therefore, in this print the coloured chloride (subchloride), the white chloride and nitrate of silver present, of which the latter is soluble in water, and can be easily removed by washing the print in several waters; and the white chloride can be dissolved by a solution of hyposulphite of soda, in which operation we have again another example of double decomposition. Thus you will recognize on one side chloride of silver, on the other hyposulphite of soda; but chloride of silver cousists, as I have already taught you, of chlorine and silver; and hyposulphite of soda consists of the hypothetical acid called hyposulphurous, and the base soda; the latter body again, that is soda, is a compound of oxygen and sodium; whilst the former body contains sulphur and oxygen. You observe, then, we have in the solution, chlorine, silver, sulphur, and oxygen, and sodium and oxygen; as soon as these bodies meet in solution, they arrange themselves as follows:—the oxygen runs from the sodium to the silver, forming oxide of silver; sulphur and oxygen (as hyposulphurous acid) combine with the newly-formed oxide of silver, and form what is called hyposulphite of the oxide of silver. In the meanwhile chlorine hastens to sodium and forms a new alliance, denominated chloride of sodium (common salt). These new compounds are both soluble in water; they can, therefore, be removed from the paper by washing in several waters, in the same way as the nitric acid was removed. This operation of washing being performed, you observe that the picture has slightly changed in colour; but it is now *fixed*, by which term we mean that we can now take the picture into the light with impunity; for the lights and shades are no longer changed by light. Commit to your understanding thoroughly the decomposition just detailed, in order that you may become a chemist as well as a photographer; in order that you may have a reason for what you practise as an art; in order that your art may become a science.

* From *Humphrey's Journal*.

## ON AN ELECTRIC LIGHT REGULATOR.

BY M. SERRIN.

The electric light is quite a modern discovery. About the year 1730, when it was first observed in England, it was possible to obtain only a few phosphorescent gleams. In France, in Dufay's hands, these gleams became sparks darting from the body and face of an electrified person. These sparks then shone brighter in a Leyden jar, and, as the machines became more perfect, gradually developed into two great discoveries of the age—the voltaic pile and electro-magnetic action; so that by means of electricity we now obtain the most dazzling light and the intensest degree of heat. Hardly thirty years since, the luminous and calorific effects of powerful batteries were first studied, and contrivances are already devised for the purpose of rendering these effects contiuuous aud constant. M. Serrin's regulator, which we propose to describe, is one of the latest inventions, and is distinguished by new and ingenious solutions of the chief difficulty of the problem.

Before describing the mechanism which gives a distinctive character to M. Serrin's regulator, let us briefly indicate the general conditions which a regulator of the electric light ought to fulfil.

There must be a pile having at least 50 Bunsen's elements of ordinary size to produce a good light. One hundred elements united in tension give a more brilliant light; but this, again, is far surpassed by arranging them in two batteries, each of 50 elements, so as to produce quantity.

It is well kuown that the current produced by such batteries is, in some degree, like the lightning's stroke, and that there is real danger in closing the circuit by touching the positive pole with one hand and the negative pole with the other. Nevertheless, this energetic power, incessantly reproduced, manifests its presence by no external sign, whilst it is propagated through a circle formed of thick metallic wires. It shows itself with violence only on closing and breaking the circuit. If sharply closed, only a bright light is seen; if the circuit be suddenly broken, a bright light is also visible, generally of a different aspect; but if the two wires, or rather the two bodies which should complete the circuit, are made to approach each other, so that the circuit, precisely speaking, is neither wholly open nor wholly closed, then the double phenomenon becomes permanent, and the light extremely brilliant. No matter can resist this heat incessantly renewed, which is maintained as long as the action of the pile lasts, that is to say, for days together.

Thick rods of gold, iron, and platinum melt like sealing-wax, and their vapours give various colours to the luminous envelopes which seem to unite the two poles. Silica, alumina, and the greater number of the most refractory substances, taken separately, are alike fused and volatilised. There is, however, one substance—the only one, perhaps—which in some degree resists the action of this furnace, and which by conjunction of favourable circumstances, is a good conductor of electricity (a condition indespensable to the object in view), can be fashioned in any form, and his moreover, neither rare nor dear. This body is charcoal, such as concretes in gas retorts, or which can be prepared in pieces by particular processes. Round or square perfectly even rods are made of it, about thirty centimétres long, and varying in thickness from five to ten or twelve milimétres. Two of these rods are adapted at one of their extremities to suitable metallic pieces, one terminating the positive wire, the other the negative wire of the pile. These wires of good red copper, from three to four milimétres in diameter, covered with silk or cotton, may be several hundred métres or even several kilométres long, according to the distance between the pile and the extremites of the wire. The positive and negative charcoals are generally superposed vertically. Were their free extremities planed and placed in perfect contact, the current introduced by means of the commutator would not manifest itself; it would pass into the charcoal as into the copper wire, without giving any outward sign of its presence. The circle would be completely closed.

But if in the apparatus or regulator containing the charcoals there is an electro-magnet provided with a moveable armature conveniently disposed, the passage of the current would cause the armature to fall, and this movement communicating itself, for instsnce, to the supporter of the lower charcoal, would depress it from two or three milimétres, whilst the supporter of the upper charcoal remains fixed. It is clear that the free extremities of the charcoal being no longer in contact, the circuit of heat. In consequence of this destructive process, the space will be broken, light will burst forth, and that the phenomenon will persist, under the single condition that the circuit is neither completely closed nor broken—that is to say, beyond the limits which the current can traverse.

The better to appreciate other phenomena, let us now carefully examine the effects produced on the charcoals.

Charcoal resists fusion, but it is acted on by a kind of molecular disintegration, which rapidly wastes it, the result either of the simple action of the intense heat or the current itself, which tears off and transforms the last material particles. The wear is unequal, that at the positive being generally about twice as great as that at the negative. The combustion of charcoal by the oxygen of the air is of little account, for no marked difference is observable when the charcoals are kept in an atmosphere of nitrogen. It will be observed that the incandesceuce of the positive pole occupies more length than that of the negative, as if the latter underwent a less degree between the two charcoals becomes in a few minutes enlarged. At first only two or three millimétres, the distance soon increases to eight, ten, or even more, according to the nature of the charcoal and the force of the current.

To observe these phenomena to the greatest advantage, we must project on to a screen the image of the charcoals magnified eight or ten times, when the light becomes supportable, so that observers can study with facility the series of appearances which present themselves in this focus of light and heat, apparently so constant, yet so agitated. We cannot now enter into the details of the curious observations which have been made on the impurity of charcoals, on the colouration of the flames by the substances introduced into them, on the fusion of bodies placed, not in contact with the charcoals, but in the intervening space. We will confine ourselves to stating that the intensity of the light is notably diminished by a kind of waster, which forms from time to time on the point of the negative charcoal by the accumulation of particles from the positive charcoal, as if by the current. These wasters disappear and reappear at intervals, but they are very rarely observed with certain charcoals and at certain degrees of intensity of the pile; consequently, careful selection of the charcoal must be made in order to secure a more constant light.

The interval between the positive and negative extremities cannot be indefinitely increased in the regulator, and for two reasons:—1. The intensity of the current diminishes in proportion to the extent of this interval. 2. The intensity of the light diminishes with the force of the current. It is necessary, then to limit the increase of the space to prevent the diminution of light. This is one of the most important and one of the most delicate functions of the regulator; and for this purpose M. Serrin's mechanism is unrivalled in ingenuity. It is evident that the electro-magnet proviously mentioned is the regulator of the motive power to coadapt the charcoal; but this adaptation is a very complex process. 1. The centre of the focus of light must remain at the same level. 2. The charcoals must not come into contact, as the circuit would then be completely closed and the light extinguished, at least for a moment. 3. The movement must be made exactly at the right instant; that is to say, before the current has undergone a certain, hardly perceptible, diminution.

It is especially in accomplishing the last condition that M. Serrin's regulator acts with unequalled precision.

The armature of the electro-magnet can be likened to the scale of a balance with a fixed weight, of which the balancing space is limited to 3 or 4 millimètres by tangent screws, and which, instead of having counter weights on the other side, are supported by two springs, one fixed nearly in equilibrium, while the other receives a variable tension by a movement of the screw. Such a scale is easily made to descend by the superaddition of 10, 20, or 30 grammes, according to the degree of tension to be given to the second spring. Such is the principle on which M. Serrin has formed his ingenious apparatus. His armature is connected with all the supports of the negative charcoal, and oscillating vertically and freely within the narrow limits of three or four millemètres, the two springs keep it raised, and the superaddition making it descend is the attractive force of the electro-magnet. This force decreases with the force of the current; consequently it decreases when the charcoals, from being worn away, leave too great a space between them, and the light begins to fade.

The variable tension of the spring is, in fact, regulated by this datum. The instant this minimum is reached, the scale ascends; that is to say, the spring raises the armature, the surcharge due to the electro-magnetic force having become insufficient to restrain it.

These improvements seem to us all the more important, since M. Serrin, in constructing his regulator, has succeeded in uniting the freedom and accuracy of the automatic movements with a solidity which excludes all accidental causes of derangement.

We have proved that this apparatus is not less fitted to receive the induced current proceeding from powerful magneto-electric batteries set in motion by a steam-engine of three or four horse-power. In this case, the current is not continuous, but alternately positive and negative. There is no need of much complication in these batteries to rectify the current, leaving it in its original uncontinuous state; but in this case rectification is useless, the regulator adapting itself perfectly to the disconnectedness and to the alternation.—*Comptes Rendus.*

## ON THE PRESERVATION OF THE ALKALINE GOLD TONING BATH.

BY PROFESSOR CHARLES F. HIMES, OF TROY UNIVERSITY.*

The alkaline gold toning process, or some modification of it, appears to be generally adopted for positive prints on paper. In the many articles that I have noticed in the various photographic journals upon this subject, I do not recollect a practical suggestion with a view to the preservation of the toning properties of the bath after it has been once used. The old hyposulphite of soda and chloride of gold toner and fixer was used by operators, even after it had been demonstrated that prints treated in that way were, not only liable, but in most cases, certain to fade; and that, therefore, any change of method could scarcely be for the worse.

It must be admitted that the old process worked more uniformly, and independently of the quality of the paper, when albumenized, than the alkaline gold process; but the latter was objected to, previous to the ascertainment of that fact by actual trial, as apparently too wasteful; for

* From the *American Journal of Photography*.

in order to tone with rapidity the solution is required to be of a certain strength, and it is necessary to maintain this strength up to the last print, or gold will be economized at the expense of time, and after toning it deteriorates so rapidly that it soon becomes worthless. Many operators, even after they had adopted the new process, kept on hand an old hyposulphite gold bath, to be used when but few prints were to be toned. The conditions of deterioration of the toning solution are well known, but chemists are not agreed as to the precise nature of the reactions that take place, or as to the compounds formed. Without consulting opinions on these points, photographers know that the simple aqueous solution of ter-chloride of gold, in the stock bottle, will keep indefinitely, but that after it has been rendered slightly alkaline, an immediate change takes place; it begins to lose its properties, and the injurious reaction continues until the solution is rendered worthless for photographic purposes: the chloride of gold is precipitated after the lapse of a few days, at farthest, as a photographically unavailable compound. The organic matter, introduced by the prints in the operation of toning, assists in this work of deterioration, and complicates it. The reactions that take place in this case, as in chemical reactions generally, are rendered more energetic by boiling or heating the solution, as is frequently recommended, in order that the gold may be deposited more rapidly upon the print. The toning properties last through several hours unimpaired, frequently, except by loss of gold abstracted by the prints, and we keep the bath in its most active condition by adding chloride, with the certainty that there are causes at work which will ruin it for future use. If these causes could be counteracted, and the chemical reactions checked when the work of toning for the day is finished, the solution would retain all the properties it possessed at that time, and there would be no loss in adding chloride of gold at any time. The substances causing the injurious results in this case are the carbonate of soda and the organic matter, but chemical testimony agrees that the aqueous solution of ter-chloride of gold is unaffected by such substances when free hydrochloric acid is present. It is probable then, that hydrochloric acid would be effective in checking the reactions, and therefore be a convenient agent for preserving the toning bath unimpaired. The stock solution of chloride of gold is generally slightly acid to test paper, or, if it is not, it is well to make it so by the addition of a few drops of hydrochloric acid, so that the impurities, which are frequently present in the articles sold for photographic purposes, may not cause it to deteriorate. I have employed the following method in toning:—I add to every three ounces of water one grain of chloride of gold, from a stock solution of one grain to a drachm of water. I then throw in a piece of litmus paper, which will be reddened in a short time, then drop in a solution of carbonate of soda, until a slight alkaline reaction is apparent, in the partial restoration of the blue colour to the test paper. I prefer to render it alkaline in this way, rather than by adding a certain weight of carbonate of soda for each grain of gold solution, since two samples of chloride of gold are rarely of the same degree of acidity, and, in my experience, the bath works more rapidly when slightly, than when decidedly alkaline. When the prints are all toned, I pour the toning bath into a bottle, drop in hydrochloric acid until the test paper shows a decidedly acid reaction; the previous yellow colour, which had disappeared on addition of the carbonate of soda, will be restored, and the bath will keep for weeks in that condition. When it is to be used again, it is only necessary to neutralize, as before, with carbonate of soda, adding, of course, chloride of gold from time to time, as the gold is withdrawn by the prints.

The chief advantage in treating a toning bath in this way lies in being able to tone rapidly without waste, as the unused gold is preserved for future use. In connection with hydrochloric acid, as above, I experimented with aqueous solution of chlorine, and with aqua regia, but found the hydrochloric acid all that was required for the purpose. I also allowed a bath to stand until on trial it would not tone at all, and then treated it with hydrochloric acid, neutralized it, and found it to work well; the gold compound, whatever it was, yielding altogether, or in great part, to the acid, dilute as it was.

In course of toning operations sometimes a bath will not work, when there can be no doubt that there is chloride of gold enough in it; in such case, acidifying it with hydrochloric acid, and then neutralizing with carbonate of soda, will be found to remedy it. Simplicity and permanency are the two great desiderata in photographic solutions, as conducive to economy of time and money; and especially is this the case with amateurs who practice the art only at intervals. They need solutions easily prepared, that can be added to, and kept of uniform strength, without risk of deterioration. The use of hydrochloric acid, as proposed, gives to the alkaline gold toning bath somewhat of that character.

## THE STEREOGRAPH AND THE STEREOSCOPE.*

PROVIDED with two binocular photographs, endowed with the conditions of difference, as demonstrated to be requisite in the preceding paragraphs, the stereoscopic effect can be produced, by superposing the pictures of these photographs on one another in space, by means of two eyes *alone;* the effect thus produced, however, can be magnified by means of refracting lenses; or the rays of light proceeding from these photographs can be presented to the eyes under conditions for producing the stereoscopic effect with more facility or more proximity, by means of both refracting and reflecting accessories; but the *eyes alone* are endowed with the power of finishing the effect.

To be brief, a pair of lenses or reflectors can produce two conjugate pictures superimposed upon each other in space, forming thereby a solid picture, either a miniature or a magnified representation of the reality; but, inasmuch as we possess no medium by which a solid picture can be retained, the eyes alone can take cognizance of this reality, and can even do the work *without any accessories.* It becomes, therefore, my task to show, in the first place, how the superimposition of two pictures is effected: secondly, to demonstrate why the superimposition produces a solid picture; and thirdly, if possible, to give a physiological clue to the perception of solidity by the eyes.

*How Superimposition is Effected.*—There are three methods by which the superimposition of pictures can be effectuated; or, going directly to the origin of optical laws, it is well known that rays of light are made to cross by three different methods; and where they cross under homologous conditions, the intensity of the light by this interference is increased, and the picture is rendered more brilliant. The first method is exemplified by the crossing of the corresponding rays from two equal radiants, or two equally illuminated equal and similar objects; the second is manifested when rays from one and the same object, or from two equally illuminated equal and similar objects are made to impinge upon mirrors inclined to each other at a given angle, whereby the reflected rays of necessity converge, and therefore cross each other somewhere. We find, thirdly, a very forcible example of crossing or interference in the convergence of a pencil of rays produced by a single magnifying lens, where all the rays of the radiant that are caught by the lens are refracted and brought to a focus on the axis; and a more pertinent example, when two lenses are inclined to each other, and radiants are placed external to the obtuse angle and on the axes of the lenses; by this means the axes converge, and if the point of interference is at the same time the common conjugate focus of the two radiants, the superimposition of the pictures at this point will be very brilliant; or a similar phenomenon can be produced by placing a

* Continued from p. 417.

a single radiant either within or without the angle of inclination of the lenses, or in front of a pair of lenses not inclined, so as to produce a virtual image of the radiant, either nearer to the lenses or farther off. A single example will be sufficient to indicate what is meant by the foregoing remarks.

Let AB and CD be two equal and similar objects, situated in the same plane, and in the same line on that plane; let O and N be two lenses, two apertures, or the two eyes, whose centres are also in the same plane, and in a line parallel to the eyes. It is evident that each point on either object is an independent radiant from which rays emanate in all directions; but from the two corresponding points A and C, through the centres of N and O, only a single ray in either case can pass, that is, the ray AN in one case, and OC in the other, both of which are in the plane of the objects; these rays, therefore, cross at the point AC. In like manner the rays BN and DO cross at the point BD; joining AC and BD, we have the virtual image of AB and CD superimposed on the same line and in the same plane as AC, BD. This example is not a very familiar one of interference for the optician, but it is a correct one, and it subserves my purpose hereafter better than any other.

*Interference of Rays produced by the Eyes.*—The axes of all normal eyes converge more or less, those of short-sighted persons more than those of the presbyopic; because the nearer the point observed, the greater the parallax, and consequently the greater the convergence. By this convergence of the rays when directed to the corresponding points of the photographs, they are made to cross either in front of the photographs or behind them; and where they cross there will be found a new image. Now, the axes of some eyes cross more easily in front of the photographs, others more easily behind them; this peculiarity depends, I believe, on the difference in the distance between the centres of the two eyes, as well as probably between the distances of the corresponding points in the mounted photographs, and may be also on the difference of noses; for, where the distance between the eyes is less than the medium, and consequently less than that between the corresponding points on the photographs, the crossing takes place in front; and where the eyes are far apart, the interference or crossing is behind the plane of the photographs.

The new picture thus formed is equally stereoscopic by either process; but in the former it is always half, or about half, the size of the originals, in the latter it is magnified. In both cases the best effect is produced when the photographs are observed at the distance of distinct vision. As a general rule, those persons, the centres of whose eyes are less remote than two inches and a-half, see the stereoscopic effect easily by crossing the axes of the eyes half way between the photographs and the eyes; whereas those, the centres of whose eyes are farther apart than two inches and a-half, observe the relief by much less convergence, so that the axes of the different pencils of rays cross beyond the photographs.

Each phenomenon requires a peculiar method by which it can be observed. In the first place let the student learn to see double, that is, by holding up the thumb before the eyes to see two thumbs; when he is expert at this, let him next hold up in front of his eyes, at the regular reading distance, both his thumbs, and try if he can see four thumbs; as soon as this is effected, then, by bringing the thumbs closer together, so that their distance apart is about two inches and a-half, the two middle ones can be made to overlap each other, whereby three thumbs will appear. The difficulty is now overcome; for the eyes, when well practised in this strabonic exploit, are prepared for regarding a stereograph which is mounted in a special manner for the purpose, when, with a little patience, three photographs will appear, of which the middle one will be very distinct, finely defined, and in full and natural relief, exhibiting all the solidity of reality.

The two outside pictures are indistinct, and the eyes will soon learn to neglect them; or they may be entirely removed from the field of view by the use of a frustrum of a pyramid formed of cardboard, whose height is equal to half the distance of distinct vision, that is, half the reading distance; the side of its upper base one inch and a quarter, and that of the lower, three inches. By placing the lower base next the eyes and looking through it, the stereoscopic picture will appear alone and distinct. This accessory I propose to denominate the "strabonic stereoscope," and the stereographs prepared for such exhibitions, "strabonic stereographs;" because the photographs of which they consist are mounted an inverse order, the right photograph taking the place of the left, and *vice versa;* that is, they are mounted directly as printed from the uncut negative.

The second method is founded on a reverse principle, that is, by excluding the rays of light from the middle of a field of view comprehending a space of one inch and a quarter square. This is effected by placing a piece of cardboard of this width in the middle, half way between the eyes and the photographs, of which the latter are fixed at the regular reading distance; in the former case we have an aperture in the middle, or at the upper base of the strabonic stereoscope, instead of an opaque screen.

The same object can be effected still more simply as follows:—Take a slip of wood about two feet long, two inches wide, and one inch thick; take, secondly, a piece of cardboard of the size of a stereograph, and bisect the two parallel sides and the two parallel ends, and join the points of bisection. Where these lines meet we have the centre of the cardboard. From this point right and left on the longer line, mark off a space one inch and a quarter in length, and at either extremity thus marked off, draw a circle half an inch in diameter. Lay the slip of wood on its flat surface on a table, and tack the piece of cardboard to one end of the slip at right angles to the table, with an equal portion of cardboard projecting at either end. Previously, however, the wide surface of the slip must be divided longitudinally into two halves, by running a saw from end to end, so as to form a groove about a quarter of an inch deep; and at a distance from the cardboard, at the end equal to the reading distance, another groove is sawn at right angles to the former, and of the same depth: in the latter grove an ordinary or lenticular stereograph is placed, and along the longitudinal groove a piece of cardboard at right angles to it. Now let the observer look through the two apertures at the stereograph; it is evident that the right eye can see only the right photograph, whilst the left eye is restricted in like manner to the left. By concentrating the individual attention of each eye to its respective picture, by pressing the external parts of the balls of either eye with the fingers, or by compressing the eyes as in frowning, the two pictures may be caused to overlap each other, when a new picture will appear possessed of the full stereoscopic effect, apparently of a larger size than the originals.

Instead of the long slip of cardboard, a small slip, as already alluded to, one inch and a quarter in width, and of a length equal to the height of the stereograph, might have been inserted in a groove half way between the eye-piece and the stereograph and parallel with them. The operation is the same in both cases. As soon as superimposition can thus be easily accomplished, the apparatus may be laid aside, when, as in the former case three pictures will appear, of which the middle one will be in relief.

Of the two methods, which can seldom be practised without accessories by the same individual, I regard the former as preferable; because the results are much finer by being condensed to one-half the size, whereby the asperities of the paper and other slight imperfections are less observable. There is quite an indescribable charm in viewing the strabonic stereograph over that of the lenticular;* I can see

* The two methods, by which the stereoscopic effect is produced, are both *strabonic;* for the axes of the eyes in both cases cross each other. In fact, we have no method whatever of seeing this beautiful effect of stereoscopy except by *squinting*, if I must use the odious term; and more than this, we

both forms; the latter, however, requires an effort, whilst the former is, as it were, natural.

I now propose to give the rationale of these phenomena, together with that of the ordinary lenticular stereoscope. Superimposition of the photographs has frequently received an optical explanation; and the difference in the two stereographic photographs has also been observed; but the nature of this difference, and the mode by which this difference *produces relief*, have never yet, to my knowledge, been satisfactorily demonstrated.—*Humphrey's Journal.*

(*To be continued.*)

## WET OR DRY COLLODION.*

BY M. L'ABBE DESPRATS.

Various Reactions, &c.—While describing in our previous essay, some experiments tending to prove the action of electricity in photogenic phenomena, it seemed to us that, hitherto, we had not remarked that the electric current changes its direction according to the order in which two or more bodies were placed in contact to act reciprocally upon each other. But we were far from supposing that the exhibition of such a remarkable phenomenon would so promptly meet with a practical application. If we experience regret at the protracted interruption of our studies, it is chiefly because this delay has caused us to defer the expression of our entire sympathy with Dr. Sabatier, whose experiments, added to our own, have imparted to them a special value. The frank and disinterested expressions of the learned doctor, have struck all those who are seriously engaged in photography, and it is greatly to be desired that his example should have many imitators. For our own part, we believe it to be our duty to congratulate Dr. Sabatier publicly, and the reader will unite with us in recognizing the value of the results, entirely new, obtained by him, the attainment of which exhibits a rare perspicacity on the part of the enquirer.

To the theoretical considerations previously developed, we now proceed to add some others, more practical, and relating to the employment of the developing solution. Hitherto, photography on collodion has admitted only developers—protosulphate of iron and pyrogallic acid. Although it is not impossible to obtain good results with gallic acid, the slowness with which it produces its effect, has nevertheless caused it to be completely abandoned. The first two agents, beside giving greater delicacy of detail to the negative, admit also of a much shorter time of exposure. In this particular sulphate of iron is the more valuable, for, very often, it will be a third more accelerating than pyrogallic acid, which is also much more so than gallic acid. We say *very often*, but not *always*. In fact, with a collodion prepared simply with iodide of potassium, the acceleration is nearly the same, whether the development is effected by sulphate of iron or by pyrogallic acid. But if the collodion be prepared with iodide of cadmium, for example, the acceleration given by sulphate of iron is a third stronger than with pyrogallic acid. When, then, it is our special object to obtain instantaneous pictures, we must give the preference to sulphate of iron. We believe also that in the generality of cases this preference will be absolute. If upon this point we hesitate to speak positively, it is because the sulphate of iron in some measure only translates literally to the eye the latent action of light; while pyrogallic action, translating more freely, if I may use the expression, associates with it a part of its own peculiar action. The action of the sulphate is then completely in harmony with the action of the light, so that if the latter be complete the former will be so too. It is not exactly the same with pyrogallic acid. If the light has not had time to fully accomplish its work, the pyrogallic acid can, by its prolonged action, in part supply it by a species of continuation; but this continuation will always be more or less imperfect. The outline drawn by the light may be very well continued, with some advantage to the proof, but too frequently also, it will be enlarged at the general expense of its detail, and the delicacy of the half tones.

At the same time we must guard ourselves from saying that pyrogallic acid is to be rejected as an unfaithful interpreter; for every time that the duration of the exposure has been appropriate, that is to say, when the light has left nothing to the continuating action of the pyrogallic acid, the effects of good development given by this developer may be confounded with those given by sulphate of iron. It is our opinion that there is a marked difference between pyrogallic acid and sulphate of iron, that the first, by its prolonged action, by causing details to appear which at first were invisible, may strengthen to exaggeration the traits that first appear: while the sulphate of iron gives all it can give at once, and that the subsequent intensifying can act only upon the details spontaneously and freely obtained, and without causing them to appear anew. From this we conclude that a perfect picture may be obtained with sulphate of iron; for, we repeat it, all interpretation being to it impossible, it can act only as a literal translator of the luminous action.

A less prolonged exposure in the camera usually gives a more perfect negative, which is always more promptly obtained. These are, certainly, very appreciable services, and very capable of making us incline to give the preference to the sulphates: they are also employed by the most skilful photographers, and they would be even by the least experienced, if its employment were not accompanied by certain difficulties which it is not very easy to overcome. One of the gravest, if not the only one, consists in the inequality of the argentiferous deposit which forms the image. This inequality may sometimes be such that the plate, on removal from the developing bath, will appear marbled—almost opaque in some parts—while at others a greater or less transparency will permit of our appreciating an extreme fineness of detail.

Many methods have been pointed out for obviating this inconvenience, which is sometimes so serious as to render a good proof nearly impossible. It was thought that a too sudden action of the sulphate of iron was the cause of this almost constant failure, therefore a diminution in the strength of the solution has been recommended. It has also been thought that an acid added to the sulphate, by rendering its action less prompt, would secure to it at the same time more regularity. What happens in this case? As might be foreseen, the deposit becomes regular, but at the same time so light, that the negative constantly remains pale and without vigour. Hence the necessity of recurring to intensifying several times, and as, notwithstanding these successive processes, the negative always leaves something more or less to be desired, with regard to vigour of tone, it is thought advisable to attempt a final strengthening by means of pyrogallic acid. However valuable this may prove, it seems to us that we should begin with the acid. For, proceeding by the cumulative process, we complicate the operations without any appreciable benefit; without taking into account that the negative must inevitably display the nature to which it has been uselessly subjected from a complicated treatment. If the operator is not capable of mastering the action of the sulphate of iron, he ought to be contented with pyrogallic acid, which, less sudden in its action, acts, so to speak, of itself, and without requiring anything from the operator. But, suppose it be desired to develop by means of sulphate of iron? We may affirm that, most frequently, it is possible to obtain as satisfactory a result as possible.

Above all, it is necessary to comprehend the nature of the deposit forming the image, as well as the causes which contribute to its formation. An examination, even if superficial,

never regard a single word in reading or writing, or a minute point when drawing, without squinting—squinting is a natural process—but let us drop the vulgar word *cross-eyed*, and substitute the aristocratic term *strabonic*, (which signifies exactly the same thing), its origin, however, is from the majestic Greek; the term, therefore will be more respected.

* Continued from p. 296.

of what passes upon the exposed plate at the moment it is acted upon by the bath of sulphate of iron, suffices to indicate that the developed picture consists solely of metallic silver. This is evident upon mere inspection, but it is proved still further by the chemical action of bodies placed in contact, and from which only silver can be obtained. For what is upon the plate is impressed by light."—*Moniteur.*

## THE PHOTOGRAPHIC ART A BLESSING TO THE WORLD—CARTES DE VISITE.

Of all the arts, the one that seems most miraculous is photography, that the rays of the sun, darting through space with a velocity of a hundred and ninety-two thousand miles in a second, should, after bounding and rebounding from the walls of a room millions of times, till they cross each other in every conceivable direction, be directed on a bit of paper, and made to print a likeness accurate in all its microscopic details, would certainly have been deemed impossible before it was done, and yet there are large numbers of persons who by the daily performance of this miracle obtain bread and meat for themselves, and little shoes and bibs for their children.

The most valuable feature in this wonderful art is the cheapness and facility with which it is performed. Heretofore, a few individuals in the community have been able to have their portraits painted by artists who, after devoting years to study and training, have been able to produce a picture bearing some resemblance to the person for whom it was designed; but the pictures of the photographer, though possessing a fidelity unapproachable by any painter that ever lived, are produced with a rapidity and ease that places them literally within reach of all classes of the community. This art contributes a thousand fold more to the sum of human happiness than the art of painting.

The ease with which photographs are taken, and the cheapness at which they are sold, has reached its highest developement in the carte de visite. A man can now have his likeness taken for a dime, and for three cents more, he can send it across plains, mountains, and rivers, over thousands of miles to his distant friends.

One of the most interesting results of the ease and cheapness with which photographs are produced is the prompting which it will give many persons to have their likenesses taken frequently during their lives. What would a man value more highly late in life than this accurate record of the gradual change in his features from childhood to old age?

What a splendid illustration would such a series of photographs make in every household. First, the new-born babe in his mother's arms; then the infant creeping on the floor; next the child tottering by the mother's apron; then the various phrases of boyhood, till the sprouting beard tells of the time when the plans and hopes of life began to take form and purpose; another portrait with softer locks and eyes is now coupled with the series, and the stern warfare with the world begins; the features henceforward grow harder and more severe; lines slowly come into the forehead, and grey hairs mingle with the locks: the lines grow deeper and the head whiter, till the babe is changed into the wrinkled old man, so different but still the same! Even when life is closed the power of the photographer has not ceased. The fixed features, that return no answering glance to the last fond look of love surviving, are caught and indelibly preserved to its memory.—*Scientific American.*

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—In the numerous attempts made to trace the causes of mealiness, the silver bath is always passed over as too innocent to be an object of suspicion; but I entertain a very strong opinion that from this unsuspected source originate nine tenths of the evils connected with sun printing: a mere expression of opinion without proofs is very properly considered valueless, it is therefore necessary we enter into details. When the albumenized surface of a paper is brought into contact with the nitrate solution, in odedience to the laws of chemical affinity, a decomposition immediately commences, the silver uniting with the chlorine; thus forming the sensitive medium, whilst the liberated nitric acid enters into a new combination. Now it is very evident, that when the point of saturation is reached, this process of decomposition must of necessity cease, and no further chemical change can take place, consequently, whatever additional quantity of silver is removed with the paper from the sensitizing bath, it is to be found adhering to the paper's surface, in the form of a nitrate of silver in combination with water; drying evaporates the liquid, but the silver salt is deposited on the surface of the paper, the quantity being regulated by the strength of the bath and rapidity of drying. Now we have to examine the influence this free nitrate exercises in the after processes—it being a less sensitive salt to the action of light than the chloride of silver, if the printing is effected by diffused light, the greater portion is removed in the washings which precede toning, and therefore cannot effect much harm; but when the printing is performed in the full blaze of sunlight a large portion is reduced, and in spite of washings, will accompany the paper to the toning bath, there to retard the action of toning, for until this impediment is removed by the pioneers, carbonate or acetate, the gold cannot perform its work; it is therfore obvious that the quantity of these reducing agents must be regulated by the strength of impediment to be overcome—this may be pretty nearly ascertained by the roughness of the print's surface, in a slowly printed picture it is comparatively smooth, in a rapidly printed one the roughness of surface varies according to the intensity of light; in fact, when printing in a bright noonday sun I have known this free nitrate to become reduced so quickly that it has prevented the light from performing its duty on the chloride of silver, and when this red looking print has been immersed into the toning bath, the reduced nitrate of silver, yielding to the action of the soda, has disappeared, leaving a thin image similar to one derived from an insufficient supply of silver. It may be urged that this must have been the cause, but a portion of the same paper and the same negative, by removing the printing frame from the action of the direct sun's rays, the print has been altogether of a different character. But to return to my subject—In my first letter I endeavoured to show the necessity of employing a sufficient quantity of soda in the toning bath to enable the gold to work freely: you will now readily perceive my reasons for believing such a course necessary to secure satisfactory toning. There are attending this method of preventing mealiness, difficulties which will be treated on in their proper place. To prevent is easier than to cure: if the quantity of chloride each sample of paper contains was only known, to prevent would be an easy matter; but under existing circumstances we must learn by experiment the exact time required to saturate each sample of paper when floated on a sensitizing bath of a given strength, say 75 grains to the ounce (where time is no object 60 grains would be perhaps better). Now if this point could be ascertained by removing the paper from the bath just before it becomes saturated, a large portion of the free nitrate adhering to its surface would be converted into a chloride, and an excess of the pernicious salt would thus be prevented, and toning would proceed more regularly, for I am persuaded the nearer the toning bath can be to a neutral condition, the more brilliant will be the prints; and I once more repeat, the alkaline agent has, in my opinion, but little to do in giving tone to the print, its work is to clear the impediments which stand in the way, in the form of reduced nitrate of silver. From the general tenor of the above remarks, you will readily perceive they open a wide field for investigation: an investigation if opportunities permitted, I would fain undetake myself. Failing these, I leave the pursuit of these important enquiries to anyone who will kindly undertake them. Promising to renew this subject next week, I remain, yours respectfully,

A Photo's Assistant.

## Talk in the Studio.

Dramatic Expression in Photography.—We have just received from Mr. F. R. Window, unquestionably one of the most charming set of photographs wo have over met with. It consists of eight portraits of Mrs. Stirling, constituting a progressive series of illustrations. The lady is represented in the course of delivering her lecture on behalf of tho distressed operatives of Lancashire. In the first she has just entered, and saluted her audience, and is standing with the easy grace and winning expression of the assured favourite of the public. In the second, tho arms are slightly raised, and the countenance has assumed a look of earnest interest, as she states the case of tho sufferers whose cause sho is about to plead. In the third tho earuestness increases, one arm is raised towards the head which is thrown back; the other arm is also thrown energetically backward as sho becomes excited by the sad narrative sho is reciting. In tho fourth, the body is thrown a littlo forward, and tho arm, with finger indexed, advanced: the argumentative phase of tho lecturo has evidently been reached. In the fifth, with both arms advanced and body thrown back, she has reverted for a moment to narrative again, only to give point to the argument, which is renowed, and put with irresistible force, in the sixth, in which tho couutenance glows and tho whole pose is instinct with the certainty of a triumphant and uncontrovertible position. The case has been clearly stated; the argument brought home to every mind, and now the heart has to bo touched; and in the seventh wo have the appeal: the foot is advanced, and tho body thrown forward, the hands are raised towards tho hreast and clasped, the head is thrown a little to ono side, whilst the countenanco is full of touching appeal for practical sympathy with the thousands of suffering operatives. In tho eighth tho peroration is reached. Tho body is drawn up to its utmost height, both arms are raised, the eyes sparkle, and tho couutenance is illuminated as with tho inspiration of the sybil. In each of these, overy part of the figure is full of life and motion, and the expression so perfectly corresponding with tho action, leaves no doubt as to the inteution of each picture. The axiom that action is tho first part of eloquenco, never received moro forcible illustration than in theso felicitous renderings of dramatic power. The photography throughout is equal to the art. Delicato and soft, yet forcible and round, admirably defined aud exquisitely perfect in manipulation, being freo from speck or defect of any kind; and the printing and toning leave nothing to desire, the tone being a rich deep warm neutral tint, without the slightest mealiness, and possessing, in every print, perfect uniformity. The last thing which strikes our attention, proves its excellence by that fact, wo refer to the background, which is entirely devoid of curtain, column, pedestal, balustrade, or accessory of any kind: thero is nothing whatever to distract tho attention from the fino histrionic action and expression of tho charming lady aud talented artiste who is represented. Wo are rejoiced to seo Mr. Window, whom we knew as an ablo amateur, stepping at one stride into the very foremost rank of professional photographers.

Mr. Glaisher's Balloon Ascents.—In one of Mr. Glaisher's recent and most perilous ascents, in which he obtained a height of nearly six miles and became insensible, after passiug through tho clouds ho attempted to take a photograph of the scene, but was prevonted by the rapid motion of the balloon. He says:—"On emerging from tho cloud at 1hr. 17m. wo came into a flood of light with a beautiful blue sky without a cloud above us, and a magnificent sea of cloud below, its surfaco being varied with endless hills, hillocks, mountain chains, and many snow whito masses rising from it. I hero tried to take a view with the camera, but we were rising too rapidly aud revolving too rapidly for me to do so; the flood of light, howover, was so great, that all I should havo needed would have been a momentary oxposure, as Dr. Hill Norris had kindly furnished with extremely seusitivo dry plates for the purpose."

## To Correspondents.

B. B. L.—With a simply iodized collodion, or one containing a very small proportion of n bromide, a strong iron developer is apt to fog. The greater the proportion of bromide used, the stronger the iron solution may be with safety. In our own practice, with a collodion containing from half a grain to n grain per ounce of a bromide, we find a 15-grain or 20-grain iron developer most suitable. 2. In summer the silver bath need not exceed 30 grains to the ounce. In cold weather it may be stronger with advantage.

An Operator.—The most probable cause of the yellowness of the print enclosed is the use of an old or acid hypo bath. It may arise from other causes, but as you do not mention any of the particulars of production, we cannot say which cause has been in operation.

F. Amos.—In order to take large landscapes with the portrait lens you have purchased, first unscrew the hood and remove it, then unscrew the back lens and remove it, next unscrew the front lens and place it in the position before occupied by the back lens. The lens is now to be fixed to the camera for use with the front lens alone; the central stops in the tube will be a little in advance of the lens, as it should in using a view lens. Any camera which takes the plates the single lens will cover, and expands sufficiently for the focus of the lens, which will probably be about 22 or 24 inches, will do.

J. G. Lock.—There is still something to improve both in your negatives and printing. Your friend is wrong in pronouncing No. 1 a perfect negative. Chemically it is probably pretty good, but the lighting is very defective. The sun appears to be shining directly on the light buildings, which appear flat, and without the relief caused by shadow; whilst the green trees are in shadow and appear black and flat for want of light. You have thus a mass of white and a mass of black, without relief or gradation. No. 2 would be better for deeper printing and less toning. No. 3 scarcely possesses sufficient vigour. No. 4 is better, but the subject is not well lighted. No. 5 possesses the same fault as your former portraits, too much diffused light and no direct light. Negatives may be practically weak, that is, wanting in contrast, and yet require long printing. Vigour depends more on the relation between lights and shadows than upon the absolute amount of deposit. Read our series of articles on iron negatives and brilliant prints in last volume, or the articles on a similar subject in the Photographic News Almanac for this year. Never tone prints in the light, or the purity of the whites will be much degraded. Keep the dish with the toning solution in the dark, or in a room with yellow light, examining the progress of toning hastily by a weak daylight now and then. Stereoscopic negatives taken with a bi-lens camera always require the prints transposing on the mount. Negatives can be sent by post if packed in a case, but not otherwise.

Emil. Seelig.—We are at the office, generally, on Thursday afternoons, if you can call.

Richard Hilton.—The article to which you refer describes the method of getting similar stereoscopic effect, or relief, in distant objects, to that seen by the eye in near objects. To obtain simply the natural amount of relief produced by ordinary vision, the lenses should not be more than 3 inches apart. 2. The ammonio-nitrate bath for printing may be used with advantage. The time required for floating the sheets depends upon the amount of alkalinity, and the strength of the bath. With a very strong bath decidedly alkaline, ten seconds may be sufficient. If slightly alkaline, longer floating may be safely employed. To strengthen your bath, make it a practice to keep adding sufficient of a 100-grain solution to maintain always an equal quantity in the dish.

N. H. W.—We presume, that in speaking of a gallery facing south, Mr. McLachlan meant the sitter facing south. With the sitter facing north, the need for his arrangement would not exist. We do not know what coloured gauze, or net, he proposes in his background arrangement, but should presume a light grey. Your specimen of glass arrived in fragments, or rather coarse powder, so that we are unable to test it in the spectroscope.

John E. Browne, Canada.—We called and enquired personally about your remittances and order. We found both had been duly received. Tho reason given for the delay was, that a photograph ordered in your letter was not yet published. We understand that the order will be despatched as soon as the photograph can be procured. We hope the next time you write, you will be able to say you have received the goods safely.

Rapid Dry Process.—In the letter of H. & J. Walter, describing a rapid dry process in our last, in page 430, column 2, line 19, for Keene's "*Wet* Process Collodion," read Keene's "*Dry* Process Collodion;" and on the following page, line 71, for "Mr. Wade," read "Mr. Wardley."

James Date.—The prints enclosed are not mealy, but are examples of what has been styled *measles*. They bear every appearance of imperfect fixation, from the use of old or weak hypo. If either of them had these markings before toning and fixing, we cannot understand it. We never met with the dirty, yellow mottling exhibited, but from the cause just named. You need not apologize for troubling us: we have pleasure in assisting our readers.

Bewitched Bath.—Your negative has not arrived; but we have received an intimation from the Post Office authorities that a "packet containing broken glass, addressed to us, is detained, and will be delivered on payment of one shilling and four pence postage. We presume that this refers to your negative, which has been insecurely packed, aud insufficiently prepaid. We see no reason, from your further description, to believe that the collodion is at fault. It is most probably the bath, but we are unable at present to throw further light on the subject, beyond what we stated last week. To you, as to a correspondent above, we repeat that no apology is needed for placing difficulties before us. All we ask is the clearest possible description of the conditions. Let us know if the trouble continues. Your parcel has arrived since writing the above. We will examino the plate, and report next week.

R. G.—The sky is too dark, but only because the negative generally requires more development or intensifying. It lacks contrast generally.

W. Steele.—We remember seeing the advertisement you name. It was issued by some provincial firm; but we do not remember certainly whom, nor can we readily ascertain. The effect to be obtained was inartistic and bad, so we gave the matter very little attention. In reference to the recent advertisement to which you refer, we regret that we cannot control or be answerable for the *bona fides* of such announcements. We hope that it will prove merely a case of neglect, not dishonesty.

J. B. Boden.—In the case you refer to the writer has evidently omitted to mention that after dissolving, 12 ounces more water are to be added; 480 grains of nitrate of silver require 16 oz. of water in making a 30-gr. bath.

H. Cooper, Jun.—We shall be glad to receive your communication on the use of benzoin and other gums with paper in positive printing.

Un de vos Abonne's.—You will doubtless be able to order the *Moniteur de la Photographie* through any foreign bookseller, such as Dulau, or direct of of the publisher, Lieber; but we do not know of nny place in London where you will meet with it without ordering.

H. G. B.—Your note on glass-rooms, with comments, in our next.

G. G.—You will see from a photograph in another column that Mr. Glaisher has attempted to paragraph the exquisite cloud scenery seen from the balloon; but that at the time circumstances were unfavourable.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 211.—*September* 19, 1862.

## PHOTOGRAPHY AND FORGERY.

The facilities afforded by photography, and more especially by photolithography, for effecting forgeries of bank notes and other documents, appear to have been considerably overlooked by those who are, or should be, most concerned. The sources of danger have been looked for in other directions, and it is from the imitative skill of the skilful engraver that counterfeit productions have been feared. In regard to Bank of England notes, a great safeguard has been believed to exist in the inimitable character of the paper, in quality, design of water mark, &c. But since the robbery of bank note paper, from the Laverstock Mills, this reliance has vanished into thin air, as the genuine paper manufactured for the bank authorities is now actually in circulation as the basis of the forgery. The bank authorities themselves rely upon the simplicity of the design and characters upon their notes, and upon the mode of printing adopted as their surest protection against imitation. Others maintain that complexity of design, produced by artists of the first ability, is the truest source of safety, arguing that, notwithstanding the skill and enterprise which have, unfortunately, been engaged in the nefarious profession of the forger, it must always happen that genuine art will be in advance of the spurious or counterfeit art. It is further argued that the number of persons who would be able, with any chance of success, to imitate the designs of genius, must necessarily be very few, and "these," as it is argued by an old writer on the subject, "by the legitimate use of their talents, can acquire competence; they, therefore, are not likely to employ their time, or risk their lives, in felonious imitations. Nay, if, in the perversity of the human mind, a first-rate artist were inclined to turn forger, he could not then do it successfully, because, even in the very first rank of historical engravers, one cannot imitate the engraving of another in a work of importance without the difference of manner being visible."

Adopting these and similar arguments, the bank authorities have held, we believe, that their position was impregnable, and that the precautions against forgeries of their notes were as complete as it was in the nature of things, or at least in the present state of science, possible to make them. Moreover, they may, and we believe do, argue, no forgery has ever yet been executed which they could not, themselves, detect; and as they could only become losers by counterfeits produced with such skill as to deceive their own tellers, and induce them, without question, to convert them into specie, they were not called upon to entertain further anxiety upon the subject. They believe that their own safety from deception is absolute, and that, for the public safety, they have done sufficient, or, at least, all that was possible; and there the matter must rest.

But the imitation produced by photography is absolute in all its parts. The most complex design of the most skilful artist is as easily produced as the most simple commonplace production of the greatest bungler. The secret marks however unobtrusive; the signature, no matter how marked its individuality or character, are all unerringly produced by the lens and camera, in the negative image. The ordinary silver print from such a negative, it is true, whilst it might deceive some persons if well executed, would speedily be detected on careful examination. It is for this reason, we doubt not, that the subject has received comparatively little attention, and excited no apprehension hitherto. But this is not the real danger. It is from the processes of photolithography, photoglyphography, and similar processes, by which photographic impressions can be produced in printer's ink, in the very material, and of the exact tint of the original, that the danger is to be apprehended; and that danger threatens the bank authorities themselves as well as the public, for it is possible to produce, by these means, imitations, which not the most skilful teller, or the most practised expert, could detect, or make oath as to the forgery.

Let us take the case of photozincography, photolithography, or the processes which have at present attained the highest state of perfection. The first of these methods, the invention of Colonel James, is practised at Southampton, for the production of the maps produced in the Ordnance Survey. The second, the invention of Mr. J. W. Osborne, and practised under his superintendence, at Melbourne, for the production of the maps and plans issued by the colonial Government of Victoria. Specimens of the work of both these gentlemen are exhibited in the International Exhibition. *Fac similes* of maps, engravings, manuscripts, pages of printed books are exhibited, all of which would defy detection. These are gentlemen, it may readily be said, from whom there is no danger of forgery. But their processes are made public; and not only may be, but actually are, practised by others. We refer those interested in the matter again to the International Exhibition; Mr. Ramage, of Edinburgh, exhibits a series of photographs in the British Photographic Department, perhaps the finest we have seen. By which process they are produced is not stated, but it is probable that the method is similar to that of Mr. Osborne. They are very perfect copies of engravings, and we have no hesitation whatever in saying, that by the same method and the same manipulator, *fac similes* of Bank of England notes might be produced which would entirely defy detection. It so happens, that these notes offer very especial advantages for imitating by such means. The design is clean, bold, and well marked: they are produced, not from engraved plates, in intaglio, printed at the copper-plate press, the printed impression of which always present a slight amount of relief which may be felt by the finger; but by block printing at an ordinary typographic press. Such an impression can, therefore, be imitated by the photlithographer without difficulty, and in such a manner that the Bank authorities themselves may be deceived.

Mr. Osborne, who is now in London, on a visit to the Exhibition, recently informed us, that wishing to call the attention of bankers in Melbourne to this danger, he produced by photolithography copies of various of their signatures, of which they admitted they would be unable to repudiate the genuineness. Any colour of ink, resembling either printing or writing ink, or any number of colours, may, of course, be easily produced, so that an actually written signature, instead of the printed signature now used, would not be an absolute safeguard.

We do not enter at present into any extended examination of the means by which such forgeries might be prevented, our object being rather to call the attention of those concerned to the existence and imminence of the danger. The means of prevention require careful consideration, and are not so easy and simple as might at first sight appear. Some years ago the subject came under consideration in the United States and in Canada. Coloured inks were employed for some parts of the note, and black for the other; but it was found that the coloured inks, not possessing, like black, a carbon basis, were easily discharged by chemical means, and photographic copies of the remainder easily produced, the coloured portion being supplied by a subsequent operation.

This difficulty was subsequently met by the use of a green formed of the oxide of chromium, which resisted the action of chemical re-agents. A geometrical pattern in this colour was printed first all over the paper, and the value, denomination, &c., of the note subsequently printed upon that in the usual way with black ink. This was an effectual check to ordinary photographic imitation, but it would be little or no check to the photolithographer, whose art would furnish him with means of evading this difficulty. A variety of means might be suggested of making the imitation difficult, but they would require more consideration than we can now give to the subject.

We may remark, before concluding, for the information of those of our readers who may be tempted to amuse themselves with experiments in this direction, that the pastime is a dangerous one; as the attempt to copy one of these notes by any process whatever, and for any purpose, is a felony, the consequences of which might be awkward.

## Scientific Gossip.

### TO PURIFY WATER.

Pure water is as essential for the well-being of the photograph as for the health of the operator, and a systematic perseverance in the employment of an impure source of this liquid will be attended in either case with the most serious consequences. The mortality of a town is, in the majority of cases, in proportion to the amount of impurity contained in the water with which it is supplied; and those who are engaged in photographic printing on a large scale can speak from experience as to the parallel holding good, in a remarkable degree, in the case of photographs. Of all the multifarious impurities which are liable to contaminate water, those which come under the class "organic" are by far the worst. These act not so much by what they themselves are capable of doing, as by the evil example they may be said to set other bodies with which they are brought in contact, acting, in this respect, after the manner of a ferment, and inducing a decomposition amongst a set of otherwise peaceably disposed atoms, of which no one can tell the end. Hence extremely minute quantities of such matter are capable of producing very extensive mischief. We have so often insisted in these pages on the paramount importance of pure water in all the operations of photography, that it is with no little pleasure we now draw attention to a plan, by which this necessary freedom from contamination can be secured by anyone, at a mere nominal expense either of money or trouble. The method is due to Mr. H. B. Condy, and consists in the addition of a solution of an alkaline permanganate to the impure liquid, when the organic matter will be rapidly destroyed. The process is as elegant as it is effectual. By the peculiar chemical properties of the permanganic acid it is capable, when employed in appropriate combination, of not only burning up every trace of organic matter in a water as perfectly as if it had passed through a furnace, but it also removes many of the mineral constituents which are sometimes almost as objectionable. An experiment of Mr. Condy's shows this in a striking manner. He made a saturated solution of oxide of lead, by shaking common white lead in distilled water, and filtering; this, on being tested with hydrosulphuric acid, gave the well known reaction of lead—a black precipitate. Four ounces of this liquid were then taken, and to it were added a few drops of a very weak solution of permanganate of lime. Upon standing for half an hour, the pink colour had disappeared; and when filtered off from the precipitated peroxide of lead and binoxide of manganese, there was only a brown tint communicated to it on testing with hydrosulphuric acid. A little more permanganate of lime was added, and the liquid allowed to stand for some hours, when, upon filtering again, not a trace of lead was found in solution. This is a very remarkable experiment, inasmuch as lead is a most difficult impurity to remove from water, whilst it is the most poisonous of ordinary metallic contaminations. Water containing iron in solution can also be purified in the same manner, so as to render it fit for use in dyeing and other industrial purposes; but the chief use of the permanganates as purifying agents is when organic impurities are to be removed. Hitherto no methods of purifying water can be considered of much efficacy. Filters remove suspended impurities only; ebullition merely destroys the vitality of animal and vegetable impurities, and precipitates carbonate of lime; alum introduces, in most cases, more than it removes; alkaline carbonates, lime, &c., merely touch some of the organic impurities; whilst even distillation itself, as ordinarily conducted, leaves much of the original organic impurity still in the water, whilst it deprives it of the dissolved gases which render it fresh and sparkling as a beverage. Of all purifying agents, filtration through animal charcoal has hitherto been looked upon as the best; but this is only partially effectual, and is tedious and somewhat expensive. Nothing that we are acquainted with at all comes up to an alkaline permanganate (either of lime or potash) in value and perfection of result, and we consider that Mr. Condy, in drawing attention to this simple and ingenious method, deserves the thanks of all practical photographers. The rationale of the process is easy to understand. Permanganic acid consists of the metal manganese united with a large excess of oxygen. This has been joined to it by powerful chemical methods, and the affinities between the metal and metalloid are sufficiently feeble to cause the oxygen to fly off on the slightest opportunity being offered. Pure water being incapable, under ordinary circumstances, of taking up more oxygen, will dissolve a permanganate unchanged; but if organic matter be present, the case is different. This, no matter how complicated its composition, invariably consists of the elements hydrogen and carbon, in conjunction, sometimes, with nitrogen, sulphur, &c. Now all these are substances greedy of oxygen, and exercising, in consequence, a powerful reducing action upon the highly oxygenized manganese compound, the carbon becoming acid, the hydrogen water, the other elements are burnt into perfectly harmless compounds, whilst the manganese is reduced to the state of binoxide, which falls down as a brown insoluble powder.

When absolutely pure water is required for some special scientific object, it can be readily procured by mixing it with an excess of permanganate of potash, and distilling it once. This we have verified ourselves, and can vouch for the extreme purity of the product. For all ordinary purposes distillation would not be required, and in this case the cost of applying the permanganate process on a large scale is very trifling. The quantity of permanganate necessary to purify 10,000 gallons of water would be contained in one gallon of Condy's fluid, the price of which is only 10s.; at this rate 200 gallons, or one ton of water, could be purified at an outlay of 2½d. On a practical scale, Mr. Condy recommends a wine-glassful of solution of permanganate of potash to be poured into a hogshead of offensive drinking water, and mixed up with a stick. Generally this quantity will render it as sweet as fresh water; but should it be very impure, half a wine-glassful more may be added. So long as organic matter remains, which is known by the pink colour of the liquid gradually vanishing, add the fluid. If too much has been used, it need occasion no uneasiness, for it is merely necessary to continue stirring for a short time with a stick, or, on a small scale, to filter it through blotting paper, for the excess of permanganate to be decomposed. The precipitated peroxide of manganese must be left to subside, and the clear liquid may then be poured off.

One great advantage in employing permanganate of potash as a purifying agent is, that any excess of metal which may be present, either by addition of too much of the pink liquid, or by not separating the precipitated peroxide of manganese, will not prove injurious, even if the water be used for drinking purposes; for physiologists have shown that the metal manganese is a frequent constituent of the human frame, and is invariably present in races who depend much upon oats for their food.

When used as a *test* for impurity in a water, a few drops of the pink liquid may be mixed with a tumbler of water, and the effect noticed. The relative impurity of two or more waters may be found by adding a certain quantity of permanganate to equal amounts of the water, and noticing which retains the deepest colour of the permanganate; this one will be the freest from organic impurities. Waters which rapidly decompose the permanganate are not fitted for drinking purposes.

## The International Exhibition.

### REVISION OF AWARDS.

The revised list of the Awards of Jurors is not, we regret to state, a correct list. To what extent the errors exist we do not know; nor to whom such errors are due; but it appears probable that some one still remains responsible for an amount of blundering truly startling. We have not taken the trouble to search for errors, but a sufficient number come unsought to indicate the large crop which might be reaped by one seeking them. In the case of Mr. Savage, to whom we referred before, the award is given, but the name is omitted. Mr. Tucker, of Trinidad, whose letter we give below, receives his award, but for an incorrectly described contribution. Mr. Cruger, of the same Island, sends a fine collection of drugs, and receives an award for "141 good specimens of timber." Mr. Devinish sends timber, and is rewarded for "drugs" These errors all stand in the "revised list." These gentlemen all reside far away; the only advantage is the honour; but what honour would be for Mr. Mudd to receive a medal for an improvement in boot-jacks, when he had contributed photographic landscapes? Or for Mr. Williams to be rewarded for an automatic toasting-fork, when he had contributed portraits? Some of the revisions made are scarcely more satisfactory. Here is a flagrant case: Mr. Crookes, whose name is well known to photographers as a chemist and physicist of very great ability, recently discovered, by the aid of the spectroscope, a new element—thallium. His claim to the discovery was never doubted. He sends a specimen of the element, of some of its compounds, a drawing of its spectrum, full description, &c. These were in the Exhibition at the proper time, and duly shown and catalogued. This contribution was entirely ignored, unnoticed, unmentioned, whilst a French contributor, who sent a specimen two months after the building was opened, and did not even claim the discovery. received a medal "for the discovery of new and abundant sources of thallium." The discoverer of the element's very existence was unnoticed; whilst he who discovered that more of it was to be found was medalled! How the remedy was applied, when the authorities were compelled to recognise the blunder, we prefer to let the *Daily Telegraph* state, which has some excellent remarks on the subject:—

"Dr. Lyon Playfair, in a preface to the second edition of his book of jurors' awards, is very careful to inform the public, that although several additions have been made to the original list of *décorés*, no single instance occurs of any new award having been made. The explanation is, that in copying from the papers sent in by the juries, there was no time to refer to the minute-books for the verification of details. We question the validity of the grounds on which the Special Commissioner for Juries gives utterance to this singular boast, on behalf of those bodies, that they have determined not to award medals to exhibitors whom they have confessedly overlooked in haste. At any rate, some of the newly published awards, in the second edition, come very suspiciously after strong representations of injustice. One example may be cited. Mr. William Crookes, the discoverer of the new element, thallium, and the exhibitor of several of its compounds, was passed over by the jurors of Class 2; while M. Lamy, a Frenchman, who brought a specimen of thallium into the building about two months after it had opened, received the honour of a medal. Mr. Crookes had sent in his case, containing not only the compounds we have glanced at, but the element itself, a drawing of its spectrum, some minerals containing it, and full written descriptions of its chemical properties, before the opening of the Exhibition. However, as we have said, he was ignored in favour of his foreign rival—who, by the bye, never pretended to have been the discoverer of thallium. On the contrary, in a paper read by M. Lamy before the Académie des Sciences, the honour is freely given to Mr. Crookes. Under these circumstances, our countryman appealed to the Commissioners of the International Exhibition, laying his case very strongly before them. He gets his medal for the 'discovery,' as appears by the second edition of the Book of Awards; and at the same M. Lamy retains *his* medal for the 'discovery' also. We confess our inability to understand this. One or other 'discoverer' must have been first, and both cannot well be entitled to a medal. But what more especially strikes us in the aspect of this case, is the difficulty of conceiving that the omission of the Englishman's name should have been the result of mere accident. Does the 'minute-book' of Class 2, section A, really and truly show that the jury gave two medals for the 'discovery' of one object? Plainly speaking, we don't believe it. There is too glaring an evidence of the fact that, having been forced into an act of justice to Mr. Crookes, the jury shrank from the disagreeable task of officially withdrawing their countenance from M. Lamy, and so took the egregious course of complimenting each gentleman on being the original discoverer of a new field in science."

The following is the letter from Mr. Tucker to which we have referred;—

"Sir,—In No. 202 of the News, and among the list of Jury Awards, honourable mention is made of my name, for views of British Guiana. Allow me to correct one of the numerous errors made by the Jurors or Commissioners. My views are views of the *Island of Trinidad*. Again, Mr. Devinish, of this Island, to whose energy we owe the fine collection of woods, obtained honourable mention for *drugs*, and Mr. Cruger, the botanist, who made the valuable assortment of drugs, fibres, &c., has had awarded to him a medal for the *woods*.—I remain, dear sir, yours faithfully, William Tucker.

"*Trinidad, British West India, August 22nd*, 1862."

Our notices of apparatus are compelled to stand over from pressure on our space.

### HARMONY AND SUBORDINATION IN PORTRAITURE.

Sir,—Being an artist of long experience in portraiture, and having lately taken to photography, I cannot help thinking that some of the impressions made upon my mind in the juncture of my experience in these two things may be useful, and, if read with care and thought, may, as a nucleus of suggestion, become profitable to the numberless students in the latter art.

I have been led to this thought by your excellent remarks upon backgrounds, which, from time to time, appear in your journal; and feeling that you take the high and artistic view of photography, I would, while I supported your admirable opinions, show that you are driven to the conclusion you most rightly arrive at, by the use and abuse amongst photographers, of material which could and ought to be of better quality, as well as better applied.

Now, I would first endeavour to make it known, that both in photography and the works of the pre-Raphaelite in painting, such is the power of nature when very perfectly represented, as it is in the productions of both when well executed, that in the degree in which Nature is so truly and fully imitated, there is less necessity for that very legal and binding arrangement of parts, which, in weaker productions, would be a positive necessity; nevertheless, wherever you meet with a work, by either of the above-mentioned powerful presentations of nature, in which, to the strength of individuality, is united a very exquisite distribution and balance of parts, adjusted and composed in accordance with all the rules of art, that work you will very soon see carried all over the world, and to be found in every show case, and every album and collection, especially if its subject have any universality of interest; thus showing that the laws of art belong to truth, and meet with sympathy if put into practice in pictorial art, as much as they do in music, or in poetry.

Law always belongs to a polity, or rather to anything composed of numbers that has to be brought into a whole—a unity. Pictorial and representative art, therefore, must have its own series of laws. Every work must be a whole composed of parts; those parts must graduate from largest to least, and (for it is all a principle of a polity) from strongest to weakest, and from high to low.

Upon this gradation depends all the harmony. Gradation is the truest illustration of harmony. In art equality never can be harmonious, nor can it in any whole pretending to a unity; while upon contrast and variety it hangs for interest and for vigour, these must always be in true subordination. But I do not wish to be too æsthetic. I will come at once to the matter on hand.

There is in art always a principal object which should immediately arrest the attention of the spectator; it should rivet him at first, absorb him at once, however varied and multiplied the parts may be, or howsoever brilliant. There are many ways of producing this, but it must be done—infallibly done—and maintained. This is signally omitted in many of the clusterings of natural objects together, which we see produced, for stereoscopic purposes, often, nay, nearly always, interesting, but sadly lacking in this excellence.

In a portrait, it is needless to say this climax must be the head; in a group, the leading figure. In a portrait the head, not the chair. In the artist's whole length, which is the photographer's *carte de visite*, it ought not to be the pedestal or the column, these accessories should be introduced so as to lead up to the climax of the composition, and carry, even if they be large objects, the spectator's eye forward to the principal thing.

The *carte de visite*, even in some of the best show cases in London, is a pedestal with a man near it; it might be catalogued as the portrait of a pedestal, and a column, and a lord. It surely requires more judgment to use these appliances well in photography than it does in painting, for a painter can play and sketch about his canvass with lines and forms; a painter, too, has more facility of throwing imaginary shadows to bring his quantities into true gradation, for the gradation of quantities is a very delightful and very subtle idea; he may, perhaps, throw a large shadow over part of a balustrade, and thus has quite as much of it, but what he has is under subjection.*

The backgrounds of the great masters in art, such as Sir Joshua Reynolds, had their columns, their pedestals, their buildings in great abundance, often, but they subserved.

The splendid whole-length painters, Titian and Velasquez, not forgetting Rubens and Vandyke, all used these additions, but they bound them down under limits of larger and less, many and few, under variety of colours and of tone, tending always to foil something on the one hand, to enhance something on the other, and never to weaken the principal figure; and—let all colourists awaken to this fact—that they put their brilliant colours upon that principal figure, and broke those colours down again, not only by gradations both of similar colours and tones, but into tints of them, down even to an elegant degree of the infinitessimal, which yielded that look of excessive finish—which word, *finish*, is only another word for the most tender gradation; for what the artist calls *finish*, and the nicest possible perception of gradation, are really synonymous.

A painter begins with his principal figure, or head, and ends with it—it is his first and his last; if surrounding parts have derogated and detracted by their persistence and strength, he coruscates either with hair or velvet cap, or anything else he can. Rembrandt did so with both light and dark, hot and cold colour. While the strength of accompaniments being kept at a distance from the head, keeps up this key-stone idea, and the work delights, nay ravishes, the eye of the beholder, and there is a certain satisfaction that if this principle be moderately well carried out, it never can torture or tire the eye. And to further illustrate, this torture is excessive on looking at some of the modern whole-lengths, called *carte de visite*, and is not only brought about by the existence of many strong parts, but also by the fact that those parts are lineal and narrow, the cornices are petite, and the balustrades sometimes dwarf-like in character, as if they ought not to be used until they had grown bigger; if painted, liney in execution, and in most cases not copied from good architectural examples. It should be known and remembered, that the Greek architects exquisitely felt, and deeply studied, the exact relative size of all the parts—their projection and their breadth. I appeal to any one, whether there is anything more common looking, more vulgar than bad architecture; the architecture from the pencil of a carpenter or a small builder?

These portions of background are mostly done by men of little higher artistic calibre: roses are put in the centres of the pannels of pedestals, where the Greeks would have put a beautiful basso relievo. Fluted columns, too, put with no feeling for breadth, though they are so beautiful, if well adapted. All narrow, all consequently weak draperies—their poor folds insipid and limpid, while yet they are tortuous, corrugated, harassing and hard. The columns, &c., it may be confessed, are of artificial manufacture, or painted; they should at least be done from fact, and let an artist do them if possible, and not a mere line and rule man. There is a way of giving them a full, soft edge—a look of thickness; and this in spite of the necessity that they should be very true, and very square, and straight, even to an extent of correctness and care most elaborate.

There may be plenty of forms in them, for it is not a multiplicity of forms that is wrong, they might have many more; multiplicity of parts always gives fulness, and, if in the right place, yields a look of plentifulness; but, of course, there must be a corresponding quantity of broad and flat portions, and divisions.

I would further suggest to the photographer, if he lives in London and determines to improve his taste in these respects, to study the building of St. Paul's, as being so wonderful, not only in its beautiful outline, but in the perfection of its parts and details; this, as well as all the buildings by Sir Christopher Wren. He can see any engraving he may desire at the print-room of the British Museum, and if he goes there and asks the amiable keeper for the works of Piranesi, he will get such an admirable illustration of round edges, that it will quite dispel his notions of cutting edges—so cutting that against them you could almost cut your hand.

I propose to leave these remarks with you for the present, willing to do more if needful, and to be more elaborate if required, or to take up other portions of artistic decorations, as they come into the hands of the photographer; and if, sir, you care as much for the theory of art, as you manifestly do in your excellent paper for the formulas of science, I am, sir, yours very respectfully, F. T.

* The amount of licence assumed, and in some instances justified, by painters in the distribution of shadows, whether they exist in nature, or solely for the purposes of balance and pictorial effect, will probably astonish most photographers when first brought under their attention. Mr. Frank Howard, in his preface to his "Sketcher's Manual," says, "He must insist, in the present state of opinions on art, and practice of professors, that the picture must be made, honestly if you can, but make a picture. And so long as those pictures by Sir Joshua Reynolds, and others, continue to receive admiration, in which the figures are supposed to be lighted in front, by moons introduced into the background, amateurs are fairly entitled, and will, probably, be contented to avail themselves of the license." He further says, in the body of the work: "The production of common pictorial effect will be shown to be very easy, if the amateur will condescend to make use of the expedients employed by the most celebrated artists, namely, to introduce shadows of all kinds and degrees that may suit his purpose, whether possible to be found in nature under such circumstances or not!" We wonder what would be said to the artistic painter, or composition photographer, who should attempt to gain pictorial effect by similar licence.—Ed.

## PRINTING WITH THE SALTS OF URANIUM.

Printing and toning with the salts of uranium are in their infancy. Notwithstanding this, it is certainly an attested fact, that vigorous prints can be obtained by these salts; and that the ordinary toning with chloride of gold is modified, perhaps improved, by the introduction of the same salts; and yet photographers do not like any innovations, and frequently, on this account, allow very powerful reagents, and their successful applications, to pass by unnoticed. The following methods of printing with nitrate of uranium have already appeared at different times in the photographic journals; it will do no harm, however, to present them altogether. We translate them from the "Photographischer Almanach" for 1862, a very interesting practical little work, a valuable *vade mecum* for the amateur and photographer, published by the Institute at Elberfeld; unfortunately its value is limited to those who either speak or understand the language of the Teutons. We intend to cull from its contents, and from the contents of all available sources in any language, the sweets of photographic lore, for the benefit of our readers; nor do we deem it illegitimate to take the step, since we are willing and desirous that we should be served in the same way; nay more, we will labour hard to discover and collect together whatever may be useful in the art of photography, or instructive in its science, in order that our fraternal journalists may not task us with meanness, but may meet with an adequate indemnification for our stealth from their columns. Our readers can assist us materially, by their experience, to make the collection just referred to; and we hope to find several of our friends awakening up from their lethargic inactivity, and, if they do not feel inclined, have not the time, or the chemical knowledge to enter into a course of independent photographic experiments, let them, at least, try to test the experiments of others and report results.

### Printing Process with Nitrate of Uranium.

*By H. de la Blanchere.*

*First Method.*

Take 10 drachms of distilled water;
,, 2 drachms of the nitrate of the oxide of uranium.

Filter the solution and preserve it in the dark. The paper must be floated for five minutes in this bath. When dry, it is exposed under a negative in the printing frame, for a time varying from one to ten minutes in the direct rays of the sun, and from fifteen to sixty minutes in the shade.

The picture is developed by immersion in the following solution:

10 grains of nitrate of silver, crystallized and slightly acid.
10 drachms of distilled water.

The picture appears in about thirty seconds, and becomes more vigorous; as soon as it is sufficiently developed, it must be washed in several waters, and then fixed. It may afterwards be toned with gold in the usual way.

*Second Method.*

The sensitizing bath is the same as the preceding. As soon as the paper has been exposed to the light, it is immersed in the following bath.

10 drachms of distilled water;
1 drachms of alcohol, specific gravity, ·849;
5 grains of nitrate of silver;
1⅔ ,, of nitrate of cadmium;
1⅔ ,, of nitrate of uranium;
¼ a drop* of nitric acid.

The bath must be very slightly acid.

*Third Method.*

The sensitizing bath as before.

*Developer.*

1000 grains of distilled water,
1 grain of chloride of gold;
¼ of a drop* of hydrochloric acid.

The picture must lie in the bath as long again as in that containing nitrate of silver; the tones become blue or blue-black, and the middle tones are easily attacked by the bath.

*Fourth Method.*

Developing with a salt of mercury;
2000 grains of distilled water;
1 grain bichloride of mercury (corrosive sublimate).

The image will be perfectly developed in two or three minutes in this bath. The tone by this developer is the most beautiful and vigorous. As soon as the prints are thoroughly developed, they are washed in water for fifteen or twenty minutes, and then dried.

### Printing Process of Houdoy.

The paper is floated in a lukewarm solution of five parts of gelatine in one hundred parts of water, and after this for ten minutes in a bath of nitrate of uranium—20 per cent. strong. It is then dried in the dark. It is afterwards exposed beneath the negative for one to ten minutes to the direct rays of the sun. The print is developed by immersion in the silver bath, and, as soon as the image has appeared with sufficient vigour, it is placed in the following solution:—

1000 grains of water;
80 ,, sulphate of the protoxide of iron;
20 ,, acetic acid.

The picture quickly assumes great vigour of a sepia tone; it is then instantly well washed in water and toned in a bath of chloride of gold one grain, and water 100 grains. By this means the picture is retained quite on the surface of the paper.—*Humphrey's Journal.*

* One fourth of a drop of nitric acid is obtained as follows:—Drop into a test-tub three drops of water and one drop of nitric acid. One drop of this solution will be equivalent to one fourth of a drop of nitric acid.

## A SHORT LESSON IN CHEMISTRY.—No. 3.*

Before I proceed any further in reference to chemical nomenclature, I deem it necessary here to describe what is ment by acids, alkalies, and bases. As the word implies, an acid is sour; to taste chemicals, however, is a very inconvenient method of testing them, and one that is seldom to be recommended; hence we have recourse to other distinguishing characteristics. In short, the distinct properties of an acid are as follows; in the first place it has a sour taste; secondly, it turns blue litmus† paper red; thirdly, it combines with bases so as to form new compounds in which neither acid nor base can be recognized, unless they are again separated. An alkali is a substance whose taste resembles that of *urine* (of course you will certainly verify this test); secondly, it restores red litmus paper back to its original blue; thirdly, it turns yellow turmeric‡ paper brown, or red-cabbage§ paper green; and finally, it combines with acids so as to neutralize them or remove their acidity. All alkalies are bases; but not all bases are alkalies.

Bases are substances, either simple or compound, that neutralize acids and form with them a class of bodies totally different both from the acids and bases; the bodies thus resulting from the chemical combination of acids and bases

* From *Humphrey's Journal.*

† Litmus is a dye-stuff, prepared from a lichen called *Roccella tinctoria.* It is sold in the form of cakes or squares of a violet colour. To prepare the ble paper, take one part litmus and four of water, mix or dissolve, and brush the solution over unsized white paper. Dry the solutions and keep them in close vessels in the dark. Red litmus is prepared from the blue by immersing the sheets in dilute sulphuric acid or vinegar, and then drying, &c., as with the blue.

‡ Turmeric is a root (*Curcuma longa*) which yields a dye-stuff to alcohol as tincture, or by decoction to water. For these purposes take one part of the pulverized or rasped turmeric to five parts of ordinary alcohol in one case, and one of turmeric to ten of water in the second. The unsized sheets of white paper are immersed in either of these fluids and afterwards dried.

§ Cabbage paper is prepared by steeping white unsized paper in the infusion of red cabbage, and afterwards drying.

are denominated salts—a most important class of chemical substances.

*Acids.*—It was supposed, at an early period in the development of chemical science, that oxygen was the acidifying principle; but we know now that we might as justly say that oxygen, too, communicates the alkaline property: for the metals potassium, sodium, lithium, calcium, etc., are not all alkaline: but, when combined with oxygen, they are the veritable alkalies or alkaline earths. Still, most of the acids contain oxygen as one of their elements, and we have frequently several acids of the same element, modified especially by a change in the quantity of the oxygen. Let us take, for instance, sulphur and oxygen; of these two elements we have have at least seven compounds as follows; hyposulphurous acid, sulphurous acid, sulphuric acid, hyposulphuric, monosul-hyposulphuric, bisul-hyposulphuric, and trisul-hyposulphuric acid. In the same way we have three oxygen acids with phosphorus, two with nitrogen, at least four with chlorine, aud two with arsenic, etc. On the other hand, as I observed in the preceding lesson, we have a well defined class of acids called the hydracids, in which oxygen is one of the elements, whilst one of the metalloids is the other, as for instance: hydrosulphuric, hydriodic acid, etc. But both this class and the preceding are seldom, if ever, found uncombined with water, which becomes, as it were, a constituent part of each acid and inseparable from it until decomposition takes place.

*Bases.*—This term when applied to inorganic chemistry simply signifies either an oxide of any of the metals, or the metal itself, just as we combine either with an oxygen acid, or a hydracid. It is, in fact, the substitute of the oxide of hydrogen, or of hydrogen in acids; for instance, hydrated nitric acid (nitrate of the oxide of hydrogen) consists of one equivalent of nitrogen, five of oxygen, and one of water (oxide of hydrogen). Now the oxide of hydrogen is the base of nitric acid, and can be set aside, and any other oxide can be substituted instead, whereby a new chemical body is formed, called a salt. In like manner hydrochloric (chloride of hydrogen) may have the hydrogen removed by a metal alone, whereby hydrogen is set at liberty from its combination and escapes as a gas, whilst a new combiuation of chlorine and a metal gives also rise to a salt. An oxide of a metal might have been used instead of the metal, in which case a double decomposition would have ensued; the hydrogen in this case allies itself with oxygen to form water; whilst the chlorine combines with the metal to form the chloride. Now the mode of naming these salts is simple and rational; we do not lose sight of the elements in the name; the base is always retained entire, and the metalloid in connection with the oxide of hydrogen, or simply with hydrogen, is also retained. For example, carbonic acid (carbonate of the oxide of hydrogen) and oxide of iron give rise to a salt called carbonate of the oxide of iron; and and hydriodic acid (iodide of hydrogen) and magnesium combine to form a salt denominated iodide of magnesium; sulphuric acid (sulphate of the oxide of hydrogen) and lime produce chlorite of lime. Thus, then, we see that salts arising from acids ending in *ic* produce salts in which the *ic* is changed into *ate;* whilst the *ous* in acids is changed into *ite*, the prefixes being used with salts in a manner analogous with either acids or bases.

## HUMIDUS DRIED UP.

BY COLEMAN SELLERS.

In my last communication I told about the great duel fought on the Harlem River, and in as impartial a manner as possible stated how Humidus (that's me) got worsted, and intimated too that a goodly row of tannin plates were in my box awaiting exposure, as soon as a certain changing box, at that time being made by Mr. Pearce, should be ready for use. Those plates were exposed, and lots more made and exposed since then, and now letters of congratulation come in from all quarters, speaking kind words and hailing my conversion with joy, until I have really begun to imagine that I have been a great sinner, through all previous time. Now I want it clearly understood that it was not the picture of this or that of our dry amateurs that influenced me in my change from wet to dry; it was Thompson's changing box; I saw it, and liked it so very well, that as soon as I reached home, I had one made. It holds twelve plates, and cost, all told, five dollars and fifty cents; I note this for the benefit of those interested. It is no easy matter to describe a mechanical device without an engraver, hence my description of it may not prove satisfactory to those who wish to furnish themselves with similar outfits. In the first place there are prepared thirteen very light wooden frames, of a size suited to the plates to be used; mine show a section of wood one-quarter inch square, and being made for ordinary stereoscope plates, measure outside three and eleven-sixteenth inches by seven three-sixteenth inches, and one-quarter inch thick; twelve of these plate frames will make a pile three inches high. The rabbets in these frames for the reception of the plates are five thirty-seconds of an inch deep. The plates are held in by a light steel spring three aud three-eighths iuches long, stuck into a notch on one side of the frame, and swung into a groove on the opposite side, crossing the centre of the plate. One of the frames has a focussing ground glass permanently fastened into it. A holder is made with two sliding shutters, one, as usual, for exposure, and the other to admit one of these frames and to slide so close to it when in as to allow no room for shaking; in this holder the entire ground-glass frame is always carried, and the focussing is accomplished by drawing open both shutters front and back; after focussing, the glass and frame are taken out and put in the pocket. The plate box consists of a holder with the same double shutter sliding on opposite sides, but with space between the shutter for twelve frames, *i. e.*, three inches. This box or holder is provided with two knife edged springs passing through the sides, or rather ends, in such a manner that when the box is held horizontally, one shutter on top and the other forming a bottom, the edges will separate the bottom one of the frames from the remainimg eleven frames, which will all rest on the springs or knife edges. It is evident now that if the bottom slide be pulled out, the bottom frame will fall out; and if the box was sitting in the exposing holder and the openings coinciding, it would fall into the holder, and could be secured by shutting the slides. If now, the slides being all shut, the spring latches are drawn back, the pile of frames will fall into the space made for them by the removal of the one frame, and space will be left on top of the pile for the exposed plate to be dropped from the exposure holder into the plate box by drawing back two slides. The frames are thus made to descend in succession, and are exposed in the same order; the whole affair is cheap, and very convenient, and, as I have said before, was the means of my *conversion.* It may not be so good as the box made by Mr. Stock, for the same purpose, but it has never missed fire in my hands, aud is very light and portable. The frames so nearly fill the box that the air makes a cushion, and they fall into place without the slightest sound.

Having thus described the box, which Mr. Thompson tells me he bought from some Englishman, I would add that as yet I have only used tannin plates in it; these plates I have prepared by using a very old collodion and an acid bath; I albumenize the edges of the plates with a margin of one-eighth of an inch. From the silver bath I pass them through two water baths, then into a tray, through which the water from the hydrant is constantly running. I next immerse them in the tannin bath, and stand them to drain on a small graduate measure, before draining on blotting paper. Finally I stand the drained plate in a box, which is lined with clean white muslin, and covered with blotting paper on the bottom. This routine gives six different operations to be gone through with, and regulates the time of washing.

If a drained plate be put into the drying bath, the rough drained one put down to drain in its place, a plate be removed from the tannin and placed on the graduate to rough drain, a plate then taken from the washing tray, held a moment to drain before plunging into the tannin, then each of the other plates changed from their respective baths in their course towards the tannin, the plate in the silver bath will be ready for removal, and another can be flowed and silvered. This system, in my hands, gives me eighteen good plates in one hour. I do not dry by artificial heat at all, and I develop the plates by the formula given by Mr. C. W. Hull, in the Circular published by Mr. Stock, and which appeared last year in this journal. The tannin process has exceeded my expectations, and I have had every reason to be satisfied with it. I have, however, confined myself to long exposures in preference to any of the short times, and subsequent accelerating formulæ; but still, for what I have seen of the other dry processes, I am inclined to think that Mr. H. T. Anthony's solid milk plates are better; these are prepared as follows—No, I won't go into the milk business now, it is too hot, and my letter has reached too great a length; I hope it will interest some of your readers.—*American Journal of Photography.*

## THE COST OF SILVERING PAPER AND TONING PRINTS.

BY CHARLES WAGER HULL.*

Among the many valuable suggestions thrown out each month in the various journals devoted to photography, I do not remember ever having met with one practically setting forth the cost of silvering paper of various sizes; nor in conversation with many amateur as well as professional photographers, have I ever met with one who had taken the trouble to find out, but most would like to know. It must, however, be understood that my experiments alhough conducted in a laboratory (not a laboratory for photography, but for the chemical department of my business), were not by any means reduced to that nice system of exactness involving the weighing and determination of the one hundredth part of a grain.

The experiments several times repeated prove that for all purposes the method is near enough. Knowing the strength of the silver bath by the hydrometer, and also the superficial measure of the paper floated, it was no difficult task to determine the amount of silver each piece required.

The paper in each experiment was salted sixteen grains to the ounce, and floated about one minute and a half on a seventy-five grain bath. The silver was calculated at fifteen dollars (£4. 2s. 6d.) per pound.

Each Card, less than three-tenths of one cent. (A cent is one halfpenny.)

Each Stereoscopic, less than three-fifths of one cent.

Each 6½ by 8½, less than one and a half cents.

Each 8 by 10, two cents.

Each 11 by 14 a trifle over four cents.

Now, if we choose to extend the calculation into the toning, and take gold as worth five cents per grain, and allow one grain to each sheet of albumen paper, the cost of prints to the amateur can soon be reached.

In the experiments alluded to, no account is made of the drippings from each sheet or piece when hung up to dry, all of which is carefully secured, and which, so far as this calculation is concerned, is all clear gain. One little trick in silvering paper which but few know, or, if they do, do not practise, is at least worth an incidental mention; and that is, when you lift the paper off the silver, do so very evenly and very slowly, and you will find that the surface silver will nearly all follow down, and but few, and very few drops will be afterward left to drain from the corner. Let such as have never taken this care, try it, and be satisfied that the saving is worth at least all the knowledge cost.

In your last number, I find our friend Sellers has a few words to say in his usual charming style; but am indeed sorry to learn that the only inducement he had to go into the "dry" was Thompson's nice box. Most of his friends have thought him converted at last, yet it appears not, but he will be ere long; time works wonders—more wonderful than his conversion to the "dry" will be. Let him keep on working that box and he will be all right yet. In his communication he states that he works the formula given by me on Stock's Circular; in the pyrogallic solution he uses one ounce of the alcoholic pyro to the ounce of water; if I so wrote for the Circular, it was wrong, it should be one-half ounce to the one ounce of water.

*New York, August* 22, 1862.

* From the *American Journal of Photography.*

## ON THE CONVERGENCY OF THE OPTIC AXES IN BINOCULAR VISION.

BY PROFESSOR CHARLES F. HIMES, OF TROY UNIVERSITY.*

In his monograph on the stereoscope, Sir David Brewster, while treating of the union of binocular pictures by the unaided eyes, when placed as they usually are—the right-eye picture on the right side, and the left-eye picture on the left side—states: "The distance in this case must be greatly less than the distance of the eyes, in order that the optic axes, in passing through similar points of the two plane pictures may meet at a moderate distance beyond them." p. 83. "We cannot thus unite figures the distance of whose centre is equal or exceeds two and a half inches." p. 97. "It is impossible to obtain, by the ocular stereoscope pictures in relief from the beautiful binocular slides which are made in every part of the world for the lenticular stereoscope." p. 123. Professor Wm. B. Rogers, in his able and exhaustive papers on Binocular Vision,† substantially endorses these statements, while disproving Sir David's theory of binocular vision founded on the successive convergency of the optic axes to the different points of an object. This assumption of a positive point of convergence of the axes, either before or behind the slide, in every case of the union of supplementary pictures, is counter to my own experience, and observations in cases of others. The limit of separation of similar points, and consequently of the size of the pictures from right to left, depends upon the constitution of the eye, which prescribes a limit to the movement of the axes, or, in other words, to the number of degrees through which the eye can be rolled. It is plain, however, that within these natural limits, unvarying habit established others within which movement is easy, and in most cases involuntary, beyond which requiring effort, and even painful. There does not, however, appear to be an instinctive tendency to converge the optic axis in looking at objects. Many persons must have noticed, that new-born infants appear cross-eyed, but that there is not a decided in-squint or out-squint, but a peculiar working of the eyes, an apparent want of concert in their movements, which appearance vanishes after a short time, to the great delight of all interested. From this early period there is an unvarying practice of convergency of the optic axes, and the limits within which it is done are, practically, parallelism on the one hand, and the angle formed by the axes when we look at objects placed at the distance of distinct vision, on the other hand. It might be presumed that within these limits there would be others, peculiar to the occupation of the individual, but the habit, within the above range, is so thoroughly formed early in life, and the power so frequently exercised at all periods, that probably no decided effect would be noticed.

The opinion expressed in the remarks quoted, must be founded either upon the hypothesis, that it is impossible to render the optic axes parallel or divergent, or that when the axes are in either of these positions, and the supplementary pictures are presented, so that the axes pass through similar points, no union, attended with the usual

* From the *American Journal of Photography.*

† *American Journal of Science,* Vols. XX. and XXI., New Series.

effect, can take place. The first supposition only proposes a difficulty similar in kind to that of closing one eye whilst the other remains open; an operation contrary to our uniform habit of working the eyes in concert. The second supposition is met by facts to the contrary. Pictures more than three inches apart can be united, and the difficulty in so doing does not lie entirely in the unusual position of the axes. Every one who has made the trial of uniting pictures by converging the axes to a nearer, or more remote point, will recollect the unusual exercise of the visual organs it required; and in either of those cases there is plainly nothing unusual in the position of the axes, the difficulty being, as Prof. Rogers has shown, in the necessity of violating the habit of converging the axes and accommodating the eyes to the same point. Sir David notices, that it is easier to get stereoscopic effect by transposing the pictures, and uniting them by converging to a near point; and the only explanatory statements made by him lead us to infer, that he considered the difficulty to be in the convergency. "This tendency," he remarks in one place, "to a distant convergency is so rare that I have met with it only in one person," and as the ordinary binocular slides could not be used on account of their size by the method of distant convergency, there was no advantage gained by its use, over the other ocular method. The difference between the two arises no doubt, from the fact, that the points of accommodation and convergence more nearly agree in one case than in the other, for when the similar points are nearly the distance between the eyes apart, the axes will be nearly parallel in passing through them to a more distant point; but when the pictures are transposed, the point of convergence will be between them and the eyes, the accommodation of the eyes will be about the same in both cases. When the pictures are separated by a distance equal to, or greater than that between the eyes, it will require effort, as in the preceeding cases to prevent the axes from converging, and for similar reasons. Those, who have overcome this difficulty by continued exertion, will perhaps remember that, even after they had succeeded in producing three pictures, or rather in reducing the four, by causing the two interior ones to coalesce, there was an indistinctness, a hazy, atmospheric appearance, although the relief was evident; that sometimes there was an instantaneous clearing up, and at other times this took place gradually, just as the habit was overcome suddenly or gradually, and the eyes were permitted to accommodate themselves to the pictures, whilst the axes remained in the same position. If, for the photographic pictures of the previous experiments, you substitute two circles of about half an inch in diameter, they will be more readily caused to overlap, by converging the axes either to a nearer or more distant point, probably because there is so little about them to invite that involuntary scrutiny by the eyes, which causes the axes to converge to the point observed. In uniting pictures by convergence to a point beyond them, it is of assistance frequently to look at a distant object, and introduce gradually the slide before the eyes; but when the distance between the points to be united equals, or exceeds, that between the eyes, we cannot be assisted in that way. In some such cases, when persons have succeeded in obtaining the relief, it has been by staring at the pictures, as if gazing into vacancy, as is done sometimes in resting mind and body, or when the mind is abstracted in thought, and persons and things are stared at, but not noticed, the visual organs being inactive, whence it also seems that the normal state of the axes is that of parallelism. In this case, as in the preceding, the complete effect generally follows a hazy appearance.

Having obtained the control over the eyes necessary in the previous experiments, it will be easy to acquire the power of uniting pictures farther apart, or of rendering the axes divergent, or rather convergent to a negative point. The best method is to take an ordinary stereograph, and cut apart the right and left pictures, put them in their proper position, and unite, and separate them by a gradual motion, the axis will remain fixed upon the similar points, and follow them, although you will be unconscious of any change, and the point of accommodation of the eyes will remain the same. If difficulty is experienced in uniting them in their proper positions, they may be allowed to overlap a little at first. When a separation of three inches is passed, in the above experiment, a change will be felt, and probably during the first trial all will become confused at three and a half inches, but up to that point the stereoscopic effect will be complete. By practice I have acquired the power of uniting the ordinary binocular slides as readily without as with an instrument, and by the method just given have experimented on the limit of separation of the pictures for my eyes, and afterwards by means of larger photographic pictures produced for the purpose. I found at first, that it required effort to overcome three inches, but by prolonged practice atdifferent times, I increased the distance to four inches. Exercise of this kind is, however, uselessly severe; further experiments in that direction were therefore abandoned, and the limit now appears to be three and a half inches. After an hour's exertion, as above, great difficulty was experienced in reading; it required conscious effort to prevent the letters from becoming double; the habit of converging the optic axes to the point of accommodation had been so broken that it became necessary to retain them in position by a decided effort. In reading old books, the old-fashioned s'es were peculiarly annoying, as they invaribly doubled, and when anything unusual or difficult was met with, as, for example, the rendering of a word in translating, the eyes immediately attempted to assist in overcoming it, by turning the axes, in all directions, causing the letters and words to march and countermarch from right and left.

No such effect results from a moderate amount of exercise in using the ordinary stereographs. The weariness of the eyes in all the preceding cases is not wholly due to the unusual character of the muscular exertion, but in part to the fact that the eyes notice many details when the supplementary pictures are combined, that otherwise would be neglected, perhaps even in looking at the scene itself. To take an extreme case: a line may appear to be a blemish, in a single picture it *may appear to have* no perspective position; by binocular examination of the slide, it turns out perhaps to be a twig, which extends far into the foreground, all other parts of the tree having been cut out; there are dots, which turn out to be leaves, and so forth; the eyes instinctively, as it were, run over, and study these, exceedingly multitudinous and minute than Pre-Raphaelite, details of the photographic representations, they work rapidly and severely, and soon become fatigued.

Since convergence of the optic axes to a positive point does not appear to be essential to the perception of relief by means of pictorial representations, it is not simply accessory to the perception of the relief of the objects themselves? Is not the effect in all cases due to the simultaneous presentation of two supplementary pictures to the retina, without regard to the angle formed by the optic axes? The successive convergency theory must at least be modified so as to consider perception of distance dependent merely upon the movement of the optic axes, not necessarily from one positive point of convergence to another. Whether this movement is simply a criterion by means of which we unconsciously form an estimate of distance by long experience, or whether there is an absolute and necessary connection between this motion and our ideas of distance, so that we *see* and do not *estimate* distance, is a matter of dispute, but there is something so plausible and analogical in Dr. Berkley's theory, which meets all cases of convergence, whether to a positive or negative point, that we insert the conclusion of his argument: "It remains that we enquire what ideas or sensations there be that attend vision, unto which we may suppose the ideas of distance are connected, and by which they are introduced into the mind. And first, it is certain, by experience, that when we look at a near object with both eyes, according as it approaches, or recedes from us, we alter the disposition of our eyes, by lessening or widening the interval between the pupils. This disposition or turn of the eyes is attended with a sensation, which seems to me, to be that which in this case brings the idea of greater, or lesser distance into the mind. Not that there is any natural or necessary connection between the sensation we perceive by the turn of the eyes, and greater or lesser distance. But because the mind has by constant experience, found the different sensations corresponding to the different dispositions of the eyes to be attended each by a different degree of distance in the object."*

These views of Dr. Berkley's, Sir David Brewster, however, considers totally erroneous, and contends that our perception of distance is not the result of experience.

## Correspondence.

### FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

*Paris, 17th September*, 1862.

M. Roussin has published some interesting observations upon the various salts of silver applicable to photography. He has lately given much attention to albumenized plates, and the best conditions for success in this branch of photography. In seeking to modify the proportion of iodide usually introduced into the albumen, he remarked, that within certain limits the time of exposure varied in the inverse ratio to the quantity of iodide added. The greater the quantity of iodide, the less time is required for the light to impress a plate sensitized, washed, and dried. He also remarked that, by considerably diminishing the proportion of iodide, and proportionally increasing the time of exposure, he obtained images as vigorous, and blacks as intense as with stronger doses of iodide. This observation naturally led him to enquire if the presence of iodide of silver was really indispensable to the formation of the photographic image, as hitherto supposed. It was very easy to solve this question. He took the whites of new-laid eggs, and beat them into a froth without adding any foreign substance, and next day covered several well cleaned plates with it. These plates, dried, immersed in a fresh bath of nitrate of silver, strength 8 per cent., and washed during four hours in several waters, then dried, were exposed in the camera and developed in the ordinary manner, with gallic acid and nitrate of silver. The time of exposure was double or triple that of an iodized albumen plate. The picture obtained was extremely vigorous, the blacks were unusually intense, and a perfect harmony in the landscape was preserved. The positive proofs obtained from these negatives were remarkably delicate, and entirely free from the pin-hole spots which so often invade the best albumen negatives.

This singular fact, of a perfect picture obtained under the ordinary conditions of photography without the aid of iodide of silver, naturally led M. Roussin to enquire if certain salts of silver, did not, like the albuminate, possess the property of being reduced by the action of gallic acid after exposure to light. Chemists must have long known that iodide of silver prepared in the dark and mixed with gallic or pyrogallic acid and nitrate of silver keeps for a very long time without undergoing any alteration, while this same iodide, exposed during a few seconds in the test-glass which contains it, to the action of solar light, is energetically reduced by these same substances.†

This ready method of testing the photogenic property of the insoluble salts of silver is general, and permits our readily premising those which may advantageously be mixed with albumen before sensitizing to replace the alcaline iodide. Every experiment consists—1st. In placing in complete obscurity, and putting into a perfectly clean glass, a neutral solution of nitrate of silver, then adding some drops of any organic or inorganic salt capable of determining a precipitate in the nitrate of silver: it is important for the nitrate of silver to be in slight excess to be assured that none of the precipitating salt remains in the supernatant liquid; 2nd. To expose this mixture to the sun for a few minutes, and shake it; 3. To take it back into the dark room, and then to pour into the glass either gallic or pyrogallic acid. It is well to solarize only one half of the mixture, but to add simultaneously to the two portions the same proportion of pyrogallic acid, to judge with certainty of the true alteration caused by light. M. Roussin made some experiments in this direction; the oxalate, tartrate, succinate, benzoate, carbonate, phosphate, and arsenite of silver, &c., are energetically reduced by a solarization of a few seconds, and may be employed like the iodide of silver itself, with less rapidity, doubtless, for obtaining photographic pictures. This new path may lead to advantageous results. Perhaps, among the considerable number of insoluble precipitates of silver, substances will be found more specially impressionable by some rays of the spectrum, and capable thereby of being modified under the influence of certain hostile hues, green and yellow, for example. Perhaps we may find among the very unstable combinations of silver a substance more sensitive than iodide of silver itself.

Whatever it be, it is well ascertained that the employment of the iodides is not indispensable for obtaining images, and that the albuminate of silver well washed and dried, is decomposed like the iodide of the same base under the influence of light, and yields remarkable negatives.

In a note presented to the Academy of Sciences, from M. H. Claudet, on the substitution of formic acid for acetic acid in the developing solution, the following advantages are claimed for the former:—

1st. The image appears as quickly as with the protosulphate of iron and with greater intensity.

2nd. If the exposure has been well timed, there is no necessity for intensifying the negative, as is generally done when protosulphate of iron is employed.

3rd. The exposure is one-sixth of the time required for the ordinary process with neutral bath, and the developer of pyrogallic acid and acetic acid.

We may readily conceive, that if a picture can be obtained instantaneously under the glass roof of the operating-room, and at a distance of twenty-five feet, a process of such great rapidity must be very useful for fixing the images of moving objects.

### THE GLASS ROOM—MODES OF LIGHTING.

Sir,—I have been for some time past contemplating the erection of a glass room, and although, as an amateur, I shall require it chiefly for taking copies of various works of art, I should like it to possess the form and arrangement by which I may also secure well-lighted and pleasing portraits of my friends.

On examining the various authorities for advice as to the best plan, I am a little bewildered by the general vagueness of the instructions given. In Mr. Lake Price's book I find some useful hints, but he is not very precise as to the amount and position of the glass required. In your own pages, of which I have been a constant reader, I find a very valuable article on the details of construction, from which I intend to profit; but the article does not enter into the question of lighting in its artistic bearings. I have, however, gathered, from time to time, many useful hints on this part of the subject, scattered through different numbers of the News. Some time ago I read a very clear article on the subject, by Mr. Sutton, which appeared to me, at the time, most in accordance with good sense of any which I had read; but from a subsequent remark in your pages, in answer to a correspondent, I gleaned that you did not quite agree with the plan

* An Essay towards a New Theory of Vision, by George Berkley, M.A., Dublin, 1792.

† It is essential that the iodide of silver be perfectly washed, or, at least, that it contains no trace of alkaline iodide before solarization. It is also preferable to leave in the supernatant liquid a slight excess of nitrate of silver.

proposed. Whilst recently discussing the matter with a friend, he placed in my hand a copy of your "Liverpool Contemporary," containing "A Chat about Glass Houses," by Mr. A. H. Wall, in which he gives a diagram, similar to that you gave some months ago, of the glass house of Mr. Fitch, without side light at all, of which he speaks very highly. He also strongly recommends the use of a front light upon the sitter, and quotes examples in confirmation of his opinion.

Now, sir, notwithstanding the vagueness of which I have complained amongst other writers, I have found them all agreed in two things, namely, the importance of avoiding a front light, and in the value of a proper amount of side light. Mr. Wall says he is the first to recommend a front light; but I am sorry he does not give his reasons for the recommendation. He says it serves "to secure roundness;" but that is just what all other writers have stated it does *not* do; flatness being regarded as its general result. Will you be so good, then, as oblige me with answers to the following questions:—

1. Is a northern aspect absolutely best, and why?

2. Is there sufficient advantage in the use of white glass over green to justify the extra cost?

3. Is a side light absolutely necessary, and why? Is top light absolutely necessary, and why?

4. Do you think, from the authorities Mr. Wall quotes, or his own opinion, that a front light is desirable?

5. Do you approve of Mr. Sutton's plan of a glass house, given in his *Notes*, September 15, 1861?

As I wish to get the best house I can with the least trouble and expense, I shall be glad to receive an early answer in your columns.—Your obliged reader, H. G. B.

*Kensington, September 2nd*, 1862.

[The vagueness, of which you complain, doubtless arises from the impossibility of laying down absolute rules for application in varying circumstances. It generally happens that glass houses have to be built to suit the exigencies of the position, not as the photographer would *choose*, but as he *can*, and individual judgment must generally be used to meet each case. We have not space here to enter into the subject at large, but will answer your questions categorically.

1. A northern aspect is, undoubtedly, best, and for many reasons. It is generally a pure, steady light, casting no direct, abrupt shadows, and, unlike the south or other quarter from which the sun directly shines on to the sitter, it is not subject to troublesome fluctuations from passing clouds, rendering perpetual variation in the time of exposure necessary.

2. A great deal of actinic light is, unquestionably, stopped out by green glass; but it unfortunately happens, that white glass is apt to turn yellow by exposure; it is doubtful, therefore, whether the advantage gained by its use is commensurate with its cost; especially, as in building a house, you can have more glass to compensate for the loss by colour.

3. A side light is most important to good results: a portrait taken with direct vertical light is generally far from pleasing. Wherever it is possible, the room should have glass in the sides; but where it is impossible, then the room should be large enough to make the light from the top virtually a side light. In the room of Mr. J. R. Williams, referred to, he is enabled from its large size, and by closing completely some of the many blinds at the top, over the head of the sitter, to allow the light to fall on the sitter much in the same way as if it were from a lofty side light. A top light is not absolutely necessary; but if it be absent, the side light should be very lofty to compensate. You require, in truth, facilities for allowing the light to fall upon the sitter at about an angle of 45°, more or less, as the character of the model may require, and it is immaterial whether the light enters at the roof or sides, if the proper angles be secured. For card portraits a greater proportion of direct side-light is required than for large heads.

4. All the light which falls on the sitter should be, in a certain sense, front light: that is, it should fall from various parts in front of the sitter. If, by front light, you mean a window in front of the sitter, we decidedly disapprove of it. All the top light, and much of the side light, may be front, and if there be a window in front, but 8 or 10 feet from the ground, that is permissible. But all light striking the sitter at an angle with the floor of, say, less than 25° or 30°, we should regard as injurious, giving a flat effect to the face, and most disastrous to the expression of the eyes. It is always desirable that the sitter look into darkness, if possible, not simply because it is easier and aids in producing a better expression, but because the pupil will be more dilated, and will, in the photograph, look darker and brighter. With light directly in front of the eye, on the other hand, the pupil contracts, and the eyes look small, light, and poor. The front light in the glass-houses of Mr. Window and Mr. Fry, is there from the necessity of the position, not as a matter of choice. In Mr. Window's it is of dark blue glass; and in both of them, it is not only a considerable distance from the model, but the model is always placed in such a position with regard to it, that it becomes, practically, a side light.

5. We consider Mr. Sutton's plan the best, in principle, that we have seen proposed. The objection we made to it was, simply, that in the proportions given the light admitted would be insufficient for use in large towns. The late Mr. Lacy, who had the most clear and precise views on lighting the model, of any photographer with whom we have met, stated to us, that if he had another glass-house to erect he would build it upon this principle, slightly modified. We regret that, by his untimely end, our readers lost some papers on the principles and practice of lighting, of which he had just commenced the preparation.—ED.]

## PRINTING DIFFICULTIES.

SIR,—Having in my last letter endeavoured to prove that the presence of free nitrate of silver on the surface of the paper causes mealiness, I shall now briefly consider the conditions which qualify it to act.

Strictly speaking, this salt is insensible to the photogenic action of sunlight; yet, strange to say, from experiments made, I find its presence is absolutely necessary to produce a satisfactory image on the surface of the paper; this fact, at first sight, would appear an unfathomable paradox, but a little consideration enables us to see through the matter more clearly. The fact of our being able to remove by washing all traces of free nitrate from the paper before its exposure proves that up to that time it exists in an independent and inert condition; but when brought into contact with actinic light, immediately a portion of the salt enters into a combination which no amount of washing can remove.

Several months since, whilst studying the singular properties of light, I imbibed the idea that what we are accustomed to term actinism is nothing more than an electrical action; that idea recent research bids fair to prove correct. Now, sir, I believe the combination spoken of to be effected by electric influences, the two salts (chloride and nitrate of silver) being necessary to produce the action and reaction which ultimately change their character, and they are united into one, thus forming the coloured substance which gives stability to the picture.

The beautiful laws which govern atomic combinations teach us that these chemical changes are not under the precarious government of chance. Atoms unite with atoms in regular undeviating proportions, which go to prove, in the case now under notice, that when the chloride of silver a paper contains has combined with its chemical allowance of free nitrate, be the sensitizing bath strong or weak, not one atom more will it exercise an influence on; what remains must exist as a free salt, or it must seek a connection elsewhere. But another difficulty here presents itself, which, if left unanswered, must upset all my former arguments. Free nitrate of silver, I repeat, is not affected by light; true, but the most humble artist who fathoms his difficulties by adding a little more "hacid to that 'ere bath," has always at his finger ends sufficient evidence to prove that this salt, when brought into contact with an organic substance, immediately becomes a sensitive medium; and cannot we find an organic companion for the free nitrate that chlorine has turned her back upon? Most assuredly we can, we have the paper itself, and, in addition to this, the albumen; this last, in my opinion, is its chosen companion, their ties of friendship being regulated by the intensity of light which cements them, and from this intimate connection springs an oft repeated source of mealiness: the thicker the layer of albumen, if a chloride is not added in a proportional quantity, the more virulent the disease. Taking these remarks into consideration, the term free nitrate I have hitherto employed, may, perhaps, be more appropriately termed an excess of albuminate of silver; a portion of this last salt is necessary in giving colour, but the boundaries are too wide to allow the albumen to take its fill without interfering with the surface of the finished print; for this excessive supply must be removed ere the gold is permitted to act evenly, and this fact, I am happy find, you have proved in your very interesting experiments, although you have anticipated the remarks I intended to introduce with the toning bath. I shake hands with you, sir, and tender my thanks for your influential endorsement to the correctness of my remarks, "a short floating, followed by a weak toning bath gave clear pictures." Why? because the surface impediment was removed fast enough for the gold to work evenly. Again, a portion of this last substance was added to the bath uncombined with the reducing agent, and mealiness ensued; for what reason? because the subordinate had become the master, the gold acted quicker than the pioneer could keep up with it, and, consequently, was deposited on an uneven surface; the addition of a little acetate of soda would have restored the balance, and all would have gone well. Hoping you will excuse the liberty of these remarks, I shall be glad to hear that you are continuing your researches in this interesting field. I hope to continue the subject next week, if not trespassing on your space.—Yours respectfully, A Photo's Assistant.

## Photographic Notes and Queries.

### Crowded Accessories in Card Pictures.

Sir,—I am quite satisfied with what I believe to be your honest and candid opinion of my photographs, in your News of September 5, to which I refer, although by difference of opinion expressed, we may arrive at right conclusions. You say that there is a little overcrowding of accessories in my photographs, and your opinion being generally in favour of plain back grounds, which I believe to be a popular error, is my apology for writing to you as an artist and photographer of twenty years daily study and practice, I beg to submit that the accessories in one of the cards sent to you, of the gentleman standing, was not subdued enough to represent well what was intended; for the others I have no apology to offer, as I believe them to be correct.

I think that a plain background may do for busts and vignettes, &c., but to desire a full length portrait in an unfurnished room, or worse still to my feelings, standing against an unmeaning plane, a thing only to be found in the glass house of a mechanical photographer, I think ridiculous, for the following reasons: first, I can never find such in the works of the great masters; and that the inhabitants of this world should be represented as they really are in connection with the things thereof, even the birds of the air have the sky and the hedge for a background, for without which, either exterior or interior, I think the figure intrusive, and can have no relative position, except between the extremes of something and nothing, which if you will allow your fancy to go with me, as in my imagination it looks like a man out of the world, and the inhabitants of other worlds looking at him, as an over conspicuous individual, who has nothing about him to connect him with any world, and everything in subordination to the same individual.

The true artists, whether in photography or otherwise, ought, in my humble opinion, before they have pretensions to art, be capable of connecting their sitters with places and things suitable for their position in life, their manners, habits, &c., whether in the well furnished apartments, the crowded street, or from the lake to the mountain top, all is required, and by a careful manipulation, proper lighting of the subjects, and the relative positions of sitters, the whole can, will, and ought to be, made use of by the artist photographer.—Yours respectfully,

*Carlisle, September* 12, 1862. F. W. Bannister.

[Without entering here into the discussion as to the respective merits of plain and pictorial backgrounds, we must remind our correspondent that his arguments only support the *use* of accessories; whilst our remarks referred to their *abuse* or "overcrowding." We never object to the judicious use of accessories for securing harmony and balance in a picture; but we contend that they should be always kept in proper subordination. The eye should not have to wander over a variety of objects, and then discover incidentally that there is a man or woman amongst them. Our correspondent's specimens were good and well composed, but some of the accessories were, to our taste, too prominent. A communication from another artist in the present number, has some remarks to the purpose on this subject.—Ed.]

### Instantaneous Dry Plates.

Sir,—In the search after a rapid dry process, I do not think sufficient attention has been given to the fact that this has been completely and satisfactorily discovered by Dr. Hill Norris. I am, myself, an advocate for the wet process; and, living by the seaside, have been forced to take instantaneous pictures, as the only means of catching the rapidly changing beauties of water, mountain, and sky. But I am compelled to admit that there are things attainable by his plates that I could not otherwise have accomplished. Of course I also believe a wet plate would beat his, where I could bring it into competition *under equal circumstances*. But how often have I gone into the dark room, with exactly the proper lights and shades in nature, and came out with my wet plate, to find all the effects reversed by a change of clouds! With the other, I could wait patiently till the propitious moment arrived.

I also enclose you a print, taken in a gale of wind, with stones placed on the camera to keep it down, the instrument deluged with spray, and, altogether, under difficulties that would have hopelessly made wet photography too wet for success. It was taken last October, without direct sunshine, as you will observe, from internal evidence.

Can no plan be suggested by which this most valuable process can be secured to the public? I, for one, feel humiliated at having to purchase instead of making my plates.—Your obedient servant, Hercules Macdonnel.

*Sorrento, Dalkey, County Dublin, Sept.* 12, 1862.

[The specimen enclosed contains a rocky foreground, with boiling surf dashing against it, and angry sea beyond; in the extreme distance are well defined hills and stormy clouds. The foreground is a little black, but all the rest is well exposed. The exposure has been quite instantaneous, and the effect is very grand. We are compelled to admit, however, that we hear of occasional cases without such success. Something more should be known as to the conditions of success, even if the secret of preparing the plates remain undivulged, as we fear is at present only too probable. Dr. Hill Norris has promised us a communication shortly, which will doubtless throw some light on the subject.—Ed.]

### Formic Acid in the Developer.

Sir,—In my last note to you I said that I had tried the use of formic acid in the negative developer, as given by M. Claudet, but without the addition of nitric acid to the bath; but the pictures I obtained were always slightly fogged, therefore I added nitric acid, rather less than the given proportions, which made it necessary to lengthen the exposure considerably, and rendered it almost impossible to obtain sufficient density, without the addition of silver to the developer, which the formic acid deposits in metallic particles on the plate, and therefore renders it useless; I have tried both bromo-iodized and plain iodized collodion, separately and mixed, but not Thomas's, as was recommended, as I wished, if possible, to avoid the expense, having some of Fisher's by me at the time.

I find that the picture appears immediately the developer is applied, but is completely fogged long before sufficient density is obtained, which I at first attributed to over-exposure, but on trying a little shorter period the picture did not come out at all; can you, or any of your readers, oblige by telling me where I am at fault. B. G. P.

[We can only suggest that the bath is out of order, probably containing organic matter. This, with the heat of the weather, would induce a tendency to fog. If the tendency exists from other causes, formic acid would probably increase it, having itself a reducing tendency.—ED.]

## Talk in the Studio.

THE PHOTOGRAPHIC "OUTCAST."—The editor of the *Photographic Notes* says: "The meanness of the recent attack on the NEWS by the *British* is quite characteristic of that journal. There are four English journals of photography, three of which are in harmony, and the fourth an outcast. The meanness, buffoonery, and vulgarity of the latter have rendered it an outcast, and its hand is against its rivals. One day it contains a timid side blow at the *Notes* in an answer to a correspondent; another day 'our esteemed and excellent friend Dr. Diamond' has a leader of his pulled to pieces in an ill-natured way; another day the NEWS is charged with unfairly copying without proper acknowledgment; and so on. This sort of thing, and the acute business talent of the proprietor, which sometimes shocks people, and renders legal interference necessary (as in the case of the usurpation of the title of the *Photographic Society's Journal*), have rendered the *British Journal* an outcast, and I verily believe that, when to its agreeable features of meanness, vulgarity, and buffoonery, you add ponderous editorial twaddle and conceit, you have in the *British Journal of Photography* a newspaper without parallel in the English language. Query, could Mr. Greenwood's last effusion have found a place in any other journal in England?"

TAXATION FOR PHOTOGRAPHERS.—The *American Journal* says, in the number for September 1;—To day begins the *regime* of taxation. Photographers, like the rest of business men, must fork over for the benefit of the Govenment; we hope they will do it with good grace, and make it up with the public if necessary. Also, photographers like other able-bodied men, must stand the chance of being obliged to go soldiering. But we hope to hear no complaint; it is the only sacrifice of the sort for the country in our lifetime; the end in view is peace and prosperity for ever.

EARLY PHOTOGRAPHIC OPERATIONS.—A "Constant Reader" sends us the following:—"Perhaps the following, which appeared in *Notes and Queries* last week (3rd S. 11, 127), may be appropriately transferred to the pages of the PHOTOGRAPHIC NEWS. 'In 'Rational Recreations,' vol. iv. London: 1774. Recreation 43. Writing on Glass by the Rays of the Sun. Dissolve chalk in aquafortis to the consistence of milk, add to that a strong dissolution of silver. Keep this liquor in a glass decanter well stopped. Then cut out from a paper the letters you would have appear, and paste the paper on the decanter, which you are to place in the sun, in such a manner that its rays may pass through the spaces cut out of the paper, and fall on the surface of the liquor. The part of the glass through which the rays pass will turn black, and that under the paper will remain white. You must observe not to move the bottle during the time of the operation.'"

A LEARNED DISQUISITION ON PHOTOGRAPHY.—The following was delivered by Mr. J. Toole at the Royal Dramatic College Fancy Fair at the Crystal Palace, during the operations conducted by him and Mr. Paul Bedford in their photographic hut:—"Amber, or oxide of cadmium, is a vegetable substance obtained from mustard and cress, grown in a warm situation, on a blacking bottle, constantly kept damp with paregoric elixir. In three days it forms into small berries; these are then subject to the gas evolved in the decomposition of the fero-sesquiquequadrate of the cyanuret of potassium; and if carried further, becomes a dry crystallized bicarbonate in the shape of a small white powder, which forms the Epsom salts of commerce: and when calcined with equal portions of gunpowder and cold cream, is known in the Arts as Photos! To produce our rapid pictures you must get a spoonful of germinifluous mixed with a few tried postage stamps, together with a little klatuka. Hold the glass to the fire for five seconds, then gaze earnestly on it for a minute; the picture is then perfect. You can "*see it at a glance;*" and then, to use the words of Lord Byron, "*There you are.*"—*Builder.*

## To Correspondents.

R. N. S.—The best mode of removing a mounted print from its card-board, in order to place it in an album, is to place a piece of blotting-paper of the same size, soaked in water, upon the print, and leave it for a quarter of an hour. It will generally be found easy, then, to lift the print away from the card. If the adhesive material do not yield to cold water, hot water may be used.

TANNIN.—Various articles on celestial photography have, from time to time, appeared in the NEWS. An interesting paper on the subject, by Warren De la Rue, will be found on p. 438 of our fifth volume.

J. H. W. H.—Salted paper is best floated for a short time on a strong silver solution: say two minutes on a 60-grain bath. The best plain-paper prints we know are those of Hennah, of Brighton, of which examples may now be seen in the International Exhibition. They are excited on the ammonio-nitrate silver bath. 2. The enlargement of negatives is too extensive a subject to be described in this column. An article on the subject will be found in the PHOTOGRAPHIC NEWS ALMANACK for this year. A paper on it, read by Mr. Vernon Heath, at the Photographic Society, appeared in our columns a few months ago. We shall, probably, have another article on the subject shortly.

YOUNG PHOTO.—We have repeatedly described the method of recovering the silver from the washing water of prints. First, precipitate the silver in the form of a chloride, by adding common salt. After standing a few hours, decant the clear water and dry the white powder, at the bottom, which is chloride of silver. Place this in a crucible with double its weight of a flux, such as borax, or a mixture of carbonate of potash and carbonate of soda. Subject the crucible to a very great heat, which will reduce the silver to the metallic state. It will be found in the form of a button, at the bottom of the crucible.

H. B.—Without knowing something of the process or manipulations used, we cannot even suggest a cause for the imperfect toning of your prints. From appearance we fancy the paper is in fault.

JOHN H. UNDERWOOD.—Your charming stereographs received. We will notice them shortly.

J. C.—You are right in your conjecture as to the best lens for the purpose. We do not believe it can be equalled at a less cost. For your purpose, however, especially if the price be an object, the No. 1 of the same maker might answer. We know many who use it with perfect success for card pictures. The stereoscopic lens requires too small a stop for such a purpose, to be sufficiently rapid. 2. The use of a small central stop in portrait lenses is apt to produce the disc of light in the centre, of which you complain, especially when pointed to the light. When it is necessary to use it under these trying conditions, paint an annulus of black round the posterior surface of the front lens, or fix an annulus of blackened card in contact. This will probably prove a remedy.

JUSTITIA.—If you forward us one or two prints we can better judge of the defects of which you complain, and help you with our advice as to the means of remedying them.

CASSANDRA.—The best mode of removing the earth from your powdered metallic silver (the settlings of developing solutions), will be simply to wash it, when the earth being soluble will be removed, and the metal remain. 2. The use of alcohol in the ammonia nitrate bath is said to prevent discolouration to a large extent. The use of citric acid would probably be the best mode of discolourizing, by causing a precipitate of citrate of silver, which will take down with it the colouring matter. Then add a portion of a stronger solution, made as at first.

THICKHEAD.—The formula by which you state the prints are produced, ought to give good results. We cannot suggest the cause of their unwillingness to tone, unless the paper be faulty. So far as we can judge, however, you do not print sufficiently deep to get good tones. 2. There are a variety of holders for the plate whilst developing. Mr. Solomon makes one, which is, we believe, efficient.

P. L. F.—Scotch glue is used for mounting by most professional mounters. A sponge is more convenient for applying it smoothly to photographs than a brush. The advantage of glue is, that it admits of the print being rolled at once, and affords facilities for greater despatch.

BI-CARBONATE OF SODA.—A correspondent, whose letter is at this moment mislaid, asks if carbonate of soda and bi-carbonate of soda are not the same thing, and if so, why the matter is complicated by the use of the prefix *bi*. Our correspondent should remember, that as a general rule, all variations in scientific terminology imply a distinction of some kind, and it would be useful to the humblest of our readers, to possess for reference, if they have not time for study, some elementary work on chemistry. We can recommend that published in Chambers's *Educational Course* as simple, comprehensive, and cheap. The prefix *bi* always implies that two atoms of the substance to the name of which it is attached, are united to one of the base. Thus in bi-chloride of mercury there are two atoms of chlorine united to one of mercury. In bi-carbonate of soda there are two atoms of carbonic acid united to one of the base. The bi-carbonate is a feebler alkali than the carbonate.

FRED. DAVIS.—See article on the subject of a red deposit on the shadows in the NEWS for August 1.

J. H.—The difficulty in taking life-size photographs direct is an optical one. It would be difficult to make a lens to do the work anything like well, with any approach to a reasonable exposure. The cost of such a lens would be enormous.

BEWITCHED BATH.—Negatives intensified with bichloride of mercury, and blackened with hydrosulphate of ammonia, or hyposulphate of soda, are sometimes acted on, both by light and by the atmosphere, but more by the latter than the former. When well varnished we have not found them alter, although we have heard of cases in which they did so. We are glad you found our advice help you out of the difficulty. We have not had time to examine the plate carefully yet.

W. H. H.—To strengthen your toning bath add more unused solution, made by the same formula. Always keep sufficient mixed, ready for use a few days beforehand.

FRED. DAVIS.—Silver flashed glass will do whenever it may be obtained. The last good sample we saw was got of Mr. Rouch.

Several correspondents in our next.

A communication from Mr. Harmer on "Double Printing," and one from Mr. Cooper on "Printing on Resinized Paper," with several articles in print, are compelled to stand over till next week.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 212.—*September* 26, 1862.

## IMPROVED METHOD OF PRINTING.

We call the attention of our readers to a communication on another page. which. if we rightly appreciate it, is likely to effect a revolution in the method of preparing paper for positive printing, in which we hope that albumenized paper will, if not entirely superseded, retire into its proper position, as useful for exceptional purposes, but by no means the proper material on which to produce artistic photographic pictures.

We have often stated our conviction that the capability of admiring, or even tolerating, pictures on albumenized paper was an acquired taste. We believe that most persons of taste are agreed that the glazed surface for pictures in monochrome is essentially vulgar in effect. Very few photographers like it for its own sake. They tolerate it, because they have become accustomed to it; and they have suffered themselves to become accustomed to it, because, in spite of the objectionable glaze, certain desirable qualities were secured in the prints, which were not easily, otherwise, attainable. It aided in rendering more accurately than plain paper the delicate detail of the collodion negative; and, by keeping the image on the surface, it aided in producing more brilliant and vigorous prints. These were desirable qualities, and, in virtue of them. albumenized paper has gradually taken position as the recognized material for photographic prints.

The introduction of the alkaline gold toning process aided in giving it a more permanent tenure. It became possible to produce pure whites in place of the cheesy tint, which at one time prevailed, and which, when combined with the vulgar glazed surface, rendered albumenized prints intolerable. Since the *furore* for card pictures has prevailed, the necessity for the albumenized surface to register the delicate gradations in these small images, has become more than ever recognised.

Nevertheless, we should like to see albumenized paper fall into comparative disuse. For large portraiture, especially for large heads, it is most inartistic and unsatisfactory, as well as unnecessary. For photographic landscapes it is not less so. For reproductions of paintings and engravings, it materially destroys their value and artistic character. For solar camera pictures it has, fortunately, never to any extent been used, nor should be for any style of photograph larger than a stereograph, or album portrait. The pure, rich, deep velvety black of a mezzotint engraving, with its delicate gradations into a dead white, are, surely, to everybody's perception, superior to the gaudy brilliancy and offensive glaze of the best albumenized print. As Mr. Sutton said in a paper on the subject some seven or eight years ago, "A print on plain paper may be dead, foggy, inky, sunk in the paper, &c. &c.. but, in its most unhappy state, it does not look *vulgar*; there is always a certain *sentiment* about it, even in its very worst phase of failure."

Mr. Henry Cooper, jun.. describes on another page a new method of preparing plain paper, by which, we believe, dead, inky, sunken-in prints may be altogether avoided. and rich prints with the texture and colour of a mezzotint engraving secured. The specimens he has forwarded with the article, although the results of early experiments. and produced, in some instances, as he states, from imperfect negatives, possess qualities which justify us in believing that all the characteristics desirable in photographic prints may be obtained. The surface is fine, hard, and close in texture, with just such an approach to gloss as is obtained by rolling, or burnishing at the back, plain paper. The image is perfectly defined, registers the sharpest lines and most delicate gradations in the negative, and is of a rich deep black, free alike from inkiness or redness. In some the lights are quite white, whilst in others the resin has communicated the faintest approach to a cream tint in the lights, quite distinct from the yellowness produced by sulphur toning, and more nearly approaching the colour of India paper—a tint very desirable in the light of a portrait. We apprehend that, although the specimens we have received are black in tone, any gradation of warmer colour may be secured by those who may prefer such tints. We conceive that for artistic effect, the texture of surface, the colour, and the vigour of the prints will leave nothing to desire.

Regarding the permanency of such prints, we should conceive, *a priori*, that they furnish ground for a much stronger assurance of their stability than prints by other processes. Albumenized paper has not certainly conduced to the permanency of photographic prints, if it has not contributed, as some suspect, to the facility with which they occasionally fade. Paper, saturated with resin, as a basis of operations, affords, in its own nature, a strong guarantee of its power of resisting many of the causes of decay, one of the most active and insidious of which is damp. It will. probably, moreover, be much more readily cleared from all trace of the hypo fixing bath, which clings with such tenacity to the fibres of a material readily permeable by aqueous solutions.

As regards the photogenic character of the combination formed by the contact of nitrate of silver and gum benzoin, little is known at present; Mr. Cooper states that the paper is more sensitive than albumenized paper, and the tone and quality of the image decidedly indicate the presence of some other silver compound beside the chloride. Benzoin contains benzoic acid, and some portion of benzoate of silver will doubtless be formed, a substance of which little is known, but which certainly belongs to a series readily blackened by light. But if the preparation only served to close the pores of the paper and keep the image on the surface, it would aid materially in obtaining brilliant prints.

Not a trifling element in the advantages which seem to be presented, is the increased facility it affords in various of the manipulations. The paper is prepared by immersion, instead of floating, in the alcoholic solution of benzoin and chloride of cadmium, and if any streaks or irregularites appear in drying, they can be removed by a subsequent immersion. The paper being entirely saturated with the resin, is, unlike albumenized paper, free from the tendency to curl up at any stage of the operations; Mr. Cooper, it will be seen, is willing, in order to facilitate experiment, to furnish samples of the paper at a price which can barely reimburse him for expenditure.

It is a somewhat singular circumstance, that the letter of our Paris correspondent a month ago, informs us of the experiments of a French operator in a similar direction. About the same time we received a communication from Mr. Cooper, informing us that he was experimenting with benzoin and other resins, in preparing paper for positive prints, and we know that he has been for some time past engaged in dry plate experiments with the same materials. This is another curious illustration of contemporaneous experiment in parallel directions in different countries. We shall be glad if our French *confrères* aid in giving precision and value to the process on the Continent, by their practical and experimental skill. If general practice and experience endorse the results already obtained, we repeat our conviction that a revolution will be speedily effected in the preparation of paper for positive printing.

Whilst referring to artistic printing, we cannot omit to call the attention of our readers to a short communication in the present number of the News, from Mr. Harmer, on double printing and vignetting, in which he describes the method employed in producing the specimens in the International Exhibition, of which we expressed a very high opinion a few weeks ago. We strongly commend the subject to all our readers interested in artistic positive printing.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Lithia Salts* (continued).—*Chloride of Lithium* is not a difficult salt to prepare. The starting point being the carbonate, this is dissolved in dilute pure hydrochloric acid, until the effervescence nearly ceases, and the acid reaction to test paper is only slight. The liquid is then filtered, if necessary, and transferred to a dish placed over a water bath, which is kept heated until the excess of water and acid has been driven off, and the dry salt is left behind. As the contents of the dish become thick and pasty, they must be kept constantly stirred with a glass rod, and when apparently dry, the heat must be continued for some little time longer, until all the hydrochloric acid is driven off; this may be ascertained by holding a glass rod, dipped in ammonia, over the dish; if a trace of free hydrochloric is present in the latter, it will render its presence evident by the formation of white opaque fumes. When all the free acid has been removed in this way, add sufficient distilled water to effect complete solution of the mass, and evaporate again, but not quite to dryness. The chloride will be deposited in the form of cubical crystals, resembling common salt. These are deliquescent in the air, and melt at a dull red heat, volatilizing at a white heat, losing, at the same time, a portion of their chlorine, and becoming converted, by absorption of oxygen and carbonic acid from the air, into carbonate of lithia. When this salt deliquesces in the air, it gradually forms large rectangular prisms with four sided summits, containing four atoms of water of crystallization. When the aqueous solution of the chloride is rapidly boiled down the same salt separates in the form of needles, united together in feathery tufts, like those of sal-ammoniac. Upon being heated, these melt in their water of crystallization, and then dry up, becoming converted into the salt first described. If these feathery crystals are very gently dried, and then thrown upon paper roughly dried, or moved about with the finger, they instantly become opaque, the opacity commencing from the point of contact and gradually extending throughout the whole mass; in this state they fall to pieces on the slightest blow, and form a crystalline powder. Both the latter mentioned hydrated and the anhydrous chloride of lithium deliquesce rapidly in the air, and are very soluble in water and alcohol. When the alcoholic solution is set on fire, it burns with an intense crimson flame. This crimson colour, which salts of lithia communicate to the flame of spirit or gas, is a very delicate test for the presence of the metal, and, in a somewhat modified form, is constantly used at the present time as a test for lithia. Instead of looking at the coloured flame direct with the eye, it is narrowed by placing a slit in front of it, and the flame is then viewed through a prism. The effect of this is to refract all the other colours (such as those given by soda, strontia, &c.) to other parts of the field, and leave the pure red of the lithia unmingled with anything else. This is the branch of analysis to which the name "spectral" has been given. We shall probably recur to this subject before long, for the present this sketch will suffice to show the manner in which it is applied to the detection of lithia salts.

*Iodide of Lithium.*—This salt is coming into some little importance as an adjunct to the usual iodizing agents for collodion. The method of preparation not being detailed in books, we will give it somewhat fully. The best plan is to adopt what is known as Liebig's process, for the preparation of alkaline iodides. One part of phosphorus is placed in a basin, and covered with forty parts of hot water, so as to melt it. When it is liquid, twenty parts of iodine are gradually added with constant stirring, taking care to allow one portion to be dissolved before a fresh quantity is added; violent action takes place, and a great portion of the phosphorus is converted into the amorphous variety, which, however, in no way interferes with the process, as the amorphous phosphorus unites with the iodine just as well, although not quite so fast. The colourless liquid, which consists of a solution of phosphoric and hydriodic acids,

$$P + 5\,I + 5\,HO = PO_5 + 5\,HI,$$

is then poured off from any excess of phosphorus, and baryta water is added, until the mixture becomes alkaline: the whole is now to be thrown on a filter, and the insoluble phosphate of baryta filtered off, and well washed. The solution, which consists of iodide of barium, with a trace of free baryta, is then to be evaporated to dryness over a water bath, with constant stirring, and the dry residue heated to the fusing point. It is now to be redissolved in water, and filtered, when it will consist of almost chemically pure iodide of barium. To this, sulphate of lithia (prepared, as shown in our last chapter,) is to be added in quantity just insufficient to precipitate all the baryta, and the mixture, containing the precipitate suspended in it, is boiled down to about one-half its original bulk. When sufficiently concentrated, it is allowed to cool, and is then filtered through a double thickness of paper. To the filtrate a small quantity of pure carbonate of lithia is added, which removes the last portions of baryta, and the solution being evaporated down, yields pure iodide of lithium. This process is very simple in practice, although somewhat complicated to read, and has the great advantage of yielding a perfectly pure product. Iodide of lithium forms very deliquescent, acicular crystals, which contain six atoms of water of crystallization. They are very soluble in alcohol, and are, therefore, well adapted for employment as an iodizing agent in collodion.

The other salts of lithia are very little known, and are of no special interest to the photographer.

*Baryta Salts.*—The earth, baryta, is of importance, both on account of the special value of some of its compounds, as well as its employment as a test, and re-agent in the preparation of other salts. In the above description of the method of manufacturing iodide of lithium, baryta water is used, and in very many similar operations it is also employed. *Caustic* baryta is best prepared from the nitrate. This salt is thrown in small quantities at a time into a red-hot crucible, the cover being put on, and the heat being well kept up between each addition, until the mass has become quite solid. Too much nitrate of baryta must not be added at once, as the salt is apt to boil over. When the crucible is half-full of baryta, the heat is raised to a bright red heat, and kept there for a quarter of an hour. The crucible is then allowed to cool, and is broken up in order to remove the baryta from it. Baryta in this state forms a greyish-white, porous friable mass. When moistened with water it falls to pieces, and becomes very hot, the heat being often sufficient to raise the hydrate produced to redness, and then fuse it. It forms a white powder, fusing at a low red heat, forming an oily liquid. It dissolves in twenty parts of cold, and in two parts of boiling water, forming a colourless solution, which deposits the crystalline earth on cooling: the cold solution, when exposed to the air, becomes covered with successive films of carbonate of baryta, until, at last, nothing remains but pure water. The best way to prepare the hydrate of baryta in the pure state is to boil some of the caustic baryta produced by the ignition of the nitrate, in water, and to filter the solution whilst hot; the filtrate is then allowed to cool, and the crystals of hydrate are deposited. Some persons recommend mixing the nitrate of baryta with its own weight of heavy spar, previous to heating it to redness. This prevents the frothing up, but is attended with no other advantages. If the operator has not any caustic baryta, he can prepare the crystals by adding potash to a cold aqueous solution of chloride of barium, or nitrate of baryta: the crystals are washed with ice-cold water, or with alcohol, till all the potash salt is separated; they are then dissolved in hot water, and the solution is left to crystallize. Hydrated baryta in this state forms transparent, colourless, four-sided prisms, which contain nine atoms of water of crystallization. When heated to the temperature of boiling water they melt, lose water, and leave a white, friable, residue, containing 20 per cent., or two atoms of water. This, when heated to redness in a crucible, froths up violently, fuses, and leaves hydrate of baryta in a state of tranquil fusion. These crystals, as well as the aqueous solution, are difficult to preserve in the air in the pure caustic state, as they greedily absorb carbonic acid, and become converted into the white insoluble carbonate. On this account baryta water is frequently used as a test for carbonic acid. For instance, if a little of the solution be placed in a test tube, and the breath be blown through two or three times by means of a glass tube, it will become quite thick and white from separation of the carbonate of baryta.

## DOUBLE PRINTING, VIGNETTING, &c.

BY R. HARMER.

Having had several enquiries as to the method adopted in printing the small volume of photographs exhibited by me in the International Exhibition, Class XIV, I will endeavour as clearly as I can to explain my way of working. My object, in adopting this style of printing, has been, to secure the best possible effect from the negative, by printing in a style most suited to its characteristics. The method of proceeding is determined by taking the proof first in the usual way, having done this, and examined the result, should there be any defect in the back-ground, I then print as a vignette, in the following manner:—Place in the pressure frame, outside the plate glass, a piece of brown paper, examining it by the light to see that there are no defects; having placed the negative in the frame, I tear out, in an irregular form, sufficient of the brown paper to give the size vignette required, filling in between the glass and brown paper with cotton wool; a much more effective vignette can be produced in this way than with the vignette glass, which merely gives a shaded oval, not a vignette as understood by engravers. Photographers who prefer the vignette style will do well to study the vignette engravings of Finden.

The proof having been printed the required depth, is now taken from the frame, the brown paper removed, and inside the frame a mask of black paper placed, in which an oval or other shape has been cut, suited to the subject printed, the print is now laid in the frame, care being taken that it is in the right position with regard to the shape of the mask; having screwed down the frame, the glass of which should be perfectly clean, a small piece of cotton wool, slightly damped to make it adhere to the glass, should be placed on the high lights; the proof may now be again exposed to a subdued light, until a tint is produced a trifle darker than the half tones.

When toned and fixed, if these hints have been followed, the result will be a vignette on an India tint ground, with white margin.

Another style of printing is effected by having two ovals or other shapes, cut in black paper, the one to be $1\frac{1}{2}$ inches or 2 inches larger than the other. When the negative is placed in the frame, lay the mask with small oval over it on the varnished side, and the sensitized paper on it, print to the required depth, remove all from the frame, and place next to the plate glass the mask with large oval. Then, the print being carefully laid upon it, is exactly centered, and then exposed to the light, the high lights having been covered up with wool as before directed, until the tint around the proof is of sufficient depth for toning to the shade of India paper.

When a negative gives hard, black and white prints, the high lights may, instead of being protected, be exposed for half the time required to produce the tint, a much more artistic proof will result, in large portraits very much resembling a fine chalk drawing on tinted paper.

If the usual paper be used, mounting will of course be necessary, but for book illustration as in the volume exhibited, paper albumenized on both sides, will do away with the necessity of mounting, and bind up much better.

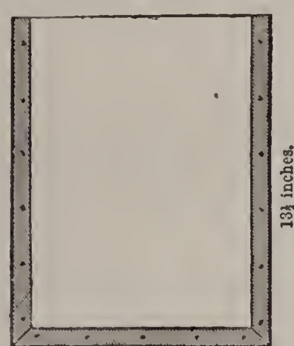
Being but an amateur, working at photography for the love of it, I may conclude by observing, that if the exhibition of the volume in question, and these hints as to the method of working, should lead a few to a more artistic way of printing, I shall feel amply repaid for the time spent in producing both.

## WATERPROOF VARNISHES AND CEMENTS.

### The Nitrate Dipping Bath, and how to Construct it.

BY H. R. NICHOLLS.

Suppose the size of the plate to be ten by eight; select some good wood—*yellow pine*—which should be sound and free from knots. It should be three-eights of an inch in thickness, and cut to the following size:—Ten inches and a half long, and thirteen and a-half inches wide; let it be planed smooth on the insides, that is, the side of the wood which will be the inside of the bath when finished. It is then to be rubbed smooth with glass-paper, known technically by the term of "Middle 2," across the grain of the wood, using a flat piece of cork, about five inches long and three inches wide, as a rubber, over which the glass-paper is held by the hand. It should be rubbed until the wood is quite level and free from ridges left by the plane. It is then to be baked in an oven, not too hot, as the wood must not be scorched. Treat also in the same way three other pieces of pine, three-quarters of an inch square, cut according to the diagram which forms the sides and bottom of bath.




While hot the inside of each piece is to be coated with the pure gutta-percha compound, about the twentieth of an inch in thickness, spread out with a flat piece of wood. Now place one of the thirteen and a half by ten and a half pieces on a flat board, coated side up, and arrange the three strips which form the sides and bottom of bath, upon which place the other piece thirteen and a half by ten and a half, coated side down. Upon these place heavy weights, and allow them to remain eight or ten hours to harden the compound. The next step it must be screwed with five-eight No. 5 iron screws from both sides. It may then be smoothed off on the outside, and varnished with brown hard varnish.

Such a bath I have in constant use, in which the nitrate of silver solution has remained continuously since last November, and keeps in good working condition, seldom requiring to be filtered.

## NEW METHOD OF PRINTING:

### On the Use of Gums Insoluble in Water for Preparing Positive Paper.

BY H. COOPER, JUN.

Some long time back the idea struck me that if we could dispense with albumen, gelatine, and arrowroot in our photographic paper, and employ in their place a gum or resin *insoluble* in water, and giving a moderate degree of gloss to the surface, our prints would be much more permanent than heretofore. After numerous experiments, I have found that benzoin seems to be the best suited for that purpose, either alone or mixed with a small quantity of some other gum.

I will presently give the formula for both methods; but will first call attention to the advantages of the benzoinized paper compared with that in general use.

1st. The simplicity and facility of preparation and cleanliness of the result; spots and streaks of any kind, with ordinary care, rarely occurring.

2nd. The moderate expense, as it can be prepared with the best materials at about half the cost of albumenized paper.

3rd. The extreme sensitiveness, and consequent quickness of printing, which is a great advantage where time is an object. With the proportion of chloride I recommend it also bronzes rapidly, so that brilliant prints may be obtained in full sunlight from their negatives. Time is again saved, as a thin negative is much sooner printed from than an intense one, if they are both printed in the same light.

The paper is of a slightly creamy tint, which I do not think any drawback, as it gives a warm colour to the picture which would be often desirable even were the paper *perfectly* white; which is a condition very difficult to obtain.

Another recommendation is, that it can be prepared by persons who have not had much practice, so that everyone preparing it for himself, will be able to vary the quantity of chloride at pleasure. This is one of its great advantages over albumenized paper. Many persons would be glad to prepare it themselves if it were not for the skill and practice required, that they might know the proportion of salt it contained. One disadvantage is, that the quality of the prints depends more upon the paper itself than it does in albumenized or plain paper. It should be rather stout, possessing a very hard and even surface. *Saxe* paper appears to me the best, though that requires picking through to remove any sheets that are thin and porous.

I will now state as shortly as possible (as I know your space is valuable) my method of preparing the benzoinized paper. You must first procure some of the finest Siam gum. That containing the most perfect "tears" is the best. Pick the tears clean from the transparent yellow part of the gum, though there would be no harm in using all, except that it would render the paper more yellow. Place the picked gum in a glazed wedgwood capsule, which is to be supported some distance above a spirit lamp, or other convenient source of heat, so that it may be heated gradually. Stir the gum with a piece of wood until it is fluid, then remove the capsule to a farther distance from the flame, and allow the benzoin to remain in a state of fusion for fifteen minutes, keeping it covered with a sheet of card or wood to present the too ready access of the air, for if it be left open it will become more yellow by oxidation. When the quarter of an hour is expired hold it for a minute or so over the lamp, to render it as liquid as possible, then pour it on the bottom of a plate or marble slab, and allow it to become quite cold when it may be taken from the plate or slab.

*Solution No. 1.*

| | |
|---|---|
| Chloride of cadmium ... ... | $\frac{1}{2}$ ounce |
| Spirits of wine (methylated is preferable to the pure) ... ... | 10 ounces. |

When solution is effected add ten drachms of the benzoin as above. Shake occasionally till dissolved. and then set aside, to settle, in a cool place; this will take two or three days. When it is settled pour off the clear portion into a clean bottle for use.

*Solution No. 2.*

| | |
|---|---|
| Benzoin ... ... ... ... | 1 ounce |
| Sandarac ... ... ... ... | 1 drachm |
| Copal ... ... ... ... | 10 grains |
| Chloride of cadmium ... ... | $\frac{1}{2}$ ounce |
| Methylated spirit ... ... ... | 10 ounces |
| Oil of cloves ... ... ... | 10 drops |

Dissolve as before.

Pour into a perfectly flat dish enough of either of these solutions. (There should not be less than a quarter of an inch in depth.) Take the paper by the two opposite corners. and totally immerse it. The solution will immediately render it nearly transparent. Remove air-bubbles. &c., and allow it to remain half a minute. Raise one corner with a pin, and *draw* the paper from the solution, so that the liquid may flow off in one sheet. If streaks appear, immerse and withdraw again. Drain as closely as possible, by which a great saving in solution may be effected. Loss of time may be obviated by two persons being employed. one to immerse the paper, the other to remove, drain, and hang it up to dry. The room should be rather warm to prevent chilling. The paper is soon dry. As both sides of the paper are alike acted upon, either may be sensitized, although, of course, the hardest and smoothest is the best.

To sensitize the paper, float from five to ten minutes on the usual silver bath, provided it be at least 50 grains to the ounce. A good means of preventing discolouration of the bath from organic matter, is one that was proposed some time back, though I do not think it has been very generally adopted: I mean that of adding a small quantity of common salt to it. The bath is never filtered, but only returned to the bottle every night, and shaken up. I also add 5 per cent. of alcohol.

The paper, prepared with benzoin, does not curl in drying, which makes it much easier to print upon. Print rather deeply, as the print will lose considerably in the after process. Wash the prints well; then let them soak for one hour in water at 70°, and tone in a bath made as follows:—

| | |
|---|---|
| Distilled aqua ... ... ... | 20 oz. |
| Chloride aur ... ... ... | 4 grains. |
| Acetate of soda ... ... ... | 2 drachms. |

Mix twenty-four hours before using.

I may here mention that I have adopted the soaking in tepid water before toning, with a sample of paper that gave dreadfully mealy prints under any other treatment, and have found it to succeed capitally. Thanks to "A Photo's Assistant" for the hint.

Tone to the required tint, as the prints do not change much in the hypo bath, which is 6 ounces to the pint. Wash with great care.

This process is most applicable for large pictures, and I think it would be very suitable for solar camera pictures, or for any prints where development printing is adopted, iodide and bromide being used, instead of a chloride, in the first preparation.

I had hoped to have sent you some specimens worthy of the process, but have been so occupied with other matters, that I have not been able to prepare any. I have enclosed two or three of the first prints I did upon the benzoinized paper, as they are the only ones I have by me. They are not from good negatives, as at first I was fearful that the paper might stick to the negative, but I have found that there is no danger, if a hard spirit varnish be employed. I am of opinion that a great deal may be done in the direction I have pointed out with gums, or resins, insoluble in water, and I do not doubt that a better, even than benzoin, may be found. I would recommend that the benzoin *alone* be tried first, as it is much more simple than No. 2. As some might like to try the paper before preparing any, I will enclose a sheet upon the receipt of address, and seven penny postage stamps.

*5, Aberdeen Park, Highbury.*

## A SHORT LESSON IN PHOTOGRAPHY.*—No. 4.

In my last lesson I remarked that the picture of the decayed leaf was a *negative* print. It lies on the surface of the albumen; and if the albumen could be separated from the paper, it would be quite transparent in the lights, so much so, indeed, that light would easily pass through those parts; whilst through the more opaque parts it would meet with considerable obstruction. This sheet of printed albumen, therefore, might be now used instead of the decayed leaf, from which a new picture might be obtained, having the lights and shades inverted, and presenting a true pictorial representation of the leaf on a white background. Such a print is in reality a *positive*; and the transparent albumenized, in the true photographic sense, is a *negative*. But the albumen cannot be stripped off from the surface of the paper; nor can the paper so albumenized be made perfectly transparent, nor allowing that it can be made practically transparent, is this the general and most commodious way by which negatives are prepared.

Before I proceed to show you the manner of making a negative, such as the photographer understands by the expression, I must here inform you that we have two methods of printing: the one by the direct rays of the sun, the other partly by the same means and partly by chemical action afterwards. The former process is called solar printing; the latter is denominated printing by development. The inorganic salts of silver, which easily change colour by the action of light, are the bromide and the chloride; others are acted upon, although less sensitively and less sensibly as regards the change of colour, yet much more distinctly in some unknown physical way. For instance, the yellow iodide of silver becomes gradually grey when exposed to the sun, or to diffused light; but it does not change colour to the same extent as the chloride or the bromide, not even when it is treated with nitrate of silver. Nevertheless, light acts upon it in a most miraculous way; and now to work to show you this.

I have here a substance denominated *pyroxyline* or soluble gun-cotton (for there is a gun-cotton which is insoluble in the menstruum which dissolves pyroxyline). You cannot distinguish this cotton from ordinary unprepared cotton, either by the taste, smell, or sight, if it has been thoroughly washed. One of these bottles contains pure and very strong alcohol, nearly absolute alcohol, consisting of at least 95 parts of absolute alcohol, and 5 parts water; its specific gravity never being greater than ·809, that is, alcohol stronger than this may be used, but not weaker. The other bottle contains concentrated ether, whose specific gravity may range from ·720 to ·715. Weigh out 18 grains of the pyroxyline and place the same in this clean four-ounce vial; to this now add 7 drachms of the alcohol; cork the bottle and shake it well, until the cotton is thoroughly imbued with the alcohol and disintegrated. To the mixture add 8 drachms of alcohol and 10 drachms of ether; again cork and shake well together. You observe with what rapidity the cotton is dissolved. This solution is *collodion*, ordinary, normal or plain collodion, to distinguish it from the collodion after it has been sensitized for photographic purposes.

This normal collodion may now be filtered, or set aside until all insoluble particles have settled, when it may be decanted from the sediment. If, on the other hand, the collodion is to be filtered, we require a special filtering apparatus, well known to the pharmaceutist, which allows the filtration to proceed in an air-tight vessel, and thus prevents evaporation. Collodion does not filter easily through paper, but it may be filtered through a layer of clean common cotton-wool, placed somewhat loosely in the tube of the funnel. Whilst it is filtering let us proceed to the sensitizing solution. For this purpose I take

2 drachms of alcohol
8 grains of iodide of potassium dissolved in the smallest quantity of water, and holding in solution
1 grain of iodide † of silver
3 grains of iodide of cadmium, and
4 grains of bromide of cadmium.

As soon as these salts are dissolved the solution is filtered through filtering paper. To every 10 parts of the normal collodion add 1 part of the sensitizing solution, and allow the mixture to stand in a cool, dark place for a day or two. It is an advantage to prepare this collodion, and to use it in the dark room, that is, never to bring it to the light until it is exposed to receive a picture.

For albumen prints, paper is the background or receptacle; for collodion prints, glass is the background. The glass for photographic purposes must be thin, homogeneous, endowed with parallel plano surfaces, and free from all kinds of flaws. When cut into the proper shape and size, each plate is prepared to receive the collodion film as follows:—The sharp edges all around, and on both sides are first taken off with a file, the plate is then fixed in the vice or on the pneumatic holder, cleaned and polished. To effect this we require alcohol, rotten stone, small pieces of canton flannel, of about three inches square, and two thin clean dry silk cloths. The rotten stone is kept in a bottle with a large neck, which is closed by a piece of gauze, with open meshes, tied round the orifice. Pour a little alcohol upon the middle of the plate, then dust some of the rotten stone upon the alcohol; now rub quickly the mixture over the whole surface, by means of a piece of canton flannel, until the glass is dry. Proceed with the other side in like manner. Take one of the silk cloths in the left hand, and then, holding the glass within thick folds of silk, clean both edges and surfaces thoroughly with the other silk cloth. Now breathe upon either surface; any imperfection in the cleaning becomes visible on the film of vapour by a want of uniformity, either of the film itself or of its evaporation. Clean and polish once more if imperfections are thus discovered. When these are thoroughly removed, be careful finally to remove all particles or fibres, either of silk or cotton, which adhere tenaciously to the glass by reason of the electricity developed by friction whilst cleaning. Such fibres can be easily brushed off with a light broad sable pencil. The glass is now ready to receive the collodion. If the plate is of small size, hold it by the left-hand corner, between the first finger and thumb of the left-hand, and pour the collodion upon the plate, beginning at the farther right-hand corner; and incline the plate with the left hand whilst pouring the collodion with the right hand. When the surface of the plate is nearly three-fourths covered, cease pouring any more collodion, but incline the plate now in two directions, so that the surplus collodion may flow off by the nearer right-hand corner into the collodion vial. As soon as the film has set, or is nearly dry (a condition which takes place in a few seconds), the plate is immersed in a bath of nitrate of silver, and is allowed to remain in this bath until the surface becomes uniformly of a cream colour. If the bath is in good order the film assumes this colour in a couple of minutes; the plate is then taken out from this bath, and the superfluous nitrate of silver is allowed to flow back again into the bath for about a minute or so, and is then introduced into the plate-holder and exposed to the view in the camera for a second or so, as the case may be. The great tendency of young photographers is to expose too long; a fraction of a second in a well-lighted view, and a second or two, when the sky is cloudy, is sufficient time with most lenses. Of this department I will teach you more hereafter.

I will now return with the plate-holder into the dark-room, and see what we have got. The film seems to have undergone no change whatever; but the moment I apply what is called a *developer*, the picture becomes manifest, as if by magic. There is now so much to be said, and seen, and done, that it is better to postpone further development until the next lesson.

* From *Humphrey's Journal*.

† Iodide of silver is prepared by dissolving a grain of nitrate of silver in the smallest quantity of water in one test tube, and two or three grains of iodide of potassium in the same manner in another. Then drop gradually of the latter solution into the former as long as a yellow precipitate is formed. As soon as the precipitate subsides, decant the supernatant liquid, and wash the residue several times with water. This yellow substance is iodide of silver, which may be kept a long time in the dark room without change.

Marine Glue.—Dissolve 4 parts of india-rubber in 34 parts of coal tar naphtha—aiding the solution with heat and agitation. The solution is then thick as cream, and it should be added to 64 parts of powdered shellac which must be heated in the mixture till all is dissolved. While the mixture is hot it is poured on plates of metal in sheets like leather. It can be kept in that state, and when it is required to be used, it is put into a pot and heated till is soft, and then applied with a brush to the surfaces to be joined. Two pieces of wood joined with this cement can scarcely be sundered—it is about as easy to break the wood as the joint.

## ENGLISH APPARATUS.—EXAMINATION OF DALLMEYER'S BINOCULAR CAMERA AND LENSES.

BY DR. VAN MONCKHOVEN.*

[Dr. Van Monckhoven is preparing for the press a new edition of *Traité dé Général de Photographie*, of which the substance of this description will form a chapter. When the article first appeared in the *Moniteur* some months ago, the worthy doctor requested us to reproduce it in our pages, which the pressure on our space has hitherto prevented us from doing. As the author has recently reminded us of our promise, we hasten to fulfil it, feeling much pleasure in recording the tribute of a continental author to the superiority of English lenses and apparatus. We may remark that the description has already been reproduced in an English journal, but without any reference to the journal in which it originally appeared. We mention this simply to remove the chance of further false charges, from what a continental *littérateur* recently styled our "aggressive" contemporary.—Ed. P. N.]

"I send you a description of the stereoscopic apparatus of Mr. Dallmeyer, which has obtained, as you know, well merited success in England and in Germany. It is with this instrument that the instantaneous views of the Boulevards of Paris have been secured by Messrs. Ferrier and Soulier. During my last visit to Paris I was able to ascertain that this apparatus was still nearly unknown there. This determined me to send you a detailed description, with the diagrams which

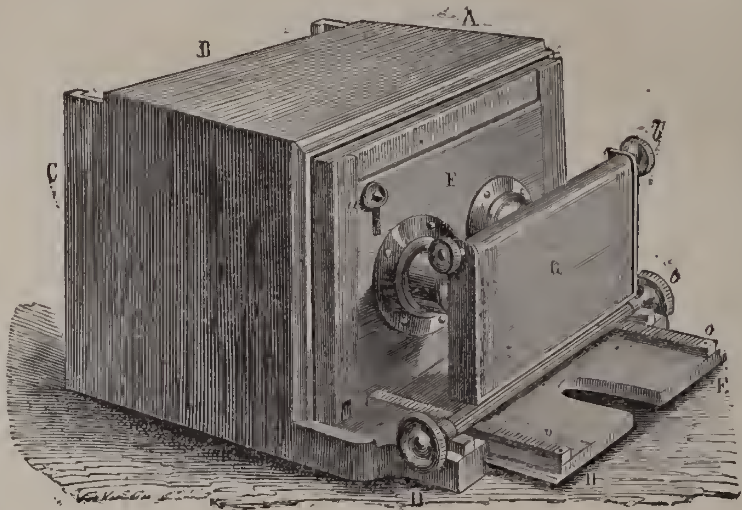


Fig. 1.

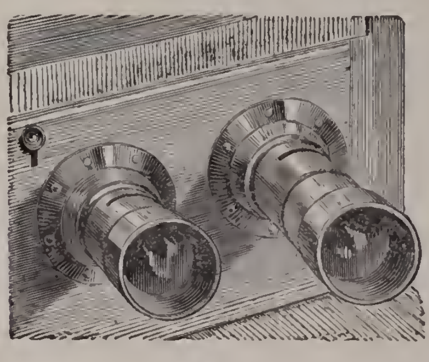


Fig. 2.

I have had executed for the fourth edition of my *Traité de Photographie*.

"All the world agrees at the present time to regard Messrs. Dallmeyer, Merz, Secretan, and Voigtlander, as the first opticians of Europe. I understand by the term optician, not a simple manufacturer, but a man perfectly familiar with mathematics, as well as practical optics, who does not confine himself to empirical efforts after perfection, but having enough of genius to create at once theoretically, an instrument, which his practical skill shall bring subsequently to absolute perfection.

It is necessary that an author should keep himself familiar with the works of such manufacturers. The English journals had repeatedly recorded the great progress realized by Mr. Dallmeyer, in his binocular stereoscopic apparatus, and I eagerly availed myself of the first opportunity of ordering a set. The result of my experience on trial was so satisfactory, that I made some diagrams of the instrument, persuaded that a minute description will be found useful to those readers who have not had an opportunity to examine the apparatus itself.

Figures 1 to 10 represent the different parts of the apparatus; figure 1 showing it complete. Before speaking of the value of the lenses, we shall first examine the camera.

Figure 1 is a drawing of the whole apparatus. A B C D represents the body of the camera, which is made of polished mahogany. The corners are brass-bound, in order to afford the best possible protection from the effect of change of temperature. The camera is fixed upon the tripod stand, by means of a nut and screw. The back part of the instrument carries, at B, the ground glass, which is not seen in the diagram. In the method adopted by Mr. Dallmeyer, this part, instead of moving, as is customary, is stationary, as he prefers that the ground glass should remain absolutely fixed and steady, as affording better facilities for focussing. The front part, F, carrying the two lenses, are put in motion by a pinion, *c*, travelling upon two racks *o o*, fixed to the part E, which is the base of the moveable body of the camera; whilst

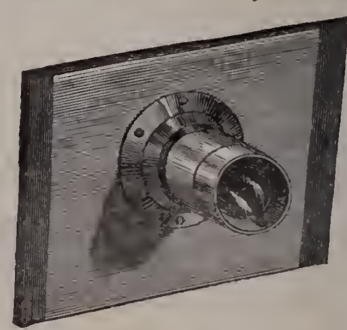


Fig. 3.

the pinion *c* is attached to the lower part D extending in front of the camera A C.

The focussing is thus rendered very easy. Whilst examining the image on the ground-glass, the pinion *c* is easily turned by the hand. The front piece F, which carries the lenses, can be raised or depressed at will, and fixed in its place by the nut *a*. When it is necessary to remove the front the lenses should be drawn out, as is shown in figure 2. This front can be withdrawn and replaced by another carrying the triple lens, fig. 3.

The interior of the camera (fig. 4.) is arranged very inge-

* From *Le Moniteur de la Photographie*.

niously. When operating with two lenses it is necessary that a partition should separate the two images; but when, on the contrary, it is used for single pictures, the partition requires to be withdrawn. To obtain this object the manu-

Fig. 4.

facturer makes use of a pliable piece, fig. 6, which can be placed in the groove *a*, fig. 4, belonging to the moveable part B of the camera; and on fixing it by closing the bolts *b* and *d*, it is easily seen that in lengthening or shortening the camera the pliable partition yields to these movements, and divides the interior completely into two distinct parts.

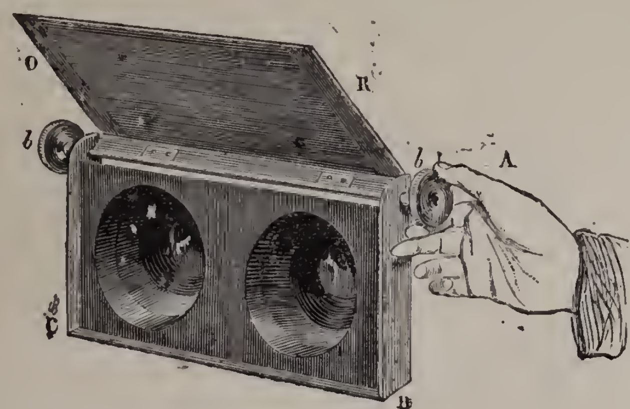



Fig. 10.

The chassis, or dark-slide, fig. 7, carries a small inner frame, fig. 8, for stereoscopic plates, with corners of silver wire. The dark slide itself will take plates seven inches and a quarter by four inches and a half. We recommend the reader to make use of plates of these dimensions, even for stereoscopic negatives. They are, of course, too large, but they aid in avoiding those stains on the print, which, as all photographers know, are apt to occur on the edge of the negative. These plates are intended for groups and

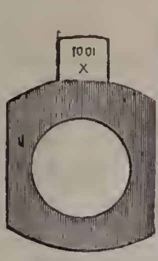


Fig. 5.

Fig. 6.

views on the entire plate, to be taken with the triple lens after removing the partition.

The dark-slide, fig. 7, merits especial attention for the ingenious arrangement devised by the manufacturer to receive the excess of silver solution. Fig. 9 shows this arrangement. The silver wire serves to keep the glass steady, whilst it rests on *c* at the extremities only. The nitrate solution which had accumulated flows into the groove *b*, which is coated with wax. Even when using the stereoscopic inner frame, fig. 8, the solution can only flow into the groove. The arrangement is very ingenious and we recommend it cordially to French cabinet makers. In conclusion, so far as the camera is concerned, we may remark that it is of mahogany, polished and varnished, this wood being generally preferred for such pur-

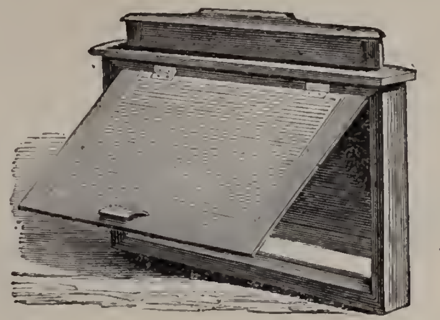


Fig. 7.

poses in England and Germany. The body of the camera can be extended from three inches and a half to seven inches.

The lenses carry upon the hood the instantaneous shutter. This consists of a simple piece of polished mahogany, which is shown closed in fig. 1, and opened in fig. 10. The part C B in the latter is fixed upon the lenses. A rod of brass, furnished with two milled heads, *b b*, carries the lid or shutter O R. One great advantage secured by this shutter consists in the fact that the sky receives less exposure than the foreground, and thus affords facilities for securing the delineation of clouds in instantaneous views.

In using this shutter, a certain amount of skill is necessary in the manipulation. We think that, in the act of opening and closing, a movement may be communicated to the plate, unless the operator possess considerable skill and coolness. It has not our entire approbation, and we are convinced that some better arrangement may be found.*

We come, finally, to the lenses. They are double combinations, of an inch and a quarter, and an inch and a half aperture, and three inches and a half back focus. Fig. 2 shows the open-

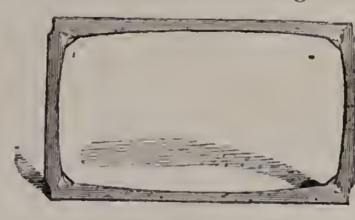


Fig. 8.

ing in which the diaphragms are placed, one of which is shown at fig. 5. These diaphragms are numerous. In counting from the largest, the time of exposure is just doubled, except in the case of those marked with a cross, X, which only require one-half more exposure than with the one preceding. These lenses may be used with their full aperture, and we confess to have been enraptured the first time we examined

* A new shutter has since been brought out by Mr. Dallmeyer which is not open to these objections.

them. We focussed a tree nearly ten yards distant, and the background of the landscape, situated about a mile and a quarter beyond, was perfectly well defined. In a second experiment, we focussed the same tree at the same distance, and persons passing between the tree and the lens were all defined with a perfection truly satisfactory. The quality

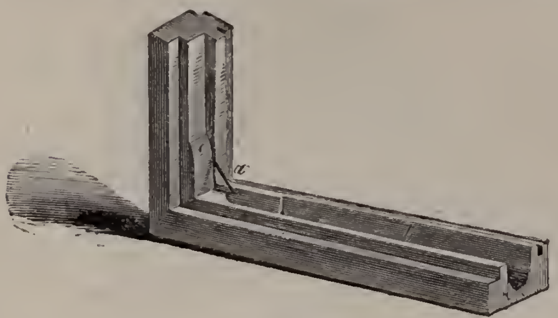


Fig. 9.

which the English call "depth of focus," it will be seen, is here very admirably obtained. As double lenses for views, that is to say, possessing fine definition, with great intensity and brilliancy united, we have never seen lenses which were comparable to these.

The use of diaphragms permits the employment of the same objectives for reproductions and for enlargements, which demand great precision and delicacy. For these purposes sufficient definition is here obtained with a diaphragm of medium size; and with the great advantage over single lenses (which are being abandoned more and more), of giving more correct lines, and a more luminous image.

By removing the partition, fig. 6, and replacing the front, carrying two lenses with that, fig. 3 furnished with the triple lens, the apparatus is transformed in a second into one for larger single views. But of the triple lens we shall speak on another occasion.

## WET OR DRY COLLODION.

BY M. L'ABBE DESPRATZ.*

Beside the iodide of silver photogenically modified, there is also that which has not been affected, besides free nitrate of silver. At the moment when the plate is put in contact with the sulphate of iron, all this free nitrate of silver is decomposed, the iodides remaining intact. But what becomes of the nitric acid? we need not examine this question here: as to the silver, that is to say, the base with which the nitric acid is combined, one portion becomes free and diffused in the water of the bath, while the remainder combines with, and adheres to, the iodide which has been modified by light. Thus, for the sulphate of iron developer to be active, is it necessary for some nitrate of silver to remain upon the plate; do we require a proof of it? then carefully wash the plate upon its removal from the camera, and it will be impossible to obtain anything in the sulphate of iron bath; whereas, if, after the washing, the plate is sensitized anew, the developer, by the restored nitrate, will become active again, and nearly as uniformly and as strongly as if the plate had not been washed.

The free nitrate of silver on the plate must be reduced to the metallic state, in order for an image to be formed; it is necessary to ensure the deposit as regularly as possible. To obtain this result with certainty, I proceed to give the various methods in which I have experimented.

It is first necessary to be sure that the silver solution is spread uniformly over the plate. It must not be in excess. We must therefore take the precaution of letting it drain properly before exposure in the camera. If, at the moment of submitting it to the sulphate bath, we remark, especially on the edges, any liquid veins, they must be absorbed by blotting paper. For when they come in contact with the bath, the reduction of the silver is made in too large a mass of liquid, and there will be a formation of a metallic deposit which will extend irregularly, so as to be too thick in some places, and not thick enough in others. Supposing, then, that the nitrate of silver is spread uniformly upon the plate, it then becomes necessary to maintain it so, or at least to do nothing to expel it from the place it occupies. For it does not exist in a state of combination, but simply in that of simple superficial juxtaposition.

If the plate is placed on a levelling-stand, it will be possible to obtain, most frequently, a good development, especially if the dimensions of the plate be not too large. To this end, it is sufficient to raise it slightly on one side, and to pour on this upper side a sufficient quantity of developing solution to flow in an even uninterrupted stream to the opposite side. Practice in this method will give sufficient skill to secure a good negative generally. It is not always successful, and we now proceed to describe two other methods which are, of a certainty, much more preferable.

Take a flat dish about one-third longer than the glass negative. Then pour into it a sufficient quantity of the developing solution to cover the plate amply—the dish being inclined so as to bring the liquid to one of the narrowest sides—then place the plate on the clear space of the dish, collodion side uppermost. Then, inclining the dish, cause the liquid to flow over the collodion film as evenly as possible. *Almost always*, if not always, the deposit of silver is formed instantly, and with perfect regularity. Nevertheless, if the developing solution arrives suddenly upon the plate in too large a quantity, it may derange the coating of nitrate of silver, and cause an irregular deposit of that metal. This method, therefore, requires a certain manual dexterity; another and simpler method, and which we still prefer, is as follows:—the dish containing the sulphate is placed level; a layer of liquid, eight-tenths of an inch deep, at the most, is sufficient; we then rest the plate on its longest side, the impressed film opposite the liquid. Then, by means of a silver hook, lower the plate slowly and regularly into the liquid. By proceeding in this manner we do not disturb the layer of nitrate of silver, and the deposit is always made with the desired harmony.

In the fear of extending this article to too great a length, we must defer what we have to say on the *concentrated* sulphate of iron developing bath, and upon that mode practised for intensifying, which seems to us the most preferable.—*Moniteur de la Photographie.*

* Continued from p. 443.

## Proceedings of Societies.

### North London Photographic Association.

The first meeting of this Association, after the summer recess, was held at Myddelton Hall, on the evening of the 17th inst. Mr. G. Shadbolt in the chair.

The minutes of a previous meeting having been read and confirmed, Mr. H. Greenwood and Mr. James Cooper were elected members of the Society.

Mr. Wharton Simpson exhibited a large series of prints, 7 by 4½, instantaneous and otherwise, photographed by Mr. Wilson, of Aberdeen, and published by Messrs. Marion and Co. The prints were examined with great interest, and received much admiration. In answer to questions, it was stated that they were produced by the wet process, with Dallmeyer's No. 1 triple lens. The magnificent cloud effects of many of the instantaneous pictures were specially admired.

The Secretary read a paper by Dr. Maddox on photomicrography, or the production of enlarged images of microscopic objects. The paper was accompanied by a number of fine specimens of transverse sections of plant stems, parasitic insects, &c. At the conclusion of the paper, these were carefully examined and pronounced of unusual excellence; but no discussion ensued.

Professor Emerson, of Troy University, United States, in answer to a question by the Chairman, stated that he had not done anything with photography in connection with the microscope, except prepare some dry plates for the experiments of Professor Rood, and the dry plates were found to answer as well as wet collodion.

A collection of stereographs was then exhibited by Professor Emerson, who explained that they had not been brought with any especial view to being shown in this country, they were merely the prints he had received as a member of the Amateur Exchange Club, in the United States. He had thought, however, it might be interesting to the meeting to see the work of American amateurs in the art. The stereoscope was shown one of a cheap form, got up by Mr. Anthony, with his (Mr. Emerson's) improvement.

The Chairman explained that the instrument possessed a facility of separating or closing the lenses. The object of the arrangement had been explained by Professor Emerson, in an article in *Siliman's Journal*, which had been reprinted in most of the English journals, and members might remember it.*

The majority of the stereographs shown were very good; and included specimens by several photographers, whose names are well known to English readers, such as Anthony, Borda, Hull, Shriver, Thompson, Sellers, and others. There were excellent specimens by the tannin process, by the milk process, and by wet collodion. Each slide had a label at the back, with the name of the photographer, and particulars of lens, process, exposure, &c., after the manner described on p. 612, Vol. VI. of the Photographic News.

Mr. Simpson called attention to one picture described as taken with Harrison's new lens, and asked if it were by the new lens intended to include a very wide angle, and, if so, what was the real focus of the lens.

Professor Emerson stated that it was. The lens had a focus of two inches and a half, and covered a picture of five inches square. The lenses consisted of two sections of the same sphere, and were arranged in the combination in their proper position as parts of a sphere. He was not aware whether the focus named was intended to express the equivalent focus or the measurement from the back glass.

The Chairman conceived that it must refer to the measurement from the back glass, as otherwise the plate would be almost in contact with the back of the lens if it were of any dimensions at all. Moreover, the print did not appear to include a very wide angle of subject.

Mr. Simpson asked Professor Emerson if he had had any experience in the ammonia acceleration of dry plates, and if there were any tendency to fogging induced by its action.

Professor Emerson stated that the accelerating action of ammonia was unquestionably a fact, and he had used it successfully. He had, on first trying it, found some tendency to fog, but by care in developing, and the regulation of the proper proportion of citric acid, the difficulty was removed.

The Chairman asked at what time the plates were submitted to the ammonia, and if any difficulty were experienced, as was sometimes in the Daguerreotype process with iodine, in securing even and regular action all over the plate.

Professor Emerson said it was applied shortly before exposure, and no difficulty was experienced in getting regular action. He just placed a saucer in the bottom of a box, and in it a piece of cotton wool saturated with ammonia.

Mr. Simpson suggested that the ordinary iodizing box, used in the Daguerreotype process, would answer the purpose.

Professor Emerson: Very well indeed.

Mr. Hislop asked Professor Emerson if he had had any experience in the hot water acceleration of dry plates.

Professor Emerson pointed out some excellent specimens, taken on tannin plates in 30 seconds, in which the aid of hot water, in developing had been used.

Mr. Hislop said he believed that experiment in that direction would be well repayed. He had recently been trying it with plates simply washed and dried, as he had before described. With a stereo lens and small stop he had obtained a good negative in ten seconds. The plate, before development, was immersed in water at about 200°, and then developed with the ordinary pyro solution. The result was as good as if the plate had had, under ordinary circumstances, three minutes' exposure

* See p. 8 of the present volume of the Photographic News.

The chief difficulty he experienced was the tendency of the plate to dry when thus heated.

Mr. Simpson then exhibited some prints on resinized paper, by Mr. H. Cooper, jun. He had only just, before coming to the meeting, received the communication and the specimens, and could not, therefore, enter into details of the manipulation (see page 494); but he was so much impressed with the importance of the process, and the promise of the results, that he lost no time in calling attention to the prints.

The specimens were examined with much interest, and high opinion of their promise expressed by many members; both as regarded quality and probability of permanency.

Votes of thanks having been passed to the several gentlemen who had contributed to the interest of the meeting, the proceedings terminated.

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—Before dismissing the silver bath, and the troubles it but too frequently gives birth to, I feel bound to add a word or two on the subject of printing from weak and dense negatives.

If the quantity of silver a paper contains is governed by the amount of chlorine mixed with the albumen, then must the formulas given to meet the requirements of the above mentioned class of negatives, be based on uncertain grounds, for I am at a loss to understand in printing from a hard negative, how a weak bath is to meet the difficulty if a strongly chloridized paper is used; and on the other hand, I am equally at a loss to discover what improvement can be derived from the use of a strong bath in connection with a weakly salted paper for printing from a negative of a feeble character.

If my former remarks, which treat on the chemical decomposition that follows the floating a salted paper on the surface of the sensitizing bath, are correct, it necessarily follows that formulas given for the purpose of getting the best results faulty negatives are capable of producing, are empirical, and, as such, uncertain in their practical working. As the results will depend entirely on the quantity of chlorine the paper contains, it is evident the larger the proportion of silver in the form of a chloride, its surface is chemically prepared to absorb, the more vigorous must be the prints, let the bath be weak or strong; that is to say, if the floating is sufficiently long to produce saturation, if not, there cannot exist the necessary proportion of free nitrate to give the print the equally necessary stability to secure brilliancy in its finished state; but I need go no further into details, the conditions required to obtain a weak or strong body of reduced silver in the paper are obvious, viz.: a weakly salted paper slightly albumenized for a dense negative, and a strongly salted one, with a proportionate increase of albumen for a feeble one,—the strength of bath in both cases may be the same, although a little difference should be observed in the time of floating.

With these remarks I bid adieu to the silver bath, but before examining the negatives previous to printing, I shall briefly detail the results of a series of experiments entered into during the past week, with an acetate toning bath. Selecting a sample of paper, which, under ordinary treatment, invariably produces mealiness; and another, that under the same circumstances gives good results. I floated each for two minutes on a 75-grain bath, hung it up, and allowed it to dry spontaneously. After the exposure in full sunshine, and the usual washings, I immersed the first two prints in the acetate bath, made by the formula given with your remarks on toning. The changes proceeded rapidly; but, "angels and ministers of grace defend us!" Such a crop of mealiness never before greeted mine eyes. Anticipating this result, I had provided an equal quantity of acetate of soda in solution to that the bath contained, this was added, which brought it up to the strength recommended by Maxwell Lyte. After a few minutes I immersed two more prints, this time the action was slower, but still mealiness—though greatly modified—made its appearance in paper No. 1; paper No. 2 was all right. I now added, drop by drop, from a bottle containing a saturated solution of the acetate, until the progress of mealiness was stayed. I then submitted several prints to the action of the bath. Paper No. 1 gave good results, but paper No. 2 found the dose too strong, and became washy and pale, thus proving the impossibility of producing a formula that is capable of meeting the requirements of every kind of paper. The first sample mentioned, is, in appearance, the most perfect I ever saw, but from the slight diminution of strength sustained by the silver bath, I attribute its faults to injudicious salting, the quantity of chlorine being altogether disproportionate to the large amount of albumen which covers its highly glazed and perfectly even surface; and for this reason it requires a large excess of the clearing agent to remove the unusual quantity of what I shall now term a bastard albuminate of silver. Although for experiment I used a new bath on this occasion, for ordinary purposes I would strongly recommend an acetate of soda bath, to be made two or three days prior to its being used; for, as I have before observed, as a general rule, the more evenly the gold and reducing agent can be balanced, the more brilliant will be the finished prints, and this balance can be best produced spontaneously.

Whilst treating on the toning bath, I shall have a word or two more on this subject. At present I shall conclude by urging photographers to refrain from running to all points of the compass for supplies of paper. Get two or three samples of different strengths, and adhere to their use. I myself am almost bewildered with the varieties I have to print from, and all in one batch, to be toned in one bath; and no argument will persuade my employer that he is doing wrong. Like a remark I once heard made, by one whose knowledge of mechanical philosophy (in spite of a former red tape successful examination), was but scant: "if water can be safely boiled in a tin vessel, there is no visible reason why oil should not." So he believes that a toning bath that will tone one paper satisfactorily, should give the same results with every sample submitted to its action.—Yours respectfully, A Photo's Assistant.

## FRONT LIGHT IN GLASS ROOMS.

Sir,—Your correspondent, "H. G. B.," did not honour my "Chat about Glass Houses" with a very attentive perusal, or he would not assert that I gave no reasons for my belief in the value of a front light. If the writer will again refer to the article in question, he will find I recommend the front light for the following reasons:—

1. Light from the front falls upon advancing surfaces, and so gives emphasis to their prominence.
2. The shades fall upon the retreating surfaces, and so keep them back in their places.
3. The side of the face in shadow receives a subordinate light from the front, which, stealing softly into even the very deepest shadows, gives them detail and transparency.
4. By the same means it also secures greater delicacy and softness for the less strongly marked shades, and marks the retiring surfaces more palpably.
5. Able men, building glass-houses, and having a front light (whether they get it originally by accident or design matters not), *use it*. In Mr. Window's room (which is rather a small one), the light is subdued with coloured glass; in Mr. Fry's (which is a large one), the distance itself subdues it; but both these gentleman, although perfectly able to exclude the front light, nevertheless use it.—Yours truly,

A. H. Wall.

## MORE JOURNALISTIC COURTESIES.

Dear Sir,—An article by Mr. Dawson, in the last number of your "Liverpool" contemporary, entitled, "A Lesson for the Learned," has brought very forcibly to my remembrance an old adage which tells us, that "We cannot touch pitch without becoming *defiled*," for it shows that even the mere attachment to the *staff* of a "publisher and proprietor," who renders his periodical a disgrace to journalism by its abusive scurrility, tends to deprive a man of the power of writing in courteous and gentlemanly terms.

Do *gentlemen* usually convey covert insinuations in their "few words of explanation?" for I do not understand the meaning of words, unless "*in the guise of a letter from a correspondent*," be so intended.

I was going to quote another old adage, which tells us, that "The old woman would not have known where to look for her daughter, unless she had been in the oven *herself*;" but a new light has broken in upon my mental vision; *perhaps* I am guilty of an injustice, in supposing it possible, that a person holding the situation of "Lecturer on Photography, at King's College," could be guilty of writing in ungentlemanly terms; and, perhaps, it *may* be the case, that what I took for covert insinuation, was, in reality, intended for a *home* thrust, to afford a gentle hint to us of the outer world, that in the journal with which Mr. Dawson is connected, letters have *sometimes* been concocted for the *sole* purpose of aiming sarcasms and inuendos against the *News* and *Notes*, in the "Answers to Correspondents;" and, *perhaps*, also, "the Editor" is coupled with the words, "were he one of my pupils," merely as to hinting the *author* of these concoctions, and *not*, as I imagined, in continuation of a covert insinuation.

As Mr. Dawson recently deplored the existence of "*much ignorance* in quarters where it ought not to be expected," allow me to mention, yet another old adage, which tells us, that "Charity begins at *home*," and also to recommend him as "a photographic teacher," to prevent the dissemination of untruth through the pages of the "*Liverpool*" *Journal*, by correcting the errors that are sometimes to be found in the answers to *bonâ fide* "correspondence."

As abuse, scurrility, sarcasm, inuendo, and covert insinuation are foreign to the notion of a "British" gentleman, the term "British" is a *misnomer*, when applied to any journal which habitually uses such weapons of attack. I have, therefore, designated it the "Liverpool."—I remain, dear sir, yours truly, George Price.

[We, some weeks ago, intimated our intention of passing unnoticed all further scurrilities in the Liverpool Journal, and have suppressed several letters sent for publication on the subject. In deference, however, to a frequent and valued correspondent, who, in a private note, urges that as he speaks not under an *alias*, but in his own name, and is known to many readers of both papers, he has a claim to be heard on a subject concerning all our readers—we waive our resolve. Until we received this letter, we had not read Mr. Dawson's communication. On doing so, we find him fighting a phantom, and as the amusement is harmless we leave him to it.]

## DECOMPOSITION OF NITRATE OF SILVER BY ACETATE OF SODA.

Sir,—In a late number of the *British Journal of Photography*, Mr. Dawson gives what he termes, a "*Lesson for the Learned.*" Now, it is because I believe Mr. Dawson to be a good chemist, that I am the more puzzled, when he states, that you may add a solution of acetate of soda to a solution of nitrate of silver, without decomposition; that is to say, without the formation of acetate of silver, giving as a reason that it is so, because it is so very insoluble.

If that white flocculent precipitate, which, from the fact that it is so insoluble, is immediately thrown down, in a curdy mass, on the mixture of these two chemicals, is not acetate of silver, I should much like to know what it is.

As Mr. Dawson's letter was meant in reply to a correpondent of yours, who, curiously enough, dates from this same city, and has the same initial, I must add, that I am not the same man. Bristol air, I suppose, makes us dull of comprehension.—I am, yours obediently,

M. Willett, M.R.C.S.

*Bristol, September 24th, 1862.*

## IODIDES AND BROMIDES IN COLLODION.*

DEAR SIR,—As the question of iodides and bromides is under discussion just now, I would wish the opportunity of saying a few works on the same.

As rightly implied in your editorial, Mr. Sutton's experiments were in a direction away from that which should have given the elucidation desired. He, however, proved that the exclusive use of bromides is accompanied by loss of intensity and of sensitiveness, and this corroborates Mr. Hardwich's statement in a general way, that bromide of silver is less sensitive to the invisible image than iodide of silver. But Mr. Blanchard's experiments appear to have approached closely to a solution of the question of the superiority of a bromo-iodized collodion over a simply iodized one, in point of sensitiveness. Similarly, the experiments of Mr. England apparently point out that a *bromo-iodized* collodion is the most sensitive *under iron development.* On the other hand, I think, it will be held established, as per Mr. Sutton's experiments, that a simply *iodized* collodion is equally sensitive *under pyro development.*

It will have occurred to all experimenters that a bromo-iodized collodion under pyro gives a hard negative, on account of the apparent inactivity of pyro on the bromide salt. It will also have occurred to them that the advantages of an iron development are manifest to perfection *when* there is a bromide in the collodion. And, therefore, under these circumstances, there would, at first sight, appear no little difficulty in establishing the superiority of one system over the other, opposed as they are to each other in radical principles.

In all experiments in such cases, it is of importance that the character of the collodion, the salts and bath employed, and the developers used should be carefully noted. To say that an iodized collodion was employed and compared in results with a bromo-iodized collodion, and found superior to it, will, in fact, prove nothing; what is required is a scrupulously correct detail of every thing—1st. Collodions, whether of one or several samples, and with or without organic reactions; 2nd. Iodides and bromides, whether cadmium, ammonium, potassium, or others, and the proportions used; 3rd. Age of iodized collodion on use; 4th. Developer, whether pyro or iron, and of what strength and age.

It is necessary to show that the collodion is with or without organic reactions, or, at least, of what age, when we consider that density is reciprocally as age and organic reactions, and sensitiveness, now reciprocally and again inversely, as them, and that they materially affect the resulting negative; and that collodion with a slight organic reaction is necessary under iron development, at least sufficient to yield the requisite tangibility of image under iron development, and with the use of a bromide, a salt known to reduce intensity. It should also be shown whether one or more descriptions of collodion are used—a very important information—as it would be a fallacy to array the results of a sensitive collodion bromo-iodized and developed with iron, against those of an inferior one simply iodized and developed with pyro, or *vice versâ.*

The description and proportion of the iodides and bromides used should be carefully noted. A great deal more, as regards sensitiveness, depends upon the combination of iodides and bromides than is suspected, and I shall be better understood on this subject were I have concluded, yet no importance has been attached to this matter. Beyond the generally received fact that cadmium is the most sensitive, no attempt has been made to establish others. It has also been the practice to diminish intensity by a bromide; but this is correct only in principle, and not always successful in practice.

The constitution of the nitrate bath is no unimportant matter in experiments, one abounding with acetate of silver and alcohol, &c., is the least desirable. The only one admissible is a pure unadulterated bath, having had a little careful working. As the question of fused and recrystallized silver is still in an unsatisfactory condition, the best salt from reputable dealers will answer, and, as regards organic matter in water, let the liquid be cleared by light and oxide, and we shall have a good, stable working bath, rectified with nitric acid and oxide.

With developers we have merely to proceed on the received axiom, that the more energetic the developer the shorter the exposure, and, under the circumstances, we hold iron superior to pyro. But iron development is seen to perfection in the presence of bromide, and when of some age and of a good strength. Moreover, Gaudin has shown what is proved in daily practice among the Parisian portraitists, that the proto-acetate is superior to the sulphate. The larger the proportion of bromide, the greater the strength necessary in the developer; but when pyro is used we must eliminate the bromide principle.

Admitting the general correctness of the above principles, I propose to use a collodion of well known quality, durable, sensitive, and yielding sufficient density with a bromide under iron development; a bath made up of pure recrystallized silver and water, from which the organic matter has been precipitated by oxide of silver, and which has been sufficiently saturated with iodide by the immersion of a dozen plates in it, and very slightly acid. As the principle of sensitiveness is under investigation, I will use iodide of cadmium as the chief component of my iodizer, for I want a stable and progressively sensitive collodion. My developer, acetate of iron.

To solve the question of *increase of sensitiveness by the presence of a bromide in collodion,* I propose to iodize a portion of the above-mentioned collodion with iodide of cadmium only. Another portion, with 3 grains of iodide of cadmium to $1\frac{1}{2}$ grains of iodide of ammonium, and a third portion with 3 grains of iodide of cadmium, to $1\frac{1}{2}$ grains of bromide of ammonium.

When a month old (say two months in England), coat, sensitize, and expose plates to the same subjects, at one and the same hour of the day. It will be found that the iodide of cadmium is not the most sensitive, because it has not sufficiently ripened, and because it has not attained its maximum sensitiveness. The *first* in the list of sensitiveness will be the iodide of cadmium plus *iodide of ammonium* collodion; and the *second* the iodide of cadmium plus *bromide of ammonium.* I have also added to a portion of the cadmium iodized collodion, as much ammonium iodized collodion as would give the proportion of 3 grains of iodide of cadmium to $1\frac{1}{2}$ grains of iodide of ammonium, as before, and to a separate portion of bromide of ammonium collodion as would give in the resulting collodion 3 grains iodide of cadmium to $1\frac{1}{2}$ grain bromide of ammonium. In both cases I have secured within a week increased sensitiveness over the simply iodized cadmium collodion, but the iodide of cadmium plus iodide of ammonium collodion, was superior in sensitiveness to the iodide of cadmium plus bromide of ammonium collodion. I have kept these collodions for long periods. The simple cadmium collodion continued permanent until it attained its maximum sensitiveness, *i. e.* it kept the longest, and excelled the other two in sensitiveness; but the iodide of cadmium plus bromide of ammonium collodion was inferior in durability and sensitiveness to the iodide of cadmium plus iodide of ammonium collodion.

I next tried these collodions with a pyro developer of the usual strength, of 1 grain to the ounce, and found as usual, that the bromized collodion was inferior in sensitiveness to the iodized ones; but I also found that the iodized ones under pyro development were inferior in results than when developed by acetate of iron.

* This communication from Mr. Augustus Webb, of Meerut, India, has been in type for some weeks, but on account of its extreme length has stood over. We are now compelled to divide it, but shall endeavour to complete it next week, when we shall probably have a word or two to say on the subject. —ED.

## Talk in the Studio.

Novel Photographic Forgeries.—The novel mania for collecting rare postage stamps, and the scarcity of some of the specimens, has given rise to a novel application of photography, as a means of counterfeiting the coveted labels. Many foreign stamps, it is well known, are printed in some dark, neutral tint —brown, or black, or purple. These are easily imitated by photography, together with the cancel marks upon them, rendering detection to an untechnical eye very difficult.

Photographic Sale.—We notice with regret that early in November, the whole of the photographic effects of Mr. Roger Fenton for sale, consisting of lenses, apparatus, &c., and several hundreds of published and unpublished negatives, will be offered for sale.

The Colour of Infinite Atoms.—Any substance in infinite division must of necessity be black, from its not having breadth enough to reflect a ray of light, which requires certain definite dimensions that philosophers have measured. Metals of all colours exhibit the same phenomenon; white silver, yellow gold and red copper may all be reduced from solutions in powder so fine that they are black.

Mr. Thompson's Changing Box.—Most of our readers will have become aware that Mr Thompson of New York, whose interesting letters on photographic matters in America appear in our pages, has a very excellent changing box for dry plates, which is the envy of many of his photographic brethren in the States. The only information that he could give on the subject was that he bought the box of an Englishman whose name he he did not remember. This box converted Mr. Coleman Sellers from wet photography to dry photography, and he immediately got a box made as nearly as possible on the same model, and has recently described it in detail. We are glad to be able to inform our American as well as our English readers that Mr. Jabez Hughes is the manufacturer of the changing box in question. We have just had a letter from Mr. Werge, who is manager of Mr. Hughes' Oxford street business, in which he says: —"I am the veritable 'Englishman' who sold the camera and changing box to Mr. Thompson, who is one of the firm of Thompson Brothers, Bankers, Wall Street, New York. Mr. Hughes has one of these changing boxes in use now at Ryde, and I dare say you saw the camera and change box too when you were down there last April, if not, if you will have the kindness to call at 379 Oxford Street, I can show you one. We have made the changing box in various sizes from stereoscopic to 9×7. It is but fair to state that Mr. Rayne, one of our workmen, is the inventor of the changing box."

Photography at King's College.—Mr. Dawson, lecturer on photography at King's College in a recent note mentions that his classes are just about to reopen, and asks us to remind our readers of the fact. Amateurs contemplating further instruction will find in Mr. Dawson a first-rate photographer and able eacher.

Large Panoramic Pictures.—Mr. Ross is progressing with the manufacture of complete sets of apparatus for large-sized panoramic pictures. We have before us a print of 16 inches by 7 inches, produced by a lens of 5 inches diameter, and 9 inches focus. The photograph is a view of a square in Bath, taken by Mr. Dawson, and, as exhibiting the capabilities of the lens, is a most satisfactory picture, although we cannot help regretting that the same amount of good photography was not expended on a more interesting and pictorial subject. We have also seen a complete set of apparatus with a lens of 6 inches diameter, and 11 inches focus, intended for pictures 18 inches long. Mr. Ross calculates that the panoramic lens, with an aperture of one-seventeenth of its focus, will cover two inches of picture for every inch of focus. This, with the last-mentioned lens, would give 22-inch pictures, but in case of the large lenses it is deemed prudent not to push them too far. For the size most commonly used, the lens of 3-inch focus, producing 10-inch pictures, porcelain baths of the proper curve, have now been made.

South London Photographic Society.—The members of this society propose to conclude their open air season by a meeting at Dulwich, on Saturday, October 4th, where they will dine together at the "Greyhound Inn." Members desiring tickets, which are five shillings each, are requested to make application before October 1st, to the Secretary, Mr. Alfred Harman, 3, Albert Cottages, Hill Street, Peckham.

Photographs at South Kensington.—The recently issued report on the Museum at South Kensington states, that the number of photographs issued during the year is 8884, and the amount received for them £705.

## To Correspondents.

W. C.—Unless you have some skill in landscape painting do not attempt to paint skies in your negatives. The attempt is perilous, and failure is more common than success. The method adopted by Mr. Mudd is, however, the nearest approximation which may be attempted by unpractised hands with any chance of success. In his case, the bulk of the sky is blacked out with any opaque colour, lamphlack answering very well. A few delicate, irregular streaks near the horizon, resembling stratus or cirrostratus clouds, are formed by clearing away a portion of the opaque colour, and allowing the sky, which is not too dense, to print through. In all cases the painting should be done at the back of the negative, which prevents any attempt at clouds from printing sharp or too well defined. In some cases clouds are painted on very thin, semi-transparent paper, which is placed at the back of the negative. No plan can be laid down which would be applicable to general cases; judgment and artistic skill must always be exercised, and, in all cases, beware of attempting more than you can certainly effect well.

T. P. G.—The "Photogen" is a patented apparatus; but the patent refers to the manufacture of the lamp, not to the use of it. Anybody possessing one is quite at liberty to use it, provided it has been manufactured by the patentee. The cost is about £5 or £6, and probably about £1 fitting up. The material used costs a few pence for each picture. The apparatus consists of a lamp, with flue or chimney, in which to burn a pyrotechnic preparation, which emits, during combustion, a very vivid, white light. The chimney is to carry off the fumes, and must be connected with the open air. The patent refers to the lamp used. We have seen very respectable photographs produced by its aid.

R. G.—With a bromo-iodized collodion a much stronger pyrogallic developer may be used than with an iodide only. But we always prefer iron and subsequent intensifying. We shall be glad to see you when you are in town. We are always at the office on Thursday afternoon. For any other time we must make a special appointment.

Z. C.—India-rubber cement, made by dissolving india-rubber in chloroform or bisulphide of carbon, is the best material for joining the edges of vulcanized tubing. 2. Condy's fluid, or a solution of an alkaline permanganate, may be used for purifying the water of which a silver bath is to be made; but should be added to a silver solution. 3. Hyposulphite of soda or sulphate of iron falling into a nitrate bath will spoil it. If only a small portion fell in, it might be possible to remedy it, but as a general rule, it would be best to throw the whole down and make a fresh bath, as it is unwise to work with a silver bath of doubtful quality. 4. The addition of too much acetate of soda to a bath is injurious: excess of acetate of silver will, of course, be formed, and this will have many injurious effects, one of which will be that you name, a tendency to form in small crystals on the plate, and we do not know of any means of preventing it. The addition of nitric acid will decompose the acetate of silver, and leave free acetic acid in the bath.

J. C. L.—We think it probable that if you add a printing-bath made with distilled water, and given to discolouration, to one made of common water which does not discolour, that bath will be likely to discolour in future, but we have never tried the experiment.

R. C. H., Aurungabad.—So far as we know, both the collodions you have used for your tannin plates are simply iodized, and in our experiments a freely bromized collodion is necessary for good results by that process. So far as we understand the steps you have taken, that is the only defect. But we cannot understand your getting a faint image without any intensity. Try the addition of a bromide to your collodion, and development at the ordinary temperature.

R. H.—We cannot state here at length the steps necessary to recover the silver from various waste solutions: instructions have often appeared in our pages. In old developing solutions it will be gradually precipitated in a metallic form, if left to stand. From fixing solutions it should be precipitated by means of liver of sulphur. Full instructions are given in No. 126 of The Photographic News, p. 50, Vol. v. 2. We know of no method of removing the gloss from your background painted in oil, except giving it another coat of oil flatting. That is, paint mixed chiefly with turpentine. 3. The changing box described by Mr. Sellers, is made on the pattern of one which is made and sold at Mr Hughes' establishment, in Oxford-street. 4. The negative of your card picture is a little lacking in intensity. If it were a little more intense it would admit of deeper printing and toning, and more brilliancy would be the result. With this improvement, and a little more perfect background, the picture would be good. The position of the figure is somewhat stiff.

J. D. D.—Several articles on the production of photographic transparencies have recently appeared in our pages. There is one in the number for August 29th, and another, by Mr. England, in the number for April 11th. Instructions for painting such slides appeared in the News for April 4th. We do not know of any one having second-hand slides for sale. Several photographic houses publish such slides. We may mention Bland and Co. Negretti and Zambra, Horne and Thornthwaite, and others.

Varnish.—It sometimes happens that the intensity of a negative is much reduced by varnishing, when the collodion is of a very powdery character. In such a case, a coating of albumen, or gum water, while the plate is wet, would prevent the varnish penetrating. The use of an amber or crystal varnish would also aid you.

Several correspondents in our next.

*** Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Letters intended for the Editor should be addressed expressly to him.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 213.—*October* 3, 1862.

## SILVER IN THE WHITES OF FINISHED PRINTS.

We call the attention of our readers to an article on another page, by Mr. Spiller, in which a somewhat startling announcement is made. Mr. Spiller has been conducting a series of very delicate experiments, for which his well-known chemical skill, and the appliances of the laboratory at the Royal Arsenal, have given him unusual facilities, for the purpose of determining the average quantity of silver and gold in the toned, fixed, and washed photograph. The results obtained are, in themselves, sufficiently interesting and curious, and will be suggestive of the amount both of gold and silver still to be saved by properly directed care and appliances. But apart from the interest of the facts educed in this direction, there is the incidental discovery of another fact, which will, we apprehend, take all photographers by surprise, and suggest new and very serious considerations as regards the permanency of all albumenized prints, no matter how minute the attention to every known condition of stability.

The whites of all carefully treated photographs are believed by photographers to consist, as they ought to do, of white paper only, albumenized or otherwise, without any trace of any chemical whatever. The salts of silver formed in sensitizing, which have been protected by the dense parts of the negative, such as white skies, shirt fronts, &c., and thus not reduced by light, are supposed to be dissolved in the fixing bath of hyposulphite of soda, and removed from the print there and in the subsequent washings. Mr. Spiller has discovered that this is not the fact. A silver compound of some kind remains with the albumen, undissolved by the hyposulphite of soda. What this compound may be, we cannot, at present, say. The chloride of silver is undoubtedly removed. The compound termed by photographers, albuminate of silver, is sensitive to light, whereas, the silver left in the whites of the albumenized print is clearly insensitive to light, as the prints do not darken when exposed; it is there, nevertheless. When Mr. Spiller first discovered its presence, he at once suspected that it was the result of careless manipulation in the individual prints under examination. He at once made enquiry of the various civilians and artillerymen "told off" to photographic duties in the Arsenal, and found that the usual proper amount of care was exercised in fixing and washing the prints, and that the presence of silver was not due to any manipulatory neglect. A number of other albumenized prints were examined, and the whites of every one, when touched with sulphide of ammonium, yielded the characteristic stain of silver. The whites of plain prints, on the other hand, gave no stain whatever. Not quite satisfied still, Mr. Spiller procured several samples of paper, plain and albumenized, and exciting all on the usual silver bath, they were dried, and then washed, and fixed in the usual manner, but without exposure to light. The result was, that notwithstanding the utmost care used, the albumenized paper, which should have possessed no trace of silver, gave unmistakeable evidence of its presence; whilst the plain paper, treated in the same manner, was perfectly free.

Now, as the albumen itself contains sulphur as one of the elements of its composition, it is tolerably plain that the elements which cause fading and yellowness existing side by side, constitute a predisposing cause of destruction, and that they only require an exciting cause to put them into injurious operation.

We have just taken a dozen albumenized prints at random, the produce of both amateur and professional photographers, the whites of every one, when treated with hydrosulphate of ammonia, manifested the presence of silver, the stain being deepest in those in which the paper was most highly albumenized. Plain paper prints, and resinized paper prints, on the other hand, remain unaffected under the same treatment. This circumstance affords additional inducement for prosecuting the resinized paper printing experiments.

We recommend our readers to repeat this experiment for themselves. Let them test the whites of any of their albumenized prints, by just touching them with hydrosulphate of ammonia, a brown stain, indicating the presence of silver, will be the result. To make the experiment more satisfactory to those unpractised in chemistry, let them try its effects on albumenized paper which has not been in contact with silver, and also upon the whites of a plain paper print; in both these cases the sulphide will have no effect, and produce no stain whatever.

The presence of a serious evil is discovered: the remedy remains to be found. Mr Spiller is still experimenting for that purpose. Our own remedy would be to discard, as soon as possible, the use of albumenized paper.

## PHOTOGRAPHY IN AMERICA.

We have recently had the pleasure of spending several evenings in the company of Professor Edwin Emerson, of Troy University, U.S., who is on a few years' visit to Europe, and have had some chat with him on photography in America, a subject in which, knowing from personal observation the practical skill of American operators, we always feel considerable interest.

It afforded us considerable satisfaction, and was gratifying to our national pride, to learn that Professor Emerson, himself an accomplished amateur photographer, considered English photography in many respects in advance of that of his own countrymen. Notwithstanding their great skill in portraiture, there were many branches of the art to which they had given but little attention. To illustrate, we may mention that composition photography is unknown there. Two of the purposes the learned Professor had set before him in visiting this country were to see a composition photograph, and to procure a Dallmeyer's triple lens. Of the composition pictures we had the pleasure of showing him in our personal collection, Mr. Robinson's "Holiday in the Woods," and Mr. Brothers' memorial picture of the principal members of the British Association who met last year at Manchester pleased him most. With these he was much charmed, their excellence fully meeting the ideas he had formed of this class of productions.

In examining various instantaneous pictures, especially the magnificent transparencies of Mr. Breese, he remarked, that in this country we possessed a facility for the production of beautiful clouds and atmospheric effects of which the American photographer was entirely deprived, from the simple fact that such clouds do not exist there. During the greater part of the year nothing prevails but the clear blue sky, which, whilst it is favourable to photographic operations generally, deprives instantaneous pictures of one of their most charming features.

Hitherto the amateur photographic public in America has been decidedly limited, much more so than in this country. Since dry photography has begun to be appreciated there the number of amateurs has increased, and is, we imagine, likely to continue increasing at the termination of this unhappy war, which, by the way, Professor Emerson only regards as commencing, and contemplates the possibility of its continuance during ten years yet.

The dry process most used in the States is the tannin. Professor Emerson himself, who, as our readers know, practises that process, possesses the utmost confidence in it, and states that he never dreams of a failure. His experience confirms our own as to the increased sensitiveness gained by the addition of honey to the solution of tannin, without any loss of any kind, in keeping or otherwise, arising from its use. He lays especial stress upon the advantage of using a very old bromo-iodized collodion as pre-eminently well suited for tannin plates. A neutral bath he has generally found to confer greater sensitiveness, with these plates, as with the wet process, but with the drawback that it induces a tendency to fogging. Heat, as an aid to development, has also been successful in his hands in reducing exposures very materially.

Mr. Thompson's changing box, which, as we informed our readers last week, is simply one manufactured by Mr. Hughes, of Oxford Street, has been the admiration of all amateurs on the other side of the water, from its simplicity and convenience, and its delivering the plate from its dark chamber into its place in the camera, without any jerk or unnecessary shaking. Dry plate photography, not having being largely practised hitherto, the acknowledged mechanical ingenuity of our American brethren has not, as yet, been called much into action to meet its requirements. Double backs appear to be as yet unknown amongst them; and when we showed Professor Emerson our own portable stereoscopic camera, with its equipment of double backs, as manufactured by Meagher, he was inclined to regard it as still more convenient than the best changing box.

The problem of an instantaneous dry process continues to excite much interest in the States. Neither hot water, nor citric acid, nor ammonia, appear to have solved the question, on the other side of the water more than here. The editor of the *American Journal* remarks, in reference to this subject, that whilst many pretend to a fair solution of the question, the prints, and not the process, are shown, leaving the matter to rest on personal veracity only, which, he adds, "is a poor reliance: in England, we suspect, there are a few more Pounceys still left; and here, Rev. Hills."

Mr. Sutton, who appears recently to have awoke to the fact on which we have so long insisted, namely, the importance of two salts of silver in dry plates, appears to think that he has solved the problem by the use of iodide and bromide, in the proportion of equal atoms. He describes the process in a paper to be read before the British Association, at Cambridge, which we shall give in an early number. The plates are stated to be equal in sensitiveness to wet collodion. We shall heartily rejoice if it be so.

## ON THE EXPENDITURE OF SILVER AND GOLD IN PHOTOGRAPHIC OPERATIONS.

BY JOHN SPILLER, F.C.S.

In continuation of a series of analytical experiments upon the amounts of gold and silver expended in the process of printing upon albumenized paper, the general results of which were announced in the Photographic News of the 18th of July last, I beg leave now to furnish additional particulars in reference to some points which, at that time, had not been fully ascertained.

First, with regard to the actual consumption of the precious metals, it has already been shown that, in the preparation of a full-sized sheet of albumenized paper, floated for five minutes upon a 70-grain solution of nitrate of silver, 50 grains of the nitrate are ordinarily withdrawn from the bath, but that inasmuch as 40 grains and upwards of this amount may be recovered in the form of silver residues easily convertible, the quantity of nitrate actually expended may be estimated at about 10 grains (or one pennyworth) per sheet. The object of the chemical investigation now to be described has been mainly to determine the proportion of gold and silver fixed and retained in the finished proof, and to compare this amount with that already ascertained to have been expended in the ordinary mode of conducting the operation of photographic printing.

For the purpose of this enquiry, a number of prints, on albumenized paper, were taken, which were considered to be well toned, and to exhibit the relative proportions of light and shade ordinarily presented in landscape photographs. The subjects were various, and the depth of printing such as to render it desirable to arrange the pictures in two sets of twenty and twelve respectively, which should fairly represent the two limits between which the average amounts of silver and gold would generally range. The set of twenty may be said to illustrate the lighter style of printing, and the twelve darker subjects to express the maximum result. In order to ensure the thorough removal of traces of chlorides and soluble salts generally from these photographs, they were washed in three changes of warm distilled water as a preliminary precaution; they were then immersed for about twenty minutes in a hot solution of pure nitrate of potash, taken out and dried; the object of this treatment was two-fold: in the first place it facilitated the combustion of the paper and other organic matters in the next stage of the process, and by furnishing a small proportion of alkaline carbonate effectually prevented the loss from volatilization of any chloride or other salt of silver. The pictures were burnt in succession over a porcelain basin, and the ashes resulting were further reduced in bulk by the direct application of a blowpipe flame. The residual matter was then washed several times with pure boiling water, until all the alkali was removed, the solution being thrown away after it had been ascertained that no traces of the metals sought were contained therein. The fixed residue was then digested with nitric acid to dissolve out the silver and leave the gold, and after having separated, in this way, nearly the whole of the silver, the remaining ash was treated with warm nitro-hydrochloric acid to extract the gold, a trace only of chloride of silver being afterwards recovered from the silicious residue by the solvent action of ammonia. In order to estimate the amount of silver, the whole of the metal was precipitated from the nitric solution and weighed as chloride, and the gold being reduced from the second solution, by the aid of bisulphite of ammonia, it was easy to collect, wash, dry, and ascertain, likewise, its weight.

The twenty photographic prints, having an aggregate superficial area of 1,760 square inches, furnished 1·93 grains of chloride of silver, and ·63 grains of metallic gold.

The twelve darker copies measured, in the aggregate, 721 square inches, and gave of chloride of silver 1·22 grains, of metallic gold ·31 grains.

If, from these data, the amounts of metals be calculated upon the whole sheet of printed albumenized paper, estimated at 390 square inches, we arrive at the following results:—

| | Silver | Gold |
|---|---|---|
| I. Ordinary proof | ·321 grains | ·140 grains |
| II. Darkly printed | ·496 „ | ·167 „ |

It will be remarked how small a proportion of silver and gold is contained in the finished photograph, and that for the ultimate deposition of this half grain of metallic silver, no less than thirty-two grains of the metal (in the fifty of nitrate), have to be employed in the original preparation of the sheet of paper; or, by another mode of stating the results, 1·6 per cent. only of the amount of silver used is permanently fixed in the photographic print. What a wide margin for the exercise of economy in the collection of the residues, and what wonderful evidence of tinctorial power is here displayed! With regard to the amount of gold actually absorbed by the print in the operation of toning, it appears that one grain of the terchloride should in many cases be sufficient for three whole sheets of paper, if means could be devised for working the toning baths to exhaustion. The result of the experiments just now described proves in each instance that in the operation of toning the print the particles of reduced silver become superficially coated with metallic gold, but that this interchange does not ordinarily extend to the entire removal of the silver, and its replacement by gold as stated by Dr. Schnauss,* for in the series quoted above a much larger amount of silver than gold was detected. In order to set this question at rest, I have selected prints which, of an inky or bluish-black colour, would be described as "over-toned;" in every case I have detected silver in the print, and generally in proportion exceeding that of the gold.

Proceeding in the next place to enquire into the disposition of the silver and gold upon the surface of albumenized proofs. I have been somewhat surprised to find so much silver existing in the sky, and other perfectly protected portions of the print, an observation which led me to examine a large number of photographs, and cuttings removed from the same preliminary to mounting, also the productions of other operators besides the work executed by our own department, and in no instance have I failed to detect silver by the discolouration on moistening the albumenized surface with sulphide of ammonia, and allowing this reagent to dry upon the paper. But if prints on plain paper be similarly tested there is no evidence of any silver remaining in the white parts of the picture, nor on the back or unprepared side of albumenized prints, will any silver be found, a conclusive proof that the same treatment which effectually removes the whole of the silver from plain paper in the course of fixing and washing, is not capable of dissolving out entirely the silver from albumenized surfaces. As a confirmatory experiment, however, I sensitized plain salted paper and three different samples of albumenized paper in the same nitrate of silver solution, and, as soon as dry, they were, without exposure to light, all washed together in several changes of common water, then fixed in a newly-made solution of hyposulphite of soda (one ounce of the crystals to four of water), and again repeatedly washed as usual, until, after a twenty-four hours' interval and a plentiful supply of water, they were judged to have been sufficiently washed. When dry, the sheets of albumenized paper contained silver in quantity sufficient to give a dark stain with sulphide of ammonium, whilst the plain paper did not contain a trace. Since making this observation I have endeavoured to find some ready means of separating this last portion of metal from its combination with albumen, and have subjected the samples of paper to treatment with hot and cold salt brine, tartaric acid, the tartrates, and a variety of other salts, without any appreciable effect; a second immersion in hyposulphite of soda removes some of the silver, and iodide of potassium, and the citrates appear to dissolve out a larger proportion, but I am still in search of a solvent which is at once both cheap and efficient.

As to the disadvantages arising from the existence of silver in the pure whites of the photograph, it must be remembered that they are always liable to discolouration by exposure to an impure atmosphere, and likewise by the effect of sulphur contained in the albumen itself as a constituent, which, if liberated by incipient decomposition or other cause, would immediately unite with the silver, and give rise to those yellow appearances so commonly observed in the early stages of fading, and, at the present moment, so palpably manifest in the Photographic Gallery at the International Exhibition.

Royal Arsenal, Woolwich, *September* 27, 1862.

* See Photographic News, vol. vi. p. 267.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.

The history of the International Exhibition will be a history of grievances. Nothing is more irksome than the task of perpetually recording, in connection with such a magnificent undertaking, a series of reiterated follies and mistakes. The task, however, often becomes imperative, for the purpose of preventing misunderstanding. Here is the "Illustrated Official Catalogue," the shortcomings of which have been already so often pointed out, and dwelt upon. We had hoped to pass it by without mention; but we have had several enquiries regarding it, and have heard many comments upon it, from which we find that a large portion of the public, photographic and general, persist in regarding it as being what it really ought to be: an official catalogue with illustrations and descriptions of such objects as were worthy of especial attention, instead of being, as it really is, simply a grand advertising medium. It should be distinctly understood, then, that all the illustrations, and all the descriptions, are advertisements, prepared by, and paid for, by the contributor. The fact of the contributions of one house being specified in a single line, and of another occupying a page or two of illustrations, descriptions, lists of prices, &c., does not in any degree indicate that the one deserves greater prominence than the other; but, simply, that one paid for the advertisement, and the other did not. To dignify such a production with the title of "Official Illustrated Catalogue," is, in the last degree, contemptible. The *Times*, a few weeks ago, had some excellent remarks on the subject:—

"The first two volumes of the 'Official Illustrated Catalogue' have just been issued. As compared with the similar catalogue in 1851, or even regarded in the milder light of a common pictorial record of this Exhibition, it is a dull and most unsatisfactory book. In 1851, the 'Illustrated Catalogue' was a work of private enterprise, and, like any other book, had to be made as instructive and attractive as possible; and, both these conditions being admirably fulfilled, the work had so large a sale that the Commissioners, on this occasion, were tempted out of their legitimate province, and undertook the publication of the catalogue themselves. With a not unnatural distrust of its financial success, the cost of printing, publishing, &c., was secured in advance by charging so much a page to the exhibitors who wished to appear in it, leaving them to find the illustrations and the matter, and admitting nothing that was not paid for, and everything that was. The result is exactly what might have been anticipated. The official illustrated catalogue of 1862 is merely two volumes of tradesmens' advertisements. In vain we ransack its pages in search of anything that will remind us of the great triumphs of art manufactures collected at South Kensington. Amid its meagre rows of names and price-lists are thinly interspersed woodcuts of cheap beds, boots, kitchen ranges, saddlery, false teeth, &c.,—just such leaves, in short, as one turns over at the end of *Bradshaw*, during the tedium of a long railway journey. Scarcely an attempt is made to reproduce any of the fine English works, either in glass, porcelain, furniture, or precious metals, and, when they are attempted, as in the case of Elkington's, Hancock's, Hunt and Roskell's, or Harry Emanuel's, the attempts are worse than failures. It is said that the three volumes of the foreign portion of the Exhibition will make up for the deficiency in the English. This may, or may not, be so; but, even if true, it is no manner of excuse for the issue of these two volumes of mere trade advertisements, as the 'Illustrated Catalogue' of the contents of the English Exhibition. They are, *unquestionably*, the dearest and dullest volumes that have been published for some time, which is saying a great deal in a few words."

The paucity of information in any of the catalogues, except in the form of the advertisements referred to, and the fact, that apparatus is enclosed in glass cases, inaccessible to the public, somewhat interferes with the complete utility of the Exhibition. A full description of the contents of each case, with details of the especial intention of the respective articles, would have added materially to the value of the display. In making our own observations upon photographic apparatus, we have aimed, as far as possible, especially in relation to all novelties, to obtain opportunity for careful examination, with detailed explanation from the exhibitor. In reference to a large proportion of the apparatus, it consists, as we have before remarked of the ordinary instruments in every-day use, well known to photographers, and not needing any detailed description.

Messrs. Horne and Thornthwaite (3,100) contribute an excellent display of apparatus and chemicals. The latter have already been noticed in these columns: they are especially well worthy of the attention of photographers, as comprising some of the most carefully prepared and beautiful samples exhibited. A specimen of chloride of gold excites much attention from the extreme beauty of the crystallization. Amongst the apparatus are examples of various stereoscopic cameras, including the well-known and very portable Powell's stereoscopic camera. A camera for card portraits is exhibited, which has a neatly contrived back for square plates, holding four negatives, which are produced by two lenses. A clever instantaneous shutter, on the guillotine principle, and some other articles, complete a display of very excellent apparatus, but without any especial novelty which we have observed.

Mr. J. C. Leake (3,111) exhibits his portable tent, manufactured by Squire and Co. The example sent to the photographic department was, we believe, made at the last moment possible to secure admission, and having been made under these circumstances of imperfectly seasoned wood, and exposed during the first week or two to the full blaze of the sun, became very much twisted and warped. It is only fair to add, that we have one in our possession which has been subject to a good deal of change of temperature during the last two years, and is still perfectly free from warping, or injury. Notwithstanding the number of tents in the market, this remains the lightest and cheapest we know. It has not so many appliances as many, and is, perhaps, even with those it has, susceptible of some improvements, but its extreme lightness and portability are great recommendations. We subjoin a description of it, which has before appeared in our pages:—

"This tent comprises lightness, portability, simplicity, and cheapness, combined with efficiency, in a greater degree than most that we have seen. It consists primarily of a shallow box or tray, about twenty-two inches long, twelve wide, and two deep, the lid forming the top of the tent. Round three sides of this tray is secured the lining, of black and yellow calico, and a curtain of the same material wraps round the operator, and excludes light. The top is supported by two light iron rods, which are of sufficient length to keep the covering in a state of tension, thus insuring perfect rigidity. An aperture in front admits of sufficient light for convenient working, and a gutta-percha tray, with a flexible tube attached, carries off the waste water. The whole is attached to a tripod stand, of a height to suit the operator. When not in use, the covering folds into the box, which may be conveniently carried by the handle attached to the side. The weight of this tent, complete, is about five pounds."

## THE NEW METHOD OF PRINTING.

### ON THE USE OF GUMS OR RESINS INSOLUBLE IN WATER FOR POSITIVE PRINTING.

BY H. COOPER, JUN.

Notwithstanding the many good qualities of the paper prepared with benzoin, it has one serious disadvantage; that is, the oxidation ot the gum by exposure to the air, which will render the prints yellow after some time. I did not think of this before I sent my last communication; but I discovered it soon after, to my great mortification, as some paper that I had prepared a fortnight, the yellow had become deeper to an appreciable extent. I then set to work, to see if any of the gum resins that I had not tried would do as well as benzoin. After a few trials, I hit upon frankincense. This gum appears to possess all the necessary qualities, and, moreover, it does not oxidize by exposure. Frankincense is a resin very nearly allied to common rosin, which makes it very difficult to obtain in a pure state, as it is very often, particularly in the cheaper kinds, adulterated with the common rosin. Although no great objection to this latter gum would be apparent at first sight, as the resinate of silver is very sensitive to light, yet, upon a closer investigation, it will be discovered that it is liable to a great deepening of colour by oxidation. Therefore, one great point is to procure the frankincense perfectly *pure*, which can generally be done by applying to a respectable house, and paying a good price for it. As it has been often said, cheapness, in its common acceptation, is the bane of photography.

Upon preparing some paper with frankincense *alone*, I found that the prints, upon drying, became covered with a kind of cold bluish bloom, which was quite detrimental to depth and transparency; I therefore added a small quantity of chio turpentine, which had the desired effect—that of removing the bloom, and giving a warm tint to the picture. As I have received many inquiries as to the nature of benzoin, and other substances mentioned by me in last Friday's News, I will explain the nature of any that I may have to call attention to, so as to be sure of being rightly understood. Chio turpentine is a gum resin used in medicine. It is a solid, but soft and pliable, like india-rubber, except that it is not elastic. Like frankincense, it is easily soluble in alcohol, but insoluble in water.

Having made several experiments upon benzoin acid, I am very nearly convinced that it has no other action on the print than nitric or acetic acid would have.* It cannot act upon the silver, except by double decomposition; but Mr. Simpson suggested, that a trifling alkalinity in the bath or the paper itself might be sufficient to aid in forming a trace of benzoate of silver, which might have some peculiar action upon the image. I find that, although it makes the prints slower in printing and toning, it is rather desirable in a small quantity, as it is conducive to clearness and cleanliness.

Both frankincense and chio turpentine being soft resins, I recommend the addition of some harder gum, to keep the picture more upon the surface. Too much must not be used, as it would make it difficult to obtain an even layer of chloride of silver. I have employed a small quantity of "Sochnée" varnish, which seems to answer perfectly; but as I wish to make the formula as simple as possible, I intend trying mastic, a portion of which is easily soluble in alcohol.

The improved formula is as follows:—

| | |
|---|---|
| *Pure* frankincense ... ... | 1 oz. |
| Chio turpentine ... .. ... | 1 drachm |
| Sochnée varnish ... ... ... | 2½ drachm |
| Benzoic acid ... ... ... | 1 drachm |
| Chloride cadmium ... ... | 1½ to 2 drachms |
| Methylated spirit ... ... | 10 oz. |

Although I say 1½ to 2 drachms of chloride of cadmium it is very difficult to ascertain exactly how much is dissolved by the alcohol in which it is but sparingly soluble. My plan is to weigh out 1¾ drachms of the chloride, reduce it to a powder, place it in a capsule, with its weight of distilled water, then apply heat till it is dissolved, and continue the heat till it is about to crystallize, then add the 10 ozs. of spirit, stir it up and pour it into a bottle, in which shake it up every now and then for six hours, when only a small portion will remain undissolved. I then filter the solution and add the frankincense, chio turpentine, benzoic acid, and sœhnèe varnish, shake till dissolved and put by to settle.—Proceed in the preparation of the paper in the same manner as for the benzoinized paper. Print *deeply*, as the prints lose more than those prepared with gum benzoin.

I have been asked whether the soaking in warm water is necessary. It is necessary that the print shuld be thoroughly permeated by the water before toning; cold water will do, but it takes longer than warm. With *Papier Rive*, the soaking will only take from 10 to 15 minutes. As regards the respective merits of *Papier Rive* and *Saxe* I may add that

* Benzoic acid is a body resembling, in appearance, pyrogallic acid. It has a very faint acid re-action; and it is obtained by sublimation from gum benzoin.

I consider the latter most suitable for large pictures, and the former for smaller subjects.

One peculiar feature of the paper prepared with frankincense is the dull look of the prints when they are dry, but this appearance vanishes as soon as they are rolled, when the picture starts out in all its fineness and depth. A high degree of gloss may be obtained by rolling both before and after mounting. The appearance, as regards surface, of albumenized paper may be imitated by immersing the unmounted rolled prints in a weak solution of mastic; care being used to prevent streaks, &c.

In answer to several inquiries respecting the manufacture of the paper, should it succeed, I take this opportunity of stating that I have no intention of supplying it, as I only pursue the art of photography as an amateur, and that I shall not have the least objection to any gentlemen, who may feel so disposed, preparing it for sale. I am convinced, by the number of applications I have received, of the interest the publication of the formulæ has created. In fact, I was quite unprepared to supply more than a quarter of the number of samples required; I took every care possible in dispatching them to the respective addresses, but if, through any mistake, any gentleman have not received their paper, I should be glad if they would let me know, and receive the above as my excuse. I have only a few more words to add. In a thing of this kind it is necessary, to ensure perfect success, that others should repeat the experiments made and proposed by the originator.—Photographers! do not be disheartened by the failure of the first trial. Try again! and if the instructions I have endeavoured to clearly lay before you, are attended to, I do not doubt of your success. I shall be most happy to hear of the result of your experiment. I shall continue mine, and if I hit upon anything important in any of the points of the process, I will not fail to let you know through the medium of those pages from which I have myself derived so many useful hints.

## PRINTING AND TONING PROCESSES.*

Much of the progress of photography is so gradual that it is scarcely perceptible, and consists more in the gradual aggregation of the experiences of able men than in any marked or entire revolutions of the processes employed. The methods of printing now used, as judged by the results displayed at the International Exhibition, might suggest two very opposite conclusions: from the delicacy, richness, and tone of the prints exhibited great progress might be argued; whilst from the faded and yellow condition into which some of the prints have, in the course of a few months, fallen, the absence of improvement, if not retrogression, at least as regards permanency, might be deduced with equal conclusiveness. On more mature reflection, however, it will be seen that, whilst almost all the prints have improved in quality, some have remained permanent as well. The conclusion inevitably follows, that, if *some have* remained permanent, *all might* have done so, and that real progress has been made. It may be of advantage, then, occasionally, carefully to collate the methods used by able men, and re-state those which, by their theoretical truth or success in practice, may be relied upon as giving the best results.

The use of albumenized paper for photographic prints is now all but universal, and it is necessary to deal with such formulæ as have reference to its employment. The majority of photographers purchase their paper ready albumenized; but, for the convenience of those of our readers who may feel disposed to prepare their own, we shall briefly refer to the best methods in use.

*The Paper.*—The French and German papers are almost universally used for albumenizing in the present day. There has been for some time past an outcry amongst photographers, that good paper was difficult to obtain. Whether the quality of photographic paper has really deteriorated, or whether the increased demand offers the temptation to put worse or unsuitable samples in the market, or whether the methods of working now in use have introduced new troubles demanding a peculiar quality of paper for their removal, it is difficult with certainty to determine. The utmost that we can say here is, procure for albumenizing the best paper possible, selecting the French or German according to the results desired. The French paper, *papier Rive*, has the hardest surface, and gives the most brilliant prints, but it is more difficult to procure of good quality, more subject to spots and surface imperfections, and more difficult to manage in all the manipulations than the German paper. It is also very subject to blister in the processes of toning and fixing. These blisters, although they generally disappear on drying, sometimes leave traces of their presence which are very annoying. *Saxe* paper is more free from imperfections, and is easy to manage throughout; it yields softer prints than the *Rive*—with less of contrast; but with careful manipulation and a good negative, no lack of brilliancy need exist in the results. It is almost unnecessary to repeat the cautions as to the selection and marking of the smooth side of the paper, as it will be manifest that this is as important in albumenizing as it was with plain paper when that was used.

*Albumenizing and Salting.*—Wherever they can be procured, fresh eggs should be used for albumenizing photographic paper. The use of stale eggs, or the practice of keeping the albumen for a few days, has been recommended by some, on account of the facility it gives to the manipulating part of the operation, arising from the increased fluidity of the albumen. But the decomposition of that body, either before it is applied to the paper or after it is on its surface, is a prolific source of future troubles. The proportion of albumen must depend on the surface required. For small and delicate photographs, such as card-pictures, pure white of egg should be used, in order to obtain the highest possible surface. For larger pictures a less amount of glaze is desirable; and the proportion may be varied, according to taste, from three ounces of white of egg and one of distilled water to equal parts of each. It should be borne in mind, however, that the tendency of albumen is to give red prints; and the greater the proportion of albumen, the greater the difficulty in securing black tones.

The proportion of salt is a most important point, and one on which much discrepancy of opinion and practice exists. Some of the best authorities who have written on the subject recommend a very large proportion of salt. Mr. Maxwell Lyte says that in his experience three per cent. of chloride of sodium, or nearly 15 grains to the ounce of solution, is the minimum proportion which should be used, and that he prefers for his own use 4 per cent., or nearly 20 grains. Some other excellent photographers recommend 10 or 12 grains to each ounce of solution. The practice amongst professional albumenizers generally, however, is opposed to this large proportion, very few of them using more than 8 grains to the ounce. One large firm, which has a reputation for producing albumenized paper of very superior quality, recently informed the writer that, in their general practice with paper used successfully for card and stereoscopic pictures by many of the best photographers of the day, they used pure white of egg and 7 grains of salt to each ounce, half of which was chloride of sodium and the other half chloride of ammonium. Another large firm stated that they used 8 grains of chloride of ammonium to each fluid-ounce of white of egg. A well-known photographer, whose paper is prepared in his own establishment to the extent of something like 3 reams a week, states that he uses 4 grains of chloride of ammonium and 4 grains of chloride of barium to each ounce of pure white of egg. Mr. T. R. Williams, who stands first amongst photographic portraitists, and whose prints are irreproachable, uses practically less chlorine than any of these, his proportion being 10 grains of chloride of barium, which is equivalent to about 5 grains of chloride of sodium, to each ounce of solution.

We may remark, *en passant*, that, whilst the consideration

* From the *Photographic Journal.*

of the base of the salt used has reference chiefly to the proportion of chlorine with which it unites, yet a strong impression prevails amongst many photographers that it does exercise some influence on the final tone of the picture —the chloride of sodium tending to a cold tone, and the chlorides of barium and ammonium to a warm tone.

In reference to the proportion of chloride, it should always be remembered that the larger the amount used in preparing the paper, the stronger should be the silver bath. Mr. M. Lyte, when using 20 grains of chloride of sodium in preparing the paper, used 100 grains of nitrate of silver to the ounce of water in exciting it. Those who successfully use 15 grains of chloride, generally use a 75-grain silver bath. Stating the matter roughly and in round numbers, the chlorine in 1 grain of chloride of sodium will unite with the silver in 3 grains of nitrate of silver. When a 20-grain chloride solution is used, a 60-grain nitrate solution will be required to convert the whole of the chloride of sodium into chloride of silver; and where a 100-grain silver solution is used, 40 grains are left as free nitrate or in combination with the albumen. With a 15-grain salting solution and a 75-grain nitrate bath, about 30 grains are left for these purposes. With a 12-grain salting solution and a 60-grain nitrate bath, about 24 grains of nitrate and albuminate remain.

With the various commercial samples of paper in which the salt does not exceed 8 grains per ounce, and with which a 60-grain nitrate bath is generally used, the excess of silver as free nitrate and albuminate is much greater.

It is somewhat unfortunate that the importance of the relation between the strength of the salting solution used in preparing the paper and the strength of the exciting bath does not receive more attention. As regards the albumen, and the proportions in which it combines with the silver, still less attention has been given. The exact proportion of pure albumen present is rarely regarded, except so far as it affects the surface to be obtained; and the amount of silver combining with it, and the effect thereby produced, appears scarcely to have received a thought. That some free nitrate is necessary is practically well known, although what part it plays in aiding the vigour of the print is not so well understood. The most probable theory is that which supposes that a portion of the chlorine set free by the action of light upon the chloride of silver unites with some of the free nitrate present, forming fresh chloride of silver, which being reduced by light, in addition to the chloride formed in the usual way, thus adds to the amount of reduced silver and the consequent vigour of the picture.

A practical formula, giving very excellent results, stands as follows:—

| | |
|---|---|
| The whites of fresh eggs ... | ... 3 ounces |
| Distilled water ... | ... 1 ounce |
| Chloride of ammonium ... | ... 40 grains. |

The eggs must be beaten until the whole is converted into a froth: and for certainly perfect results, when it is again fluid the operation may be repeated. The salt should have been dissolved in the water, and added to the albumen before heating. If a higher surface be required, pure white of egg, without water, may be used, preserving the same relation between the salt and the solution, that is, ten grains to the ounce.

No addition of acetic acid or any other substance need be made. The addition of acetic acid causes the formation of acetates, which induce rapid discoloration of the excited paper and other troubles.

The process of albumenising should be performed in a room at a temperature of at least 70° Fahrenheit, as rapid drying keeps the albumen on the surface of the paper, and aids in producing brilliant prints. There should be plenty of solution in the dish. The sheets should be raised from the surface of the albumen, and suspended from two corners by the aid of American clips, without any turning of the sheet round, first holding by one corner and then by another in the way which has been recommended by some amateur writers, such a method tending to produce streaks. Practice only, and the exercise of judgment and skill, will enable the manipulator to avoid bubbles, and get an even surface, free from streaks and uneven waves of albumen. From half a minute to a minute will generally be sufficient time for each sheet to remain on the albumen; but the thickness and absorptive powers of the paper will, in some degree, govern the time; a thin and soft paper requiring less time than a thick or hard paper. The paper, when dry, will be improved by rolling. It should be stored in a very dry place, as it deteriorates if kept damp.

*The Exciting Bath.*—In the ordinary method of printing, a 60-grain nitrate bath should be used, with the paper prepared as above, without the presence of either free nitric or acetic acid. Three minutes' average floating will serve; but the time will be modified by the quality of the paper, just as in albumenizing. Some operators have recently recommended the use of an ammonio-nitrate bath for albumenized paper. The results are unquestionably very good when the process is successfully worked, but it requires great care throughout. A very strong bath should always be used in such a case; for a strong bath has another use besides those already indicated, namely, to coagulate the albumen rapidly, and thus keep the silver on the surface and preserve the brilliancy of the image. If the bath be at all alkaline, great strength is imperative, that the albumen may be coagulated before the ammonia has had time to dissolve it.

The formula most generally recommended is to make 20 ounces of a 80-grain solution of nitrate of silver; then take half of it, and add ammonia until the precipitate first formed is re-dissolved, in the usual way of making an ammonio-nitrate bath. This done, the solution is to be added to the remaining half of ordinary silver-solution; and about 2 ounces of absolute alcohol, or 1 ounce of ether, is to be added to the whole. Another method is to make an 80-grain ammonio-nitrate bath, and then divide it into two parts: to one of these add nitric acid until it has a very faint acid reaction. The two parts are to be added together, and the solution is ready for use. With either of these baths, the paper must be floated for a very short time, or there will be danger of the ammonia dissolving off the albumen in patches. A few seconds will suffice with some papers, and in no case should a minute be exceeded.

Another method is simply to add sufficient ammonia to produce a very slightly alkaline reaction, using also a strong bath and short floating. It is certain that a neutral or slightly alkaline bath makes the paper more sensitive and less liable to the irregular mottled toning called *mealiness*. The paper should be dried rapidly, and used as soon after exciting as possible.

*The Printing.*— A point sometimes overlooked is the is the importance of having the paper perfectly dry before placing it in the pressure frame. Sometimes, in his eagerness to get a batch of prints into the light, the operator will place the paper in the frame as soon as it is surface-dry, but whilst retaining some traces of moisture in the body of the paper. The result is, that the prints are drying and shrinking whilst exposed; and a blurred, imperfect image is the result. The most brilliant images are generally produced by printing in diffused light, which is to be preferred for all cases except where the negative is very hard and intense. Unless a negative have sufficient vigour to allow of a slight bronzing in the shadows, without over-printing the lights too much, it will be difficult to get deep-toned and rich prints.

*Toning.*—The prints should be washed in two or three changes of water prior to toning. If the first washing-water be distilled, it will frequently prevent the formation on the face of the prints of a thin film of carbonate, chloride, or other insoluble salt of silver, which, adhering very firmly, interferes with the toning-operation. It is desirable that, in the washing, each print be thoroughly soaked or permeated with the water, so that when it enters the toning-bath the action upon it may be even and regular.

Various formulæ for what is called the alkaline gold toning process have been proposed, and tried successfully. Those which have found favour with the greatest number appear to be that of Mr. Maxwell Lyte with the phosphate of soda, and that of Mr. Michael Hannaford with acetate of soda. The first stands thus:—

| | | |
|---|---|---|
| Distilled water | ... ... ... | 5 ozs. |
| Terchloride of gold | ... ... ... | 1 gr. |
| Tribasic phosphate of soda | ... ... | 20 grs. |

The second formula stand thus:—

| | | |
|---|---|---|
| Distilled water | ... ... ... | 5 ozs. |
| Terchloride of gold | ... ... ... | 1 gr. |
| Acetate of soda | ... ... ... | 30 grs. |

Experience has proved that either of these solutions gives better results, toning more evenly, and free from the mealy, mottled effect sometimes obtained, when they have been mixed a few days or even a few weeks previous to use. Should they, when thus kept, appear sluggish or inert, a few drops of a fresh solution of chloride of gold, of the same strength, will commence the toning-action, which will then proceed without interruption. If the prints have been sufficiently washed to prevent any decomposition in the gold bath whilst toning, the solution may be used over and over again, without disadvantage.

The prints should be kept moving about whilst the toning is going on, to prevent any irregular action. The operation should be performed in yellow light; but a glance now and then by the aid of daylight may be taken, to judge better of the exact tone, which should be a little deeper before removal than is required, so as to allow for loss in fixing. Over-toning should, however, be avoided, as it destroys the brilliancy of the print.

It may be important to remark that, whilst phosphate of soda and acetate of soda are both, theoretically, neutral salts, they generally possess a slightly alkaline reaction, which is in some cases sufficient to neutralise any trace of free acid in the chloride of gold. This is not, however, always the case: and in order to avoid the slightest risk of any free acid reaching the bath of hyposulphite of soda and causing decomposition there, it is desirable either to test the solution with litmus paper, and add, drop by drop, sufficient of a solution of carbonate of soda to neutralize it, or what is simpler and better, place each print into a dish containing a weak solution of carbonate of soda, as it comes from the toning bath, and allow it to remain a few minutes before fixing.

The methods of alkaline gold toning and subsequent fixing, are considered by the majority of photographers to be more philosophically correct, and to afford the best guarantee of permanency; nevertheless, it must not be denied that many excellent authorities have contended that the old methods of toning with hyposulphite of soda and gold, when conducted with proper precautions against sulphur-action were quite as trustworthy as regards permanency, and simpler in operation, than the new methods. Amongst these we may mention Dr. Diamond, whose prints are well known in the scientific world as amongst the most perfect and rich in tone, as well as the most permanent of those which have been fairly tested by time. His method is as follows:—To a pint of saturated solution of hypo, 4 grains of chloride of gold are added, and a piece of biborate of soda, about the size of a walnut. The prints are placed in this solution until they acquire the desired tone, and are then removed and left for a quarter of an hour in a fresh solution of hypo. Neither solution is ever used after the slightest evidence of decomposition is manifest, either by smell or by discoloration.

*Fixing.*—After toning by the alkaline gold bath, the prints are to be immersed in the soda bath, or rinsed and placed in fresh solution of hyposulphite of soda, four ounces of the salt being dissolved in every pint of water. It is somewhat difficult to state with accuracy the number of prints which may be perfectly and safely fixed in a given quantity of hypo solution, so many circumstances affect the question; but, as a general approximation, it may be stated that one sheet of paper may be safely fixed by each ounce of hyposulphite of soda, if care be taken to avoid any decomposition. As the material is cheap it is never worth while to run any risks. From ten to twenty minutes, according to the kind of paper will generally be sufficient time for the fixing operation. The prints should be kept moving about, and prevented from adhering one to the other. Imperfect fixing, whether from the use of weak or exhausted hypo solution, or too short immersion, or the prints sticking together, is quickly seen from the prints showing mottled patches of a dirty yellow or brown tint produced by the decomposition of hyposulphite of silver, which the fixing-bath was not strong enough, or had not opportunity to dissolve before the print was removed.

*Washing.*—The subject of washing has frequently been discussed, and there is little of importance to be added thereupon. It should be as rapid as is compatible with its thoroughness. Rapid changes of water, and each change as complete as possible, are important. A regular system of changing the prints into a fresh dish of clean water, draining each one for a few seconds before placing in the next dish, more readily removes the hypo than merely pouring water out of the dish where the prints lie, and, without removing the prints, filling up again. A little sponging of each print is very valuable. Four or six hours of such washing as we have described would be more effectual than six times as long with the prints sticking together, without draining or sponging singly. One or two final washings in tepid or warm water are valuable; but hot water is apt to injure the print, and removes the size from the paper. The idea that such removal was an aid to permanency at one time prevailed, but is now generally exploded.

Dr. Diamond attributes much of the permanency of his prints to the practice, which he considers important, of ironing each with an iron as hot as possible without burning the paper.

One or two precautions, sometimes neglected by amateurs, should be mentioned before concluding. First, the importance of conducting every operation, up to the washing, in yellow light. Many operators place the paper in the pressure-frame in daylight, and also examine the progress of printing by the same light; and some even tone in diffused light. The whites of the prints cannot fail to suffer from such habits. Secondly, it is very important to avoid handling the prints, especially with fingers which have touched other chemicals, and more especially still with fingers which have touched hypo, at any stage of the printing and toning. Stains inevitably follow such handling. It is not an uncommon thing to examine and touch prints in the toning bath with fingers which have just touched others in the hypo bath; this tends at once to decompose the toning bath, and to spoil the prints. In short, care, cleanliness, and judgment should be used throughout.

## A SHORT LESSON IN CHEMISTRY.—No. 4.*

Salts exist in three different chemical conditions; in the first place they may still retain an *acid reaction*, a state in which the acid preponderates over the base; secondly, they may be perfectly *neutral*, the natural and legitimate condition of a salt, as we are taught to understand by the definition of a salt; and thirdly, the base may preponderate over the acid, so that such a salt is said to have a *basic reaction*. In exemplification, we have sulphate of potassa, and again bisulphate of potassa, in the latter of which the acid is double in amount of that in the former, and acts upon bases as if it were free; this bisulphate is, in fact, a double salt, being the sulphate of the oxide of potassium + the sulphate of the oxide of hydrogen. Secondly, pure nitrate of silver is a neutral salt, that is, a salt producing no change either on blue litmus paper or on red litmus paper. Finally, subace-

* From *Humphrey's Journal*.

tate of lead is a salt which has a basic reaction, having in fact three times as much of the base (oxide of lead) as the acetate, this salt acts on red litmus paper like an alkali.

Acids, bases, and salts may exist either *hydrated* or *anhydrous*, that is in connection with water or without; not always, however, in either condition but sometimes in one, sometimes in the other, and sometimes in both. Thus we have anhydrous sulphuric acid, and hydrated sulphuric acid; anhydrous soda, and hydrate of soda; and (anhydrous) nitrate of silver. Furthermore certain salts exist either in an *amorphous* condition, or in a crystallized form; in the former condition they may contain water as an essential part of their constitution (constitutional water); in the second they contain an additional quantity of water which is essential to crystallization (water of crystallization). For example, sulphate of the protoxide of iron (protosulphate of iron) exists either as a green vitriol in a crystalline form, or as a white powder in an amorphous condition; the former salt contains seven times as much water as the latter.

Salts are denominated monobasic, bibasic, tribasic, etc., in accordance with the fact that the acid in such combines either with one equivalent of the base, two equivalents, three equivalents, &c., but the two equivalents of one and the same base, or three equivalents of one and the same base; may have their substitutes, giving rise to the interesting classes of compound salts, as for instance: Rochelle salt= tartrate of potassa and of soda: and microscopic salt= phosphate of the oxide of sodium, of the oxide of ammonium and of hydrogen.

In addition to what I have remarked in reference to chemical combinations, you must know that there exist very well defined compounds, acting in one case like metalloids and acids, and in the other like metals and bases; and that these produce, by their combinations with one another, or with either metalloid or base, a species of compound salt exactly analogous to simple salts. This cyanide of potassium is a compound of hydrocyanic acid (prussic acid or cyanide of hydrogen); but hydrocyanic acid=cyanogen and hydrogen; and cyanogen is a compound consisting of two equivalents of carbon and one of nitrogen. Sulphide of ethyl is composed of sulphur and a compound base containing four equivalents of carbon and five of hydrogen. Such combinations are very common in organic chemistry, and will become much more important when we begin to understand the precise reactions in reference to the science of photography.

I have mentioned the word *equivalent* more than once; it requires explanation. Chemical compounds are built up of equivalents, as distinguished from indefinite mixtures; they take just so much of either element in the composition, and neither more nor less. If we assume the weight of the lightest of all elements as the standard of unity, then the individual weights of all the rest of the elements will be multiples of this unit; and, consequently, the weights of compounds will, in like manner, be multiples of the same standard unit. These ratios or comparative weights of the constituents of any compound are called the *chemical equivalents*, or combining proportions of these constituents. For instance, hydrogen is the lightest of all bodies, and it combines with many of the metalloids; let us see in what ratio it combines with them. We may assume 1 ounce, 1 pound, 1 cwt, 1 part, &c., as a starting proportion of hydrogen which is to combine with each of the other elements, as with oxygen, bromine, chlorine, sulphur, &c. Now water is a compound of hydrogen and oxygen; and by the most refined analyses, often repeated, it has been ascertained that, for every *single* ounce of hydrogen, *eight* ounces of oxygen are required to form the liquid. Again, hydrogen and chlorine combine so as to form hydrochloric acid in the proportion of one ounce of hydrogen to thirty-five ounces and a half of chlorine. Hydrobromic acid contains one ounce of hydrogen to seventy-eight ounces and twenty-six hundredths of bromine; and hydrosulphuric acid contains one ounce of hydrogen combined with sixteen ounces of sulphur. Now the great beauty of chemical combination is manifest in this fact: if chlorine, bromine, and sulphur combine with oxygen, then the resulting compounds will have the ratio of weights: 8 of oxygen to 35½ of chlorine; 8 of oxygen to 16 of sulphur; or supposing such compounds do not exist, or that others exist also, then 35½ of chlorine may combine with twice, thrice, &c., of 8 ounces of oxygen, but never in fractions of eight; and so with all the rest of the elements. Take the combinations of chlorine and oxygen as an example:

| | Chlorine. | Oxygen. |
|---|---|---|
| Hypochlorous acid | = 35·5 and | 8. |
| Chlorous acid | = 35·5 and | 24, [3 x 8]. |
| Hypochloric acid | = 35·5 and | 32, [4 x 8]. |
| Chloric acid | = 35·5 and | 40, [5 x 8]. |
| Perchloric acid | = 35·5 and | 56, [7 x 8]. |

The number 8 is called the equivalent of oxyen, 16 two equivalents, &c. In like manner 35·5 is the equivalent of chlorine; 78·26 that of bromine; 16 that of sulphur; 1 that of hydrogen. Ammonia consists, however, of 14 parts of nitrogen to 3 parts of hydrogen; laughing gas contains 8 of oxygen to 14 of nitrogen; hence we see that ammonia contains 1 equivalent of nitrogen to 3 equivalents of hydrogen. Protoxide of iron contains 8 of oxygen to 28 of iron, whilst the sesquioxide contains 24 of oxygen to 56 of iron; the first therefore, contains one equivalent of either element; but the latter is a compound of 3 equivalents of oxygen to 2 of iron. Now the ratio of 3 to 2 is that of 1½ to 1, a ratio containing a fraction, which is obviated in all cases by doubling the whole number. In my next lesson I will show you the application of chemical equivalents to photography.

## SALTS OF SILVER, PHOTOGRAPHY, AND INDELIBLE INK.

The quality which salts of silver possess of becoming black by exposure to light lies at the very foundation of the photographic art. The chloride of silver is most sensitive to the action of light. It was discovered a long time ago by the old alchemists in their search after the "philosopher's stone," and was by them denominated "horn silver." It is formed from a solution of the nitrate of silver. The latter is made by dissolving metallic silver in aquafortis (nitric acid), then adding a solution of common salt to it. A white precipitate of chloride of silver is formed, which, when exposed to light for a few moments, changes from white to violet colour, and then to black. The blackening of this salt by the rays of light did not escape the attention of the old alchemists, and it led them to the opinion that light, as well as heat, was one of the great agents in the transmutation of metals. The action of light upon certain salts and substances, whereby they are decomposed and changed in appearance or colour, constitute the chemistry of the photographic art. Other salts beside the chloride will also turn black if exposed to the light, provided they are in contact with organic bodies. The action of light upon different substances is not yet well understood. This agent facilitates (in some cases) the combination of certain elementary bodies, and in other cases it hastens the separation of combined elements. The blackening of silver salts by light is an instance of chemical decomposition. In the form of chloride of silver it is a white salt; when it becomes dark by exposure to light, the black substance produced is simply metallic silver in a very finely subdivided state. A very simple experiment may be performed to establish this fact. Dip a slip of ivory into a solution of the nitrate of silver until it assumes a bright yellow colour, then place it in a tumbler containing rain water, and expose it to the direct light of the sun, and it will then gradually become black; but when dried and rubbed with an agate burnisher, the ivory surface will become bright, and resemble a slip of metallic silver.

Heat produces an effect upon the salts of silver analogous to light. M. Niepce de St. Victor heated a metallic plate by boiling it in water, he then placed the print of an engraving against it, and over that a sheet of paper prepared with the nitrate of silver and the chloride of gold, and he obtained a violet-blue impression on the paper of the dark parts of the engraving. If the paper is only prepared with the nitrate of silver, the light parts of the engraving are reproduced in metallic luster.

Long before photography was known or practised, the nitrate of silver was employed to colour the human hair, stain marble, and mark linen, and it is still employed, to a large extent, for the first and last-named purposes. The best indelible marking ink is made with nitrate of silver, aqua ammonia, a small quantity of cream of tartar, sugar, gum arabic, and the whole coloured red with carmine. About one part of the nitrate of silver is dissolved in twelve parts of water, and ammonia poured in slowly, until the solution appears free from precipitate. A very small quantity of gum arabic and sugar are required. This ink must be kept in a bottle screened from the rays of light. Although called indelible, this ink is easily removed with the cyanide of potassium, but it withstands the action of washing with soap and water.

Simple photographic paper for copying pictures and various objects, may be made as follows;—Prepare a solution of nitrate of silver by dissolving an ounce of the nitrate in twelve of water, and adding aqua ammonia gradually until the liquor becomes clear. Take a sheet of white paper, soak it in a solution of common salt and then dry it. After this, stretch it on a clean board, apply the ammonia nitrate solution to its surface evenly with a sponge, and dry it in the dark.

To copy a print or a negative picture it is placed with its face upon the sensitive paper, and a plate of glass is placed upon its back, and the whole exposed to sunlight through the glass. The picture gradually appears upon the prepared paper, first in a bluish tinge, then black. When fully developed, the paper is first washed in soft water, then the picture is fixed by washing in a solution of the sulphide of soda.

Hair is stained black with a solution of the nitrate of silver and ammonia; or what is better, a solution of one part of the nitrate dissolved in six of water, is first applied with a sponge, then a solution of one ounce of the sulphuret of potassium dissolved in six of water is applied, and the hair then becomes quite black. A little rose water is applied afterward to neutralize the odour of the sulphuret. What an important part the solutions of silver play in the arts! They convert grey hairs into sable locks; and with the sun beam for his pen, the artist can transfer to his tablets the lineaments of youth and age, and the resemblances of insect, leaf, fruit, and flower.—*Scientific American.*

## Proceedings of Societies.

### Amateur Photographic Association.

A Meeting of the Council of the Amateur Photographic Association for the admission of members and subscribers, was held September 26th, at 26, Haymarket, the Right Hon. the Viscount Ranelagh, Vice-President, in the chair.

The minutes of the last meeting having been read and confirmed, the following members and subscribers were proposed and duly elected.

| | |
|---|---|
| Admiral Kellett, C.B. | Major-General Osborne. |
| The Hon and Rev. A. Campbell. | Robert Murray, Esq. |
| R. S. Newall, Esq. | A. W. Hume, Esq. |
| F. Ark, Esq. | Captain W. R. Houghton. |
| J. W. Weldon, Esq. | W. Drury, Esq. |
| Rev. R. Battiscombe. | Miss E B. Huson. |
| Robert Hunt, Esq. | Thomas Pryce, Esq. |
| R. F. Holle, Esq. | Captain A. Hoskins. |
| B. Willis, Esq. | W. Allen, Esq. |
| W. F. Tollemache, Esq. | S. Mortimer, Esq. |
| G. Farquhar Smith, Esq. | T. Woods, Esq., M.D. |
| Captain J. G. Sandeman. | Thomas Halifax, Esq., M.D. |
| Ben. Fagh, Esq. | Miss E. Gamlin. |
| W. J. C. Moens, Esq. | J. Vaughan, Esq. |
| F. H. N. Glossop, Esq. | The Commander of H.M.S. *Algiers.* |
| Lieut.-Col. C. Holder. | F. W. Pigott, Esq. |
| James Ferrier, Esq. | R. Staples, Esq. |
| Mrs. C. J. Osborne. | W. Sibbald, Esq. |
| W. H. Price, Esq. | C. J Setts, Esq. |
| John Yates, Esq. | Geo. Potts, Esq. |
| Charles Crookes, Esq. | J. W. Tillerton, Esq. |
| J. Proctor, Esq. | D. W. Hill, Esq. |
| T. J. Murray, Esq. | J. Morton, Esq. |
| Hugh McBean, Esq. | A. Hall, Esq. |
| F. E. Currey, Esq. | F. W. Hasenclever, Esq. |

The Secretary then laid before the meeting some very fine Egyptian negatives by Robert Murray, Esq., one of the newly elected members, which were much admired. The negatives are by the calotype process, and almost rival in sharpness and half tone the finest collodion plates.* Also some interesting copies of ferns, by C. S. Harris, Esq.

Several matters of detail, relative to the method of supplying the Association prints to members and others, having been arranged, the proceedings terminated.

A. J. Melhuish, *Hon. Sec.*

### American Photographical Society.

A regular meeting of this Society was held in the New York University, on Monday evening, September 8th, President Draper in the chair.

In consequence of a misunderstanding about the length of the summer vacation, a number of members thinking October the meeting month instead of September, the attendance was small. The minutes of the last meeting were read and approved. There being no reports of committees, communications and discussion came in order.

Secretary Thompson exhibited several negatives and prints therefrom, and some glass transparencies by the milk process. He explained at length the peculiarities of this process, and read an account of his manner of working. (The "milk process" is given in full in one of Secretary Thompson's former letters to the News.)

The President and others remarked the very thin and weak appearance of these negatives to the eye, and the exceedingly vigorous prints they produced; thereby showing that it is not dense opacity which constitutes a good negative, so much as a thin non-actinic colour.

Mr. Tillman expressed great pleasure in viewing these pictures, and admired the glass transparencies on account of their rich brown colour and tone. He moved a vote of thanks to Secretary Thompson, which was carried.

Secretary Thompson stated, in acknowledgment, that the glass transparent stereograph admired by Mr. Tillman was printed by gas-light in five seconds, and was a year old. The idea of the milk process was entirely due to H. T. Anthony Esq. He only claimed the manipulation, and carrying out of Mr. Anthony's idea.

The Secretary then gave the Society a short account of his waggon drive last May, from New York to Honesdale Pa. in search of the picturesque.

Professor Seeley referred to Professor Hime's recent paper on Stereoscopic vision. He agreed with his theory that the points of vision for each picture must be separated according to the object in view.—Thus the cameras for stereos must be separated several feet in taking a landscape, and in all instances more than the space between the eyes must separate the optic axes. He thought a person saw the same effect of distance and size with one eye as with two, and a single picture will have a stereoscopic effect if viewed through a convex lens with one eye.

Secretary Thompson thought Professor Seeley's arguments were contradictory, for if we saw the same solid effect with one eye as with both, why have any distance between the optic axes at all.—Why not print two copies from a single negative and place them side by side for viewing in the stereoscope? He had tried this by mounting two right eye pictures of a stereo, (the left being spoiled) on the same card, and of course lost all the effect.

Mr. Tillman thought the convergence of the optic axes should be about the same as the eyes are apart, to give a proper natural effect, but a greater convergence than that would exaggerate everything.

President Draper believed in the stereoscopic effect being produced by one eye. He mentioned the case of the birds and fowls whose eyes were on opposite sides of the head, and only one was used at a time, yet the fowl never fails to judge distance more accurately than we can who use both eyes. He asserted that in reading usually we use but one eye while we think we use both. Then there are many persons who can see no stereoscopic effect in the most perfect stereograph.

Secretary Thompson was reminded of the famous pictures of Jacopo Chimenti, and promised to bring copies of them to the next meeting, to afford any curious member the experiment on the causes and effects of Strasbismus, as contracted by viewing these pictures in the stereoscope.

* It may be some encouragement to hear that Mr. Murray taught himself entirely by a shilling hand-book, sent out to him in Egypt, having never seen a negative taken by anyone until after his return to this country.—A. J. M.

President Draper mentioned the recent comet, as seen through his large telescope. The appearance was a nucleus with a face-like tail. The nucleus seemed in motion like a mass of molten iron boiling with heat. He watched the transit of the comet's tail across a small star, and although the tail must be thousands of miles in thickness yet the star was not obscured by it.

On motion the Society adjourned to the second Monday in October. F. F. Thompson, *Secretary*.

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—Next to printing from a be-fogged and stained negative, nothing can be more offensive to the eye of an intelligent printer, than a well-manipulated plate spoiled by the inartistic arrangement of its details, which destroys all hope of anything like harmonious results in his finished work. How he longs to cast a soft, harmony-producing shadow over that obtrusive table, with its painfully sharp edges. How his feet itch to kick over that staring snow-white pedestal. And as a sum total of his desires, he would doubtless make a clearance of that heterogeneous heap of antique, out-of-place, ill-balanced accessories, as complete as Dickens's dwarf practised on the old curiosity shop, or "Womankind" bade fair to accomplish in the dusty chamber so fondly cherished by their eccentric antiquarian relative. Oh! Mr. Wall, resume once more your powerful pen, and clear away this too popular barrier, that obstructs the road leading to the goal which photography's votaries must reach ere they can successfully claim kindred with the fine arts. Teach them to see and feel, that they are working for the future more than for the present. Show them that a falsely designed picture is more unpardonable than a falsely written history, because man may err in his judgment, but the lens cannot make a mistake; and a large proportion of its present productions in the shape of portraiture, when handed down to posterity, will certainly induce them to believe the habits of their progenitors were anything but tidy, and their tastes far from the boundaries of refinement. But my mealy subject grows cold under this exciting topic. I must, therefore, hasten to select a negative from whence we may trace one more source of mealiness. It not unfrequently happens, whilst engaged in toning a batch of prints, we notice all the pictures obtained from a particular plate turn off mealy, when the slightest trace of that evil is absent in all the others. To explain the cause, we must examine the negative previous to intensifying, and by reflected light, we readily perceive a coarse granular deposit on the half tones and shadows. In the after-processes, each of these atoms will be strengthened by further deposits; and being beyond the influence of molecular cohesive attraction, there will exist interstices comparatively transparent, which admit a greater amount of light, and, consequently, a greater depth of printing power than can be obtained from the adjacent more opaque parts. Owing to the deposit of the "bastard albuminate," this inequality of colour is not perceptible until the print is exposed to the action of the toning bath. When pushing for dark tones, the parts least exposed to light are overdone before the required depth of colour can be secured; the remedy is obvious—be satisfied with a little less toning.

And now, we must get our frames in order, and commence printing operations, for our patrons are getting clamorous for their cartes de visites. Whilst I am toning, you will have my views on the requirements of this process, to meet the demands exacted by the toning bath. At present, I shall merely add, that he who starts on a day's printing with an intention of getting a large number of prints from an unmanageable number of negatives, will find that he must sacrifice quality for quantity. During the whole day, he is in a fever of excitement, jumping and hopping about like a street tumbler amid a shower of halfpence, until his physical powers and his paper are together exhausted; and he forgets that in the first washing there lurks another source of mealiness, and except he keeps the prints moving about, and changes them quickly into another water, the liberated silver will combine with the organic or other substances the first water contains, and cling to the surface of the print with a tenacity no after treatment can remove. Under the conditions given in my second letter, a long soaking is invariably required; with a stout horny paper, the water made warm is a decided advantage, because the pores of the paper are more readily opened; their distension loosens the molecules of reduced silver, thus giving free access to the reducing agents contained in the toning bath. I thank Mr. Cooper for endorsing the views I entertained on this subject by practical tests, as well as for laying open the secrets of his valuable discovery. It proves that he believes, to quote the words of Sir John Herschel, "the arts cannot be perfected till their whole processes are laid open." Again, he says, "Art is but the application of knowledge to a practical end; if the knowledge be merely accumulated experience, the art is empirical; but if it be experience reasoned upon, and brought under general principles, it assumes a higher character, and becomes a scientific art."—Yours respectfully, A Photographer's Assistant.

### IODIDES AND BROMIDES IN COLLODION.*

Startling as these results may appear, and utterly opposed as they are to the experience of photographers at large, I shall, I think, be able to show, to the satisfaction of all who will hear me patiently, that the presence of bromide could not be otherwise than productive of insensitiveness, and that it is only under certain circumstances that a simply iodized collodion, under pyro development, is superior to the same, or to bromo-iodized collodion under iron development.

First of all—as regards the loss of sensitiveness by the presence of a bromide—Mr. Hardwich, an universally respected authority, has shown that bromide of silver is ten times less sensitive than iodide of silver. In corroboration of this Mr. Sutton has shown that the exclusive use of bromide produces insensitiveness. Iodide of silver then being *the* sensitive medium, by what law of nature, may I ask, should a combination of the two salts shorten exposure, or give increased sensitiveness and prove superior to iodide alone? If, as it is maintained, that the presence of a bromide is the cause of increased sensitiveness, I ask that the following simple experiments be made. Iodize collodion with iodide of cadmium, and another portion with iodide and bromide of cadmium; also some with iodide of ammonium, and another portion with iodide and bromide of ammonium; after proper keeping, coat, sensitize, and expose plates, develop with iron, and mark the results. It will be found, as I have repeatedly done, that the iodide of cadmium collodion is superior in sensitiveness and intensity to the bromo-iodized cadmium collodion; and similarly the iodide of ammonium collodion is superior to the bromo-iodized ammonium collodion. If then the alleged addition of a bromide gives increased sensitiveness, why does it not in these cases?

I shall probably be referred to the results on bromo-iodide of silver in the Daguerreotype process, but I think it is pretty clear that the superior sensitiveness in that process was due to the *mercurial developer not to the bromide of silver.*

If, then, by experiments such as I have made, and by the dictum of so high an authority as Hardwich, iodide of silver alone is the most sensitive to light, and bromide productive of insensitiveness, how is it that the belief in the superior sensitiveness of a combination of iodide and bromide has arisen.

It will be seen, by a reference to the results of my experiments, that bromo-iodized cadmium collodion was inferior to simply iodized cadmium collodion, and bromo-iodized ammonium collodion to simply iodized ammonium collodion, and that on the addition of a portion of iodide of ammonium collodion to iodide of cadmium collodion, an

* Continued from p. 467.

immediate increase of sensitiveness, though no durability was obtained over the simply iodized cadmium collodion, and that sensitiveness, but want of durability, was also obtained by the addition of bromide ammonium to iodized cadmium collodion, but that the bromized ammonium plus cadmium collodion, was inferior in durability and sensitiveness to the iodized cadmium plus ammonium collodion.

The inference from the above is, *that the increased sensitiveness was owing to a molecular action set up in the collodion on the addition of the alkaline salt (whether iodide or bromide ammonium), to the acid salt cadmium, and to the consequent excitation produced in the collodion, towards a state of nicely-balanced equilibrium, an excitation hitherto erroneously attributed to the bromide salt, because an alkaline bromide has, in most cases, constituted a part of the bromo-iodizer, which is usually, mostly, or largely compounded of the cadmium salt.*

The same excitation may be inferentially assumed, as I have found it, when we have a potassium or ammonium iodide with a cadmium bromide.

But, although the use of a bromide is attended with loss of sensitiveness, the more appreciable as the quantity is large, compared with simply iodized collodion, yet its presence in collodion is very desirable, because of its established sensibility to coloured light, and it simply remains for operators to regulate the quantity according to requirements, remembering that there is scarcely a subject which will not benefit by its presence in suitable strengths. Of course, the iron developer must be used.

Although the simply iodized collodion, under iron development, has been shown superior to the same with the pyro development, yet there are many instances to prove the superiority of the latter over iron with simply iodized collodion, and the cause of this appears to lie in the use of the iodides. Experimenting with various iodizers, I have found that *collodion iodized simply with potassium or ammonium, is more sensitive under pyro development than under iron;* but starting from this point with both developers, and introducing *cadmium as a component of the iodizer, the superiority of iron became manifest when the proportion of the cadmium salt was at least half, and that inferiority increased with the increase of cadmium.* It must be remembered that sufficient age was given to the collodion in all cases where cadmium was used, so that the conditions of the experiment should be uniform throughout. From the above it is apparent that *the iron developer must be used when the cadmium salt is a component of the iodizer, and that it fails in proportion to the smallness of the quantity of cadmium, or where the iodizer is entirely ammonium or potassium.*

Pyro development and iodized collodion are slower than iron development and iodized collodion, in the cases shewn above, where cadmium constitutes at least half the iodizer, and they are slower in the same cases than iron development and bromo-iodized collodion made up like the simply iodized collodion, but having, instead of the compounded iodides, a small portion of them as *bromide. But simply iodized collodion, as above, and pyro development are faster than the iron and bromo collodion in question, when the proportion of the bromide is large.* One grain to seven or eight oz. is quite sufficient. An increase to one grain per oz. will give the superiority to the pyro development and iodized collodion in a marked and decided manner.

Before concluding, I will beg not to be misconstrued. One sample of collodion, one strength of developers, one description and strength of bath, as before implied, were used throughout. None were sensitive enough to give instantaneous results. Ross's stereo view lens was used, and the exposure was simply experimental—less for the desire of producing pictures, than for the sake of determining the respective merits of iodized and bromo-iodized collodion, *and of pyro* and iron development—so that the difference in results, between one case and all, was appreciable and notable, even *to seconds of exposure.* This would have been absolutely difficult, if the exposure had been in each case of such a character as to descend to difference in fractions of seconds! Now, it frequently happens with operators, that certain conditions of chemicals and light operate so at times, as to confer surpassing sensitiveness to their plates, and this is particularly true of instantaneous photography, which being, like photography in general, of a progressive character, will, doubtless, at no distant period, so shorten the time of exposure, as to make the presence of a bromide in large quantities an absolute necessity. For where results are reduced to a fractional scale, the differences of sensitiveness between iodide and bromide become of so infinitessimal a character, that the latter salt, from its superior sensibility to coloured light, may yet be preferred, even to the total exclution of the former. But I would submit, that in such a case it would be a difficult matter to pronounce an opinion either one way or the other, on the present question of iodide, *v.* iodide and bromide. And the difficulty would continue until the exposure was increased to some calculable period. I will, therefore, here object entirely to the instantaneous experiments of Mr. Blanchard, where a ten-thousandth part of a second of exposure, more or less, would possibly ruin his simply iodized ammonium or potassium plate, or complete his bromized one.

Another objection to instantaneous experiments is the circumstance that no two lenses are of absolutely equal power. Their difference of power is inversely as the given exposure, and it will probably appear in a magnified form when the exposure is a fraction of a second, and the result a phantom image for subsequent intensification, the more especially so when, as in Mr. Blanchard's experiments, half the plate is coated with a sensitive bromo-iodized collodion, and the other with an inferior iodized one.

None of the experiments, four in number, made by Mr. Blanchard are really fair. They were simply illustative of the circumstance that under certain conditions, which nobody should adopt, bromo-iodized collodion is superior under iron development to simply iodized collodion. Now it is not sought to learn the superiority of ammonium and cadmium, combined as iodides or bromo-iodides, over potassium or ammonium, as appears to have been done by Mr. Blanchard, and inferentially by other successful operators, such as Messrs. Fry and England (for their results are identical with Mr. B.'s), but rather to prove the general excellence of bromo-iodides over simple iodides, and for this reason they should have taken, as I did, and wish to have others repeat, simply as an *approach* to what has been apparently overlooked, viz., *equality of conditions in the iodizing and bromo-iodizing solutions, so as to bring the organic and inorganic developers to a par.* I say they should have taken proportions of the cadmium and ammonium salts, the former preponderating, for an iodizer; and for a bromo-iodizer the same salts in the same proportions, only substituting the bromide of ammonium for all or part of the iodide of ammonium. It will then be found that whatever the proportions used, provided the cadmium does not fall below half the quantity of the salts used, and provided that those proportions are uniform both in the iodizer and bromo-iodizer, it will be found that the simply iodized collodion under pyro is superior in sensitiveness to bromo-iodized collodion under iron only when the proportion of the bromide is large, and that simply iodized collodion under iron is superior in sensitiveness in all cases to bromo-iodized collodion under iron, in proportion to the quantity of the bromide salt. It will be found that 1 grain to 7 or 8 ounces will not appreciably affect sensitiveness; but as foliage and coloured lights and shades cannot be rendered without bromide in a satisfactory manner, its introduction is an absolute necessity. And, lastly, it will be found that simply iodized collodion under iron is superior in sensitiveness to the same under pyro development.

Trusting that you will not consider the length of this communication a fault, and that you will deem it worthy of a corner in the Photographic News, I remain, &c.,

*Meerut, N.W.P. India, July* 26, 1862. Augustus Webb.

## Talk in the Studio.

Photographic Exhibition at Dusseldorf.—We have recently received from Herr A. Gestewitz, of Dusseldorf, a long account of a series of photographic reproductions, now exhibiting in that city, in the Hall of the Society of Arts. These photographs are from the establishment of Mr. T. F. Michiels, in Brussels, and are all copies of oil paintings by such artists as Heubner, Hilgars, Lindlar, Lachenwitz, and others. They are stated to be superior to anything ever produced, as regards half tone and general artistic effects, and especially in the correct rendering of the various colours and shades of the originals. Herr Gestewitz has obtained an order from the "Cultusministirium," in Berlin, signed "Lehnert," for the protection of these photographs from piracy, a mark of appreciation never accorded to works of art of this kind before.

Mr. Robinson's new Picture.—Mr. Robinson is favouring the provinces with the first sight of his new composition photograph, "Bringing Home the May." From what we have seen of the design, and some of the early studies for the picture, we anticipate that it will be one of his best. The *Western Morning News*, noticing a recent art exhibition in connection with the Cornwall Polytechnic Society, says of this picture :—"The contributions by amateurs occupy a considerable amount of space in the left gallery, and decidedly the place of honour is occupied by Mr. Robinson's most beautiful photograph, 'Bringing Home the May.' This is an ornament to the gallery, and was admired by all who lingered to look at it."

Photographic Exhibition at Nottingham.—We have received a communication from Mr. A. G. Grant, 58, Long Row, Nottingham, in which intimation is made of an intended photographic exhibition in that City. Prizes are proposed, the value of which is to be raised by subscription amongst exhibitors. Fifteen prizes for the excellence in the following classes :—Photographic portraits, plain, black and white, water colour, oil, crayon or chalk, cartes de visite, collodion positives, coloured, animals plain, landscape views, stereoscopic views, portrait paintings, miniature ditto, landscape ditto, and animal ditto, are proposed. A meeting of those concerned is to be held on the 3rd. of October at Mr. Grant's residence. By whom the exhibition is proposed, or by whom it is to be managed, or who is responsible, we do not clearly understand, but we give publicity to all we know on the matter.

New Work on Photography.—Mr. Sutton has in the press a new three shilling work to be entitled "The Collodion Process, Wet and Dry." It will be published by Sampson Low, Son and Co., Ludgate Hill.

## To Correspondents.

J. B.—The paper to be used in the uranium-printing process is simply plain photographic paper, without albumen or other preparation, beyond that described. The chief defect in your card print is, want of definition in the face : it is not sharp ; otherwise, it is pretty good. The spot to which you refer is a metallic spot in the paper.

F. P.—The dirty-yellow stains in your print are, undoubtedly, due to imperfect fixing. Independent of your hypo being old, as you state, the prints have, probably, stuck together, and thus prevented the perfect solvent action taking place in every part of each one. The hypo should be new, and strong enough ; and the prints should be kept well immersed and moving about. When prints become mottled with a dirty yellow or brown, whilst washing, it generally indicates imperfect fixation. The insoluble hyposulphite of silver, which is formed, becoming decomposed, whilst washing, and producing the effect in question.

F. Vincent.—The texture of the canvas and painting will generally show, more or less, in reproductions from old paintings. The effect may be reduced by taking care that the light falls on the painting, in such a manner as to make the small excresences and texture give as little cast shadow as possible. It is a branch of the art requiring much judgment and experience to meet each particular case.

A.—The iridescent deposit formed between the film and the glass, is almost invariably the result of dirty glasses. However clean the glasses may have appeared to be, this is generally a proof that they have not been chemically clean. Other causes will favour this deposit, such as the use of a thin collodion, made with powdery pyroxyline, and under-exposure, followed by over-development or over-intensifying.

Phos.—The circumstance you describe is somewhat inexplicable. That negatives taken at the same time, with the same materials, treated in the same manner, varnished with the same varnish, placed in two new boxes, and kept in the same place, should in one box be spoiled with vermicular cracks, and remain perfect in the other, would appear to admit of one explanation only : namely, that one box was damp, and the other dry, or that one box was made of porous absorbent wood, and the other not. Unless there was some difference in treatment, this is the only explanation we can suggest. Possibly, without noticing it, some of the plates have been less thoroughly washed after fixing than others. Any trace of the fixing salts left in the film is an almost certain cause of such cracks. Perhaps a better thing in this case than finding out the cause, is the suggestion of a remedy. The plan proposed by Mr. Claudet, in such cases, proves, we know, in most instances, efficient. It consists, simply, in rubbing the cracked surface with powdered charcoal, which fills up the cracks, and makes their presence scarcely observable in the prints. Probably, powdered plumbago will do as well. The best security against future recurrence of such cracks consists in very careful washing, and drying, before varnishing ; in the use of varnish of known good quality, and in thoroughly dry storage. The quality of the negatives appears very good, and the subject pretty. Perhaps there is a trace of under-exposure. We think the plate is rather too narrow in proportion to its length for the best effect. The length is, within a fraction, of being double the width. An inch more in width would have added to the effect. The lens does its work very well, but you over-estimate the angle included. The plate is 7½ in., and the focus of the lens 7½ ; even if the plate were well covered to the edges, it would not include 55°. If about three-quarters of an inch of imperfect definition be cut off each end, you will have something less than six inches. But that, even, gives a very good angle with satisfactory definition. From what we have seen of the productions of the new Harrison lens, we have no reason to believe that it includes an extraordinary angle ; but, as we have never been able to ascertain the equivalent focus of the lens, with which the specimens we have seen were produced, we cannot speak certainly.

P. M.—The leather used for the bellows bodies of cameras, is what is known technically as "skiver," or perhaps with the best cameras "roan." It is always lined with black calico. 2. Make your toning solution, and before use test with litmus paper. If it be acid, add drop by drop of a solution of carbonate of soda, say 10 grains to the ounce, waiting a few minutes between each addition, until the red colour of the litmus begins to disappear.

A. B. C.—Parchment size is not suited for mounting photographs. Good glue, or freshly made starch should be used. 2. There are a variety of good positive developers : 20 grains of iron, 20 minims of acetic acid, and 2 minims of nitric acid, form a very good one. 3. We do not know anything of the advertized back ground to which you refer.

C. Bryan.—The constant addition of citric acid to your printing bath, will, by precipitating citrate of silver, weaken it. If no precipitate is formed, it is because there is free nitric acid. Test for acidity, and if present, neutralize it. But the probability is, your bath is getting weak in silver, in which case the remedy is simple. We will examine the glass and report upon it.

A Subscriber from the Beginning.—Your bath is evidently out of order ; probably with organic matter. The best remedy will be to neutralize and sun it. From the results you describe the collodion is probably simply iodized. Mix with it some bromo-iodized collodion ; the positive collodion of the same maker will do. This will rid you of the spots, comets, &c. The ordinary positive collodion process is used with Skaife's pistol camera, and ordinary good chemicals answer the purpose. It will not work instantaneously in a bad light. It is simply a lens of very great rapidity, and a camera for small pictures, with means for rapidly exposing. It is, of course, subject to the same conditions as other lenses ; and without sufficient light there is no working.

An Amateur.—The indistinctness is due to the negative. The subject has been badly lighted, and the exposure too short. It is not simply sufficient to have sunshine, but it must fall upon the landscape in a proper direction. Your plates must, however, have been very insensitive ; 20 minutes exposure of a tannin plate, with a Ross lens of 14 inch focus, and half inch stop, ought to have been more than sufficient. The image appearing on a tannin plate on taking it from the camera, is generally a sign of over exposure. If this were the case with the negative in question, you must have mismanaged the development, probably by adding too much silver, and getting general deposit all over the plate instead of regular development. You can become a member of the photographic society on being proposed by a member. We shall have pleasure in proposing you for election.

J. C. H.—Your progress is, on the whole, satisfactory. You will have a little more control in lighting with your new arrangements. One of the prints shows some trace of imperfect fixation. There is some fault in your oil-painted backgrounds if they crack on rolling. Take care to keep them sufficiently behind the sitter to be out of focus. The lens you name is very admirable for landscapes. You cannot do better than obtain it.

H. Smith.—Mr. Lacy used the collodion of various makers, and in various proportions, to suit the conditions required at the time, the state of the light, the condition of the bath, &c. No fixed rule can be laid down, judgment must constantly be used. At one time he used a mixture of Thomas's negative with usual iodizer, and Mawson's positive. Latterly he used chiefly Rouch's (Hardwich's) bromo-iodized, alone, or mixed with others. The print enclosed is a little hard, and the feet are very badly placed.

A. F. B.—No. 3 in the list given, without the slightest doubt.

F. P.—See a recent article on toning in No. 210 of the Photographic News, entitled "Toning Experiments." On adding gold to the toning bath, if it be acid, neutralize it. We have not tried keeping the toning bath made with citrate of soda, but see no reason why it should not follow the general rule. We cannot tell to what kind of strokes you refer without seeing them, but you are probably referring to defects in albumenizing. Dry plates prepared with milk, according to the process of our American correspondent, are not washed after the milk is applied. See report of American Photographic Society's meeting. There is no certain method of ascertaining, by its appearance, when a print is fixed. Sometimes, when imperfectly fixed, it may be seen by opaque patches appearing when the print is examined by transmitted light. There is no objection to the use of citric acid and carbonate of soda in the toning bath, if you prefer to use it.

A Subscriber.—The effects described are exactly similar to those which arise from supersaturation with iodide of silver, and are very apt to occur in a strong bath in hot weather. We should recommend adding some un iodized solution of not more than 30 grains to the ounce. We will write soon.

Dr. Saunders Van Loo.—The collodion received safe. We will make an early trial of it.

Frank Howard, J. G. Fuller, J. H. Redin, Janie, Fantail, J. C., Charles Derby, W. W., D. J., W. G. G., and several other Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 214.—*October* 10, 1862.

## British Association for the Advancement of Science.

The British Association has just concluded its thirty-second annual meeting, for the third time held at Cambridge. Any remark on the certainty and rapidity with which science and civilization have advanced since the establishment of this Association would be the assertion of a matter so trite as to appear a mere platitude. We were struck, however, by a trifling remark of our companion in the railway carriage journeying back to London, himself a veteran man of science—Mr. Robert Chambers. He said, "When I last attended the Association in Cambridge, seventeen years ago, I rode outside a stage coach: there was no railway to Cambridge then." How far the efforts of the modern peripatetic philosophers, as they have been termed, have contributed to the rapid progress of modern years, is difficult to determine; but that an association including all the greatest luminaries of the day, with the expressed purpose of giving a stronger impulse and more systematic direction to scientific enquiry, to obtain more attention for the objects of science, and promote the intercourse of all interested in its advancement, must have an immense influence on the progress of mankind is a fact now admitted by all, even by those who for years flouted the Association as a worthless and foolish thing.

Our own art, in its various developments, has for years, past occupied a share of the attention of different sections of the Association, the subjects being generally divided, somewhat arbitrarily, between Section A, Mathematical and Physical Science, and Section B, Chemistry. In the proceedings of this year, although no photographic exhibition was formed, as on some former occasions, photography held in the sectional meetings and elsewhere a tolerably prominent position. The papers read on the subject were, in Section B, "Description of a Rapid Dry Collodion Process," by Mr. Thomas Sutton, B.A.; "On a Photolithographic Process, adopted by the Government of Victoria for the Publication of Maps," by Mr. J. W. Osborne; "On Some of the Difficulties arising in the Practice of Photography, and the means of removing them," by Mr. Maxwell F. Lyte, M.A., F.C.S.; "On a Simple Method of Taking Stereo-micro-photographs," by Mr. Charles Heisch, F.C.S. In section A, M. A Claudet, F.R.S., read a paper, "On the Means of following the small Divisions of the Scale regulating the Distances and Enlargement in the Solar Camera;" and a paper was sent by the Rev. J. B. Reade, on "Experiments in Photography with Colour." The whole of these papers will appear in our columns in due course. At the soiree on Tuesday night, M. Claudet exhibited, by the aid of the oxyhydrogen light, the enlarged images of the solar camera. Mr. Brothers' large group of twenty-two members of the Association, coloured in oil: some photographs and apparatus by Ross, and by Dallmeyer, and a magnificent display of Ross's microscopes and microscopic objects, were the chief attractions of the soirees.

Mr. Sutton's paper, from what we are able to glean from those who were present at the discussion—it was read before we arrived in Cambridge—scarcely gave satisfaction, want of explicitness and want of novelty being urged against it. A more important question to discuss is its efficiency. It appears to us as explicit as the limits of such a paper admit. As regards the question of novelty, its chief claim would consist in the use of bromide and iodide in the proportion of equal atoms. The principle upon which it is based, the necessity of having two salts of silver in the sensitive film, is not new; we have constantly urged its importance, as our readers know. As regards its efficiency, that is another question. We have before us a print from a panoramic negative produced by this process, with just the same exposure, we are assured by Mr. Sutton, as he would have given wet collodion, and indications have been obtained of still greater sensitiveness. On this subject we cannot do better than give a letter we have just received from Mr. Sutton:

Dear Simpson,—I enclose you a print from a rapid dry collodion panoramic negative, taken in exactly the same time as a good wet collodion plate. The process was that described in my paper read before the British Association.

You know me well enough to feel sure that I am not deceiving myself, or trying to deceive others, with the announcement that this is actually the much-wished-for solution of the rapid dry process. I have also taken breaking waves, clouds, &c., instantaneously, upon these plates. In the course of my experiments indications have occurred of dry plates six times as sensitive as the best wet collodion. When, then, is this to stop? I hope you will use your influence with your readers, and induce them to try this process, already so near perfection. Who will use wet collodion out of doors after this? The plates are as certain, and quite as easy to prepare. The print is toned with a new double salt of gold, which I have called calcio-chloride. It makes a permanent solution, and never fails in giving rich vigorous prints, such as I send. Minute particulars of the rapid dry process will be given in my book.

Yours faithfully, Thomas Sutton.

In the print received there is perhaps a trace of under-exposure, but it is a marvellous result for a rapid dry process.

Of Mr. Osborne's excellent paper we cannot speak too highly: it is unquestionably the most practical paper which has been published on the subject: we shall probably have a few observations to make on it shortly. Mr. M. Lyte's paper was, as it could not fail to be from his pen, very interesting. Some of the theories were, we fancy, untenable, but the practical suggestions were, however, decidedly useful, if not entirely new. The practice we have so often recommended, of washing the plate, after long exposures, with a little distilled water, so as to prevent stains arising from accumulated drainage, was endorsed by Mr. Lyte. His method of preserving the printing bath from discolouration is well worthy of attention.

Mr. Heisch's short paper on a method of obtaining micro-photographs for the stereoscope is at once novel and simple; so simple as to excite surprise that it has never been thought of before. M. Claudet's paper consists of a very clear description of a mathematical method of obtaining the exact conjugate focus by means of a scale for any degree of enlargement. The title of Mr. Reade's paper, "Experiments on Photography in Colour," will excite hopes which will be disappointed, and for the sake of his reputation, we wish he had not sent it. The specimen which accompanied the paper as an illustration of the results obtained, consisted of a collodion positive, the high lights of which exhibited that creamy tint, verging on a salmon colour, with a greenish tint, in the half tones, which every photographer has obtained a hundred times, and is, in fact, the colour commonly obtained in a certain class of negatives when just verging on solarization. Variety of colour, beyond this, there was none. All the lights of the picture were of one tint, and all the shadows of another, whether they pertained to flesh or drapery. When the paper was concluded, and the specimen examined, no word of comment was made, but each one passed the picture to his neighbour with an elevation of the eyebrow and a shrug of the shoulder.

Photographs were often made available in the illustration of papers in the various sections, and in the able inaugural speech of the President, Professor Willis, the application of the art in connection with meteorological, magnetic, and astronomical observation was fully recognised. In speaking of the objects of the Association he thus refers to its employment of photography :—

An example of its peculiar functions is given in the very last report for 1861, when it appears that an instrument contrived by Professor William Thomson, of Glasgow, for the photographic registration of the electric state of the atmosphere has been constructed by Mr. Beckley in the workshop of the observatory, with mechanical arrangements devised by himself, and that it has been in constant and successful operation for some time. Those who have experienced the difficulty of procuring the actual construction of apparatus of this kind devised by themselves, and the still greater difficulty of carrying out the improvements and alterations required to perfect it when brought into use, will agree that the scientific importance and utility of an establishment cannot be overrated, in which, under one roof, are assembled highly skilled persons, not only capable of making and setting to work all kinds of instruments for philosophical research, but also of gradually altering and improving them as experience may dictate. The creation of this peculiar observatory must be regarded as one of the triumphs of the British Association. As far as the Association is concerned, its maintenance has absorbed between £5,000 and £6,000, and the annual sum allotted to it from our funds has for each of the last six years reached the amount of £500. The construction of the photoheliograph may be quoted as an example of the facilities given by this establishment for the developing and perfecting of new instruments of observation. A suggestion of Sir John Herschell in 1854 that daily photographs of the sun should be made has given birth to this remarkable instrument, which at first bore the name of the solar photographic telescope, but is now known as the Kew photoheliograph. It was first constructed, under the directions of Mr. De la Rue, by Mr. Ross, &c. The British Association aided in carrying out this work by assigning the dome of the Kew Observatory to the instrument, and by this completion in 1857 in their workshop by Mr. Beckley, the assistant; but the expense of its construction, amounting to £180, was supplied by Mr. Oliviera. On the occasion of the eclipse in 1860 this instrument was conveyed to Spain, under the care of Mr. De la Rue, who most successfully accomplished the proposed object by its means, and was replaced at Kew on his return. But to carry on the daily operation to which it was constructed, requires the maintenance of an assistant, for which the funds of the Association are inadequate, although it has already supplied more than £200 for that purpose. Mr. De la Rue, in consequence of the presence of the heliograph at Kew being found to interfere with the ordinary work of the establishment, has kindly and generously consented to take charge for the present of the instrument at this observatory, and at his own observatory when celestial photography is carried on.

## DESCRIPTION OF A RAPID DRY COLLODION PROCESS.

BY THOMAS SUTTON, B.A.*

The problem which has most interested photographers of late years has been the discovery of a dry collodion process, by which plates can be prepared as sensitive as with wet collodion. In the wet process, the negative has to be taken and finished upon or near the spot from which the view is taken, and with wet collodion the tourist is, therefore, obliged to work in a van or tent, and carry a load of paraphernalia about with him, which is, of course, both expensive and inconvenient. To avoid this, he is compelled to work with dry plates, and hitherto no process has been published by which dry plates can be made as sensitive as wet ones. A rapid dry process has, therefore, been an important subject of investigation to photographers, because, during a long exposure of a plate, the shadows move, and figures sometimes alter their position. A man or horse, for instance, are likely to remain still for a few seconds, but not for ten minutes.

I have lately solved this problem of rapid dry collodion, and produced dry plates as sensitive as wet ones, which will, moreover, preserve their sensitiveness and good qualities for several weeks, and perhaps indefinitely. This process, and the principles upon which it is based, I will now shortly describe.

The rapidity of this dry process depends upon the accelerating effect of bromine in dry collodion, and in this respect an analogy exists between the Daguerreotype and dry collodion processes. In the former a silver plate, simply iodized, is extremely insensitive, but when submitted to the fumes of bromine its sensitiveness is increased a hundred-fold, the same thing happens in those collodion processes, wet or dry, in which the free nitrate of silver is washed out of the film. A collodion film, simply iodized, and without free nitrate, is as insensitive as an iodized Daguerreotype plate, but a bromo-iodized collodion film without free nitrate may be rendered as sensitive as a bromo-iodized silver plate. In the wet collodion process the most exalted sensibility is conferred upon a simply iodized film by the presence of free nitrate of silver; but you cannot retain free nitrate in a dry collodion film because it not only crystallizes on drying, but by becoming concentrated as the water evaporates, dissolves the iodide of silver, and forms a curious and interesting double salt, the exact properties of which have not yet been fully investigated. You cannot even retain a perceptible trace of free nitrate entangled in a dry collodion film without introducing an element of instability, and consequent uncertainty in your work. The principle, therefore, of preparing a rapid dry collodion plate consists in using bromo-iodized collodion, and removing all the free nitrate, which is the element of instability.

But the image produced upon a bromo-iodized silver plate, developed with mercury, is extremely thin and superficial, as may be proved by transferring it to a sheet of gelatinized paper. And similarly, the image developed by pyrogallic acid upon a dry bromo-iodized collodion film is thin, and too transparent to yield a good printing negative. It is necessary, therefore, to apply to the film a coating of some organic substance, in order to give density to the dark parts of the negative. Many substances have been used for this purpose, viz., gelatine, metagelatine, albumen, various syrups, gum arabic, infusion of malt, tannin, &c., &c.; and experimenters have, almost without exception, exhausted their ingenuity in varying these preservative coatings, as they are called, instead of seeking in the use of bromide for the true accelerating agent. The preservatives named have not all the same effect, and besides affecting the sensitiveness of the film, they also determine the colour of the finished negative, gelatine and gum giving a black, tannin a red, and albumen a yellowish colour to the deposit in the dark parts. Much, therefore, depends upon the selection of a proper preservative, when the most exalted sensitiveness is required.

One more difficulty remained to be overcome, and it is this. When a collodion film has once been allowed to get dry, and is wetted a second time, it is very liable to split and leave the glass; or if a preservative has been applied to it, it is very liable to rise in blisters, which spoil the negative. But this may be prevented by giving the glass plate a preliminary coating of india-rubber dissolved in kerosolene.

The operations in the rapid dry process are, therefore, as follow :—

1. Clean the glass plate, dry it thoroughly, and apply to it a solution composed of 1 grain of india-rubber dissolved in an ounce of kerosolene.

2. Coat the plate thus prepared with bromo-iodized collodion, containing an equal number of atoms of iodine and bromine, added in combination with cadmium. There should be about 5 grains of mixed iodide and bromide of cadmium to the ounce of collodion.

* Read before the British Association.

3. Excite the film in a bath composed of 30 grains of pure recrystallized nitrate of silver, slightly acidified with nitric acid.

4. Wash off all the free nitrate of silver, and pour over the film a preservative composed of 25 grains of gum arabic freshly dissolved in an ounce of water. Let it dry spontaneously, and before putting the plate into the dark slide, dry it again thoroughly before a hot flat iron.

5. Give the same exposure as for wet collodion.

6. Develop the picture by first wetting it with distilled water, and then pouring over it a developer consisting of 1 ounce of distilled water, 2 grains of pyrogallic acid, 2 scruples of glacial acetic acid, and a few drops of a weak solution of nitrate of silver. The image appears immediately, and very soon acquires the necessary intensity.

7. Fix the negative in the usual way with a saturated solution of the hyposulphite of soda or lime, and when dry varnish it with spirit varnish.

Negatives taken in this way are equal in every respect to those taken upon wet collodion plates, and the process is as simple as any of those which are now employed for slow dry plates.

At the termination of the paper some discussion followed, and much regret was expressed that Mr. Sutton was not present himself to elucidate the matter more fully and clearly. We had not the good fortune to be present at the time, but extract the following report of remarks on the subject by Mr. Maxwell Lyte, from the *Cambridge Independent* :—

Mr. Maxwell F. Lyte made some observations upon the subject. He said—"My experience having been somewhat considerable in the use of dry collodion, I venture to make a few remarks on the paper. There is no doubt of the fact that a combination of bromide with the idoide of silver is decidedly advantageous as an accelerator in the case of sensitive dried films ot collodion ; but that this introduction of bromine should in any way be looked upon as new, when employed in this manner, is a mistake. Bromides have been very long employed in landscape photography, as a useful adjunct, and have been alternately vaunted by various practitioners as accelerators, and the contrary. One thing seems certain, that where greens form one of the prevailing colours in the picture, their impression is most decidedly facilitated. The proportion of bromide proposed to be introduced by Mr. Sutton is, in my opinion, rather too large—one part in four of iodide being the proportion which I find to work best. The use of gum arabic as a preservative coating, combined, it is true, with a very small portion of honey, was mentioned by me in the journal of the Photographic Society of Paris many years since, but subsequently discarded as giving a tendency to fog ; but perhaps my decision in this respect may have been hurried, as I may not have washed the plate thoroughly enough, and certainly the proposed acid nitrate bath in which Mr. Sutton renders his plates sensitive, is likely to diminish this fogging tendency. This fogging it was which induced me to substitute the metagelatine for the gum arabic, which I subsequently did. Now, however, I am led to believe that the following modification of the resin process employed by the Abbe Desprats is the simplest and best process for dry collodion. Add to the collodion one-fifth per cent. of the resin of scammony, that which has been purified and bleached with animal black is to be preferred. Sensitize in a bath of seven per cent. nitrate of silver, slightly acidulated with acetic or nitric acid ; wash the plate most thoroughly in clean rain water, or in distilled water, to which has been added 0·1 per thousand of common salt or chloride of ammonium, and let the plate become dry in a place thoroughly free from dust. The exposure is less than that required with any other dry process with which I am acquainted, and is not above one-half more than that required for moist plates. The development should be performed by first moistening the plate with distilled water, and then pouring on a solution containing one part of pyrogallic acid, ten of acetic acid (glacial), and five hundred of water. Fix with a solution containing about one of cyanide of potassium to a hundred of water. It is not absolutely necessary to employ for the *first* washing bath distilled or rain water, with an addition of chloride, as in actual experience I have obtained very good and perfect results with spring water ; but, considering the varied nature of the salts found in spring waters, it is prudent to proceed as above recommended. The second washing should always be performed in water as pure as can be obtained—in distilled water if possible—and especially the presence of any bicarbonates is to be avoided. The present is only a sketch of what I propose to present hereafter in a more detailed form, and was only elicited from me by hearing Mr. Sutton's paper. The acceleration of which Mr. Sutton speaks may very probably depend on the action of the gum with which he coats the plate. Gum arabic is the lime salt of a very weak acid. In contact with nitrate of silver it is decomposed, with formation of the gummate of silver ; but no such double decomposition takes place when it is placed in contact with the bromide or the iodide of silver. The action of light, however, on these latter compounds is to eliminate their acid element and separate the silver, and the iodide and bromide set free would tend to fix themselves on the lime in the gum. If the washing be not thoroughly performed, however, gummate of silver will form, which blackens in contact with the developer, even without previous exposure to light. It is, therefore, with much propriety that Mr. Sutton insists on a careful washing of the plate after sensitizing, and previous to the application of the gum. In the preservative process of which I have given a slight sketch, I have chosen to employ the resin of scammony, as it is soluble in ether, and, from its friable nature, seems to more completely disintegrate the collodion, and render it pulverulent, a condition most essential to obtaining intensity on dry plates. The collodion I employ is prepared just as I have already explained in a paper published some time since in the *Photographic Journal* of London."

## ON A SIMPLE METHOD OF TAKING STEREO-MICRO-PHOTOGRAPHS.

BY CHARLES HEISCH, F.C.S., LECTURER ON CHEMISTRY AT MIDDLESEX HOSPITAL.*

The production of stereoscopic micro-photographs, which should give the effects seen in the binocular microscope, has been for some time a desideratum. Like many others, I have been engaged in attempts to meet the difficulties encountered in using the binocular microscope as the instrument to produce them. The use of this instrument for the purpose, at first sight seems very simple, but it presents several difficulties.

1st. The two bodies standing out at an angle to one another precludes the use of one plate on which to take two pictures.

2nd. The light of that picture which has been reflected by the prism, is always weaker than that directly seen, so that it is difficult to regulate the time of exposure. Under these circumstances I devised the following plan :—

A microscope with its eye-piece removed, is placed in a horizontal position, and fitted to an ordinary sliding back, single lens, stereoscopic camera. The ordinary adapter for the object glass being removed, its place is supplied by one carrying a tube which can be turned half round inside, by means of a lever from the outside sliding in this tube, is second furnished with a stop which cuts off half the pencil of light coming from the object glass, in fact, occupies the same place as the prism in a binocular microscope. The distance of this stop from the back of the object glass, is adjusted, experimentally, by sliding the tube which carries it in and out, till the image shown on the ground glass of the camera is equally illuminated in whatever position the stop may be turned.

The prepared plate being put in its place after carefully focussing the object, the first picture is taken. The plate is then shifted, the stop turned half round, and the second picture taken on the other half of the plate.

If the object be of considerable thickness, more effect may be produced by focussing the upper surface for one picture and the under surface for the other. The adapter for the object glass with its tube and stop I send herewith. It can be adapted to any microscope.

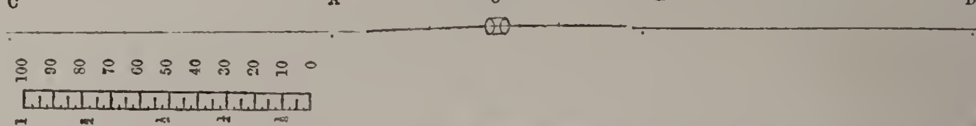
* Read before the British Association.

## ON THE MEANS OF FOLLOWING THE SMALL DIVISIONS OF THE SCALE REGULATING THE DISTANCES AND ENLARGEMENT IN THE SOLAR CAMERA.

BY A. CLAUDET, F.R.S.*

In a former paper, read before this Association, I have proposed a new method of measuring both the distances of the negative and screen, by means of a scale or unity, divided into 100 parts, and smaller fractions, if possible. By this method the distances are measured, not from the object glass *o*, fig. 1, but from the points A and B, being the focus for parallel rays. No object can be brought nearer the lens than A; and B being the focus for parallel rays there cannot be any focus nearer than B.

Fig. 1.




The scale, A C, is fixed on the table containing the optical apparatus, and an index connected with the frame holding the negative, being brought exactly on any division of the scale indicates the proportion and the distance of the image.

The whole arrangement would be very complete and satisfactory, if the scale were long enough to be marked with divisions sufficiently conspicuous; but the shorter the focus of the object glass and the smaller the divisions of the scale must be. Even for long focus object glasses it is very difficult to subdivide the parts of the scale to a degree which enables us to obtain, with the greatest accuracy, both the exact positions of the negative and screen.

The means I have adopted to reach the divisions with a greater precision and certainty, consists in constructing, on the table of the apparatus, an equilateral triangle, the base of which is the exact length of the unity of measure. Taking 8 inches, for example, as the length of the scale, we have a triangle, A B, fig. 2, the three sides of which are eight inches.

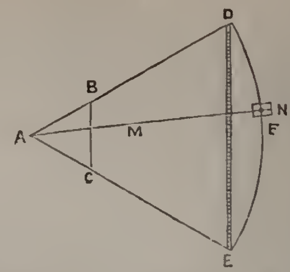
Fig. 2.


We can enlarge the base 3, 4, 5, or any number of times, by extending the sides A B and A C in the same ratio. So that if we want to enlarge the scale four times, we form the triangle A D E, fig. 3, the base of which is four times larger than B C, or equal to 32 inches.

If, instead of dividing B C into 100 parts, we mark these divisions on the base D E, it is evident that they are four times larger than if they were taken on the base B C.

Now if we take the lines A D, A E as the radius of a circle, the centre of which is at A, we may describe the arc D F E, the cord of which, D E, is the increased scale, and supposing that this radius is a metallic thin wire M fixed on a piece N sliding on the arc, it is evident that each division of the magnified scale which happens to be covered by the wire, will correspond exactly with an equal division of the scale B C. But as it would be very difficult to mark distinctly the divisions on the base B C, and if these divisions could be marked, still more difficult to see to read them, we may

Fig. 3.



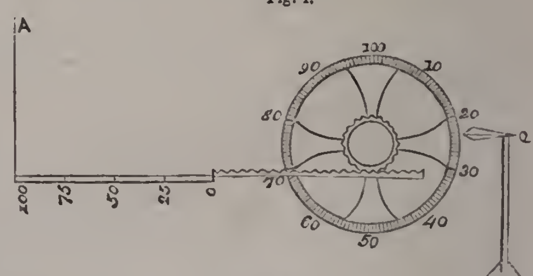

dispense with dividing B C, finding a greater advantage by establishing larger proportionate divisions on D E, the only thing to do being to fix on A C and A E the position of the unity B C, according to its length, by taking A B and A C equal to B C.

So that after having brought the metallic wire on the division of the scale D E, indicating the size of the required image, and the wire being fixed on the index moving with the frame of the negative, we shall bring the index exactly on any division of the scale B C, however small it may be.

Another plan suggests itself for obtaining the same result, which would consist in fixing the moveable frame of the negative A, fig. 4, on a rack as long as B C, which, acting on a pinion adapted to a sufficiently large wheel containing the required divisions, could produce a whole revolution of the wheel, and an index being fixed on the table, would indicate on the wheel the exact amount of the course effected by the negative on the scale B C, and by moving the wheel to the division required, this would bring the negative with the greatest accuracy to the distance corresponding with the division.

This system for focussing all camera lenses might be very advantageously adopted in photographic operations, and would be less subject to errors than the usual or visual way of focussing on the ground glass.

Fig. 4.




* Read before the British Association.

## DETAILS OF A PHOTOLITHOGRAPHIC PROCESS, AS ADOPTED BY THE GOVERNMENT OF VICTORIA, FOR THE PUBLICATION OF MAPS.

BY MR. J. W. OSBORNE, OF MELBOURNE.*

Towards the end of the year 1859 I read a paper in Melbourne, before the Philosophical Institute, now the Royal Society of Victoria, on a new photolithographic process, invented by me, and patented in the colony on the 1st of

* Read before the British Association.

September of that year. I have now the honour to bring this subject under the notice of the British Association, in such a form as to enable every one skilled in photography and lithographic printing to execute it with certainty and success.

The process I am about to describe has been for upwards of three years in active operation in the Department of Crown Lands and Survey, at Melbourne, the first map for sale having been printed on the 3rd of September, 1859, since which time many hundred maps and plans of all sizes, have been produced by its means. The Victorian Government has also recently erected an office suited to the requirements of the process, and offering every facility for its successful prosecution.

Before proceeding to give exact details, I shall sketch out the leading characteristics of this photolithographic method, with the intention of making more intelligible the object of the careful manipulations which are subsequently enjoined; premising, also, that the remarks embodied in this paper have reference only to the reproduction of drawings or engravings in simple black and white, without the gradual passage from dark to light, known as half tone, and peculiar to mezzotinto engravings, chalk drawings on stone, and in an eminent degree to ordinary photographs from natural objects.

A reproduction from stone being required of a drawing or print of the nature I have described, the first step is to obtain a negative on glass, bearing to it the desired relation as regards size. From this a photographic positive is printed by light in the pressure-frame, upon paper coated on one of its sides with a smooth surface, consisting of gelatine and bichromate of potash with an admixture of albumen. This positive is now covered with lithographic retransfer ink by passing it through the press, inverted upon a stone, which has been evenly covered with that substance by the printer's roller. The next operation is to float the paper with its inked side upwards upon a tray of boiling water, the effect of which is, in the first moment, to fuse the thick greasy ink, giving it thereby more homogeneity, and, subsequently, to coagulate the albumen in the coating, and, as the water cools, to swell and soften the gelatine which, protected by the opaque portions of the negative, has not suffered the well known alteration by the actinic influence in the presence of the chromium salt. As soon as the blackened print has remained a sufficiently long time upon the surface of the water a little gentle friction will be found to remove all the ink, save that in contact with the altered positive work upon the paper, and a subsequent flooding with boiling water, will sweep away every thing that is soluble upon the surface of the print, leaving behind the coagulated albumen only in the form of a smooth tenacious film under the design.

After this print is properly dried, it becomes what is technically known as a "positive transfer," and is, in fact, a photograph of the original in re-transfer lithographic ink, so constituted as to admit of the design upon its surface being transferred to a stone in the ordinary way known to lithographic printers. From the drawing thus obtained, the usual number of copies can be printed, the quality and permanence of the work upon the stone being in no way influenced by it photographic original.

To recapitulate, I would first draw attention to the negative, upon the quality of which depends the excellence of the works subsequently produced. Its characteristics should be extreme sharpness of definition, freedom from distortion of any kind, absolute transparency of the shadows, and considerable intensity. Unless these conditions are fulfilled it is impossible to produce photo-lithographic work which will compare favourably with that produced by hand. As may be expected, much will depend upon the lens employed, and in this respect I cannot do better than recommend the use of Mr. Dallmeyer's triplet, which I believe to be unsurpassed for copying purposes, and to the excellent qualities of which I gladly bear witness. The method I have systematically followed to produce negatives of the prescribed quality, is as follows:—Bearing in mind the fact that in copying, the photographer is, even under the best of circumstances, working in a weak light, owing to the near proximity of the original to the lens, and the small stop required, it will be found best to develop with iron, and to abandon the idea of getting sufficient intensity in the first instance. Intense clear negatives may occasionally be produced under favourable circumstances, fit for silver prints; but not as a rule in all weathers, or in the routine of daily work. I therefore recommend the use of intensifying agents, of which the most important is Major Russell's developer. Previous to its use, however, I have found it necessary to resort to a method of "clearing up," which will, I believe, be found new and useful. This consists in re-iodizing, to a very slight extent, the deposit in the film after fixing, by the use of free iodine, and then dissolving off the iodide of silver thus formed. In practice it will be found best to prepare a saturated solution of iodine, in a two grain solution of iodide of potassium. Pour a few drops of this into a developing glass, and dilute with water. Treat the fixed plate with this after very careful washing, until the liquid becomes colourless. The operator will then be assured that all the free iodine has expended itself upon the silver in the film, and by judging of the colour of the dilute solution he uses, a most accurate estimate may be formed of the amount and intensity of the change it will effect upon the negative. By proceeding in this way, the deposit, which in my opinion is always to be found upon the transparent shadows, even in the clearest pictures, is totally swept away, leaving them incapable of determining the precipitation of an additional quantity of silver. Major Russell's admirable developer for his tannin process, may now be used, and the development pushed to any desired extent, without fear of destroying the contrast, or dimming the shadows in the slightest degree. To obtain the necessary intensity by this method alone, would occupy too much time, the negative being invariably a very feeble one to begin with, in consequence of which it will be found well to wash the plate, when a certain amount of intensity has been obtained, and *immerse* it in a saturated solution of bi-chloride of mercury, in water acidulated with hydrochloric acid. Afterwards apply a weak solution of iodide of potassium, increasing its strength gradually, until the deepest yellow colour pervades the whole depth of the deposit; when the yellow may be changed to a dark olive with advantage, by flooding with a one grain solution of chloride of gold.

The glass for negatives treated in this way, should have the edges roughened for obvious reasons, and it is also very advisable to pour over the finished negatives, while wet, a solution of gum arabic, of such a strength as to leave no gloss when dry. This precaution will be found to prevent the peeling off of the film while drying, and to obviate the necessity for varnishing, as the plates will keep perfectly well if stored in tin boxes.

The next step in this process is the manufacture of photolithographic transfer paper. For this purpose introduce 800 grains of Nelson's opaque gelatine into a flask, add 440 grains of finely powdered bichromate of potash, and cover both with eight ounces of cold water; place the flask in a dark place for two or three hours, for the purpose of allowing the gelatine to soften and swell. After the lapse of that time its contents are to be melted by immersing and agitating it in hot water, after which the temperature must be lowered to about 110° F., and two liquid ounces of albumen added and thoroughly mixed. About 12 or 14 half sheets of plain positive paper of good quality, having been slightly damped for some time previously, are now to be coated with this solution in the following manner:—A small tin trough is provided, about 11 inches long, 3 inches wide, and 1½ inch deep, into which the gelatinous solution is carefully strained. The trough is made fast to one end of a board, upon which the positive paper is placed, and when the temperature of its contents has fallen to 85° F., the operator, laying hold of a sheet by two adjacent corners, draws it slowly over the trough, while an assistant presses it into contact with the surface of the liquid by means of a piece of wood of suitable form.

This is by far the best method of coating paper with gelatinous liquids, with which I am acquainted; it is economical, ensures great regularity, and enables the liquid used to be retained at the necessary temperature without difficulty. I believe it would be found useful by the manufacturer of common albumenized paper.

After being coated the sheets are to be hung up and dried in the dark; the room used for that purpose requiring to be artificially warmed in damp or cold weather. In preparing this paper, great care must be bestowed upon the quality of the albumen used; the eggs from which it is obtained must either be taken when but a few hours old, or they must be buttered with the freshest butter while yet warm, in which case they will keep, if taken care of, for about a fortnight. If this rule is not attended to no certain results can be looked for.

The positive transfer paper thus made, is, when perfectly dry, to be rolled or glazed in a press, so as to improve the regularity of the surface, enabling it to be brought into the closest contact with the negative. The average time required for its exposure in the pressure frame is, in Victoria, about half a minute; in this country I do not think it would exceed double that time. When the paper is taken from the pressure frame, it is inked by the printer in the manner already described; a somewhat stiff ink being used for the purpose. This should not be applied to the paper in too heavy a coating, but should just allow the stronger parts of the positive work upon the print to be dimly perceptible through it. To effect the coagulation and soaking, I have made use of tin trays of an inch and a half deep, and otherwise of dimensions to suit the size of the negatives. The water used must be actually boiling, and about a pint of it should be poured into the tray and then rejected, before the latter is filled for the reception of the inked print. This is done to prevent the cooling of the water used for coagulating, which, without it, would be so lowered in temperature as to effect its object with difficulty. The time required for the proper soaking of a print is variable, and must be fixed in every case by the judgment of the operator; but an hour may be named as the average interval which should elapse before the print is ready for "washing off." The general appearance of the blackened surface, the relative differences in elevation and gloss, which the positive portions present, as compared to the rest of the inked face, and the temperature of the water, are the guides which experience alone will make valuable.

The soaking having been completed, the print is placed upon a smooth board, and the requisite friction for the removal of the superfluous ink, applied with a clean and dense sponge moistened with water.

Here again, it is hardly possible to give directions which will ensure perfect success in the hands of one inexperienced in the process; but I may state that the amount of friction which the print will bear without injury, will not fail to surprise the operator who washes one off for the first time.

When the details upon the paper have acquired the greatest degree of sharpness of which they are capable, the washed off print is ready for "scalding." For this purpose it is attached to a flat board, and placed in an inclined position in a large trough. A very large quantity of boiling water is now poured upon it in such a way as to pass both above and below the paper. This is an important, indeed, an indispensable operation, its effect being to carry away every particle of soluble gelatinous matter, which, were it allowed to remain would inevitably "stop out" the work during the subsequent operation of transferring, and it is here that the albumen, by resisting the action of the boiling water, shows how admirably it is fitted for the part it has to play, namely to insure, by its sticky nature when damp the immovable adhesion of the paper to the lithographic stone, during the process of transferring in the press.

Finally, the scalded print is dried by floating it upon the surface of the water, which has been described as having just passed over it; a border of ink left on purpose round the edge of the paper, preventing the hot water from flowing in upon it, while the heat from below causes the evaporation from the albumen surface to be completed in a few moments.

By adopting this method the print dries perfectly flat without the formation of irregular corrugations upon its face, which would become receptacles for drops of water, containing, in all probability, gelatinous substances in solution.

This photographic print in greasy ink, or "positive transfer," as it is called, is given to the printer—after the drying of the back has been allowed to take place spontaneously—who transfers it to the stone in the usual way, treating it throughout as if it had been produced by the hand of a lithographic draughtsman.

I beg to lay before the members of the Association specimens of hand-drawing, both mathematical and artistic, wood-cuts, engravings, and lithographs reproduced from the stone by my method. Also a specimen of photo-zincography, and of transfer to the surface of waxed copper, as a guide to the engraver. And, lastly, I should remark, that several of the photolithographs here exhibited, are produced by joining two or more positive transfers, from different negatives, before laying them down upon the stone, the number joined in this way amounting, in one case, to eight; from which it will be seen that a large camera is by no means necessary for the production of a large copy; nor is there any limit, but the the size of the lithographic stones and press at command to that of the finished photolithograph.

In the course of reading his paper, and at its close, Mr. Osborne entered into further oral explanations and remarks. Referring to the usual process of photography, he explained that the printing surface consisted of an image in a greasy ink, which was either drawn upon, or transferred to, the lithographic stone, which consisted chiefly of carbonate of lime. The common opinion held was, that the ink was simply absorbed by the stone, but he held the conviction that an actual combination took place. The mere contact of grease and carbonate of lime could not, of course, effect this combination; but he thought it was probable that, in the processes of burning, &c., to which the materials were subjected in the manufacture of the ink, a portion of fatty acid might be liberated, which, acting upon the stone, produced actual combination. This was the more probable from the fact, that if the image were removed from the stone by means of a solvent of the ink, such as turpentine, there was still a tracing of the image left upon the stone, which, as lithographers well knew, could be "rolled up" again by applying fresh ink, with a roller, in the usual manner.

In exhibiting a variety of very beautiful specimens, consisting of maps and plans of Victoria, and of drawings, together with some transfers, &c., he explained that, for the satisfactory reproduction of the maps, it was desirable that a definite system should be used in the drawing of the originals, especially where the copies had to be made on a reduced scale, as, otherwise, the lettering would be so far reduced as to render it difficult to read. The economy of the process was made apparent by reference to some of the specimen maps, which, at one time, used to be issued at two guineas each, and by means of photo-lithographing they were enabled to reduce the price to three shillings each. Some of the large specimens were produced by taking several negatives, and joining the transfers obtained from each on to one stone, a process which materially facilitated the production of large plans.

In answer to a question from the President, as to any inaccuracy arising, either from the photographic image or the contraction of the transfer in drying, after the hot-water soaking, Mr. Osborne stated, that on one occasion the Surveyor-General, desirous of testing the process, unknown to him (Mr. Osborne), had a copy of a plan, which had been reproduced on the same scale as the original, printed from the stone on to tracing paper. This photo-lithographic copy, on tracing paper, was then laid on the original drawing, when it was found that the copy was absolutely coincident with the original. The chief thing to be observed was, that all the transfers to be joined should be printed on paper cut from the same way of the sheet, otherwise the contraction in drying would be unequal, and a perfect junction impossible.

Mr. Maxwell Lyte asked Mr. Osborne if his discovery was prior to that of M. Poitevin?

Mr. Osborne said it was not.

Mr. G. Wharton Simpson said, if he had rightly understood Mr. Osborne, the discovery claimed was not the origin of photo-lithography itself, but of producing the photographic image upon the lithographic stone by means of a *transfer*, by which all the difficulties, inconvenience, and imperfection of photographing direct upon the stone was avoided.

Mr. Osborne said the transfer was, in truth, the important part of his process, and that, by its means, other important advantages were secured, such as the impressing the image directly upon the stone itself, and incorporating it with the stone, as in the usual lithographic process. In M. Poitevin's, and some other processes, there was a layer of albumen, or gelatine, &c., between the image and the stone, and this layer quickly wore or broke away in printing, and left the stone useless. When he first read a description of the process in Melbourne, he had entered into an examination of M. Poitevin's process, amongst others, and had pointed out where they failed. That paper had been reproduced in at least three of the English photographic journals,* so that he need not enter further into the question.

Mr. James Wyld, M.P., asked Mr. Osborne if his process were not, in many respects, similar to that of Colonel James, and which of the two were discovered, or published, first?

Mr. Osborne said, that the two processes were in most respects analogous. Colonel James worked on zinc, to which a certain grain was imparted to make it bite, and he used gum with the chromic salt. He (Mr. Osborne) used the lithographic stone, and gelatine, and albumen; and, he believed, the advantage was decided in favour of the latter. Regarding the question of priority, his process was worked, and published, six months prior to that of Colonel James. The latter was published in March, 1860, whilst his (Mr. Osborne's) was patented in September, 1859.

Professor E. Emerson asked what method of focussing Mr. Osborne adopted?

Mr. Osborne said he focussed on a ground glass, with a magnifier. He was not, however, quite satisfied with the result, as the ground glass was too coarse, and there was an appreciable distance which the lens might be moved without any apparent change in the sharpness of the image. He believed, moreover, that a better lens still might be produced, and had been consulting with Mr. Dallmeyer, as to the making of a combination, in which the grinding would be effected by the method employed for astronomical object glasses.

Mr. M. Lyte said he had found that a collodionized plate plunged in the bath for a second or two, and then washed and dried, made a very good focussing glass, when a magnifier had to be applied, as the texture of the ground glass was thus got rid of.

Professor Emerson said that plain glass was better still. He used plain glass with a few diamond scratches on it, upon which to focus the magnifier. Although the specimens exhibited were very perfect, perhaps the finest he had seen; still, he thought, by absolutely correct focussing, more perfect results might be obtained.

* See Photographic News, vol. iv. p. 374, and 388.

The President remarked, that the plan to which Professor Emerson had referred was adopted by Professor Dove, in a microscopic photometer he had contrived.

Mr. Osborne said, he thought that the absence of fine lines, to which Professor Emerson referred, as the result of imperfect focussing, was rather due to the photographic negative, in which the finest lines were sometimes filled up with the deposit of silver.

After a few more words from Mr. M. Lyte and others, the discussion terminated.

On the subject of Mr. Osborne's paper, and the discussion which followed, Colonel James has addressed the following letter to the *Times*:

Sir,—In the report of the proceedings of the Chemical Section of the British Association, which appeared in the *Times* of yesterday, Mr. J. W. Osborne's account of the process invented by him at Melbourne, Australia, is given, and which he has named photo-lithography.

"In the course of subsequent discussion," the report says, "it was elicited that one of the principal claims to novelty involved, was the fact that Mr. Osborne's process was the first in which the image on the stone was effected by means of a transfer. The process of Colonel Sir Henry James, used at Southampton for the reproduction of Ordnance maps, was analogous to it in this respect, but was first used six months subsequently to the process of Mr. Osborne."

The inference which may be drawn from this is that I have adopted Mr. Osborne's process, or something very analogous to it, without any acknowledgment. If Mr. Osborne had only stated that my discovery had been made independently, and without any knowledge of the result of his labours, it would be unnecessary for me to address you on this subject, but the facts are, that an account of the process adopted by me is given in my report to Parliament for 1859, with the copy of a small deed printed by it; that Mr. Osborne, in a letter dated Melbourne, 16th January, 1860, which is printed in the *Photographic Journal* of April, 1860, says, "A positive is printed from this negative upon a sheet of paper so prepared, that the image can be transferred to stone," but he gives no information as to what the nature of the preparation is; and, in fact, he appears to have studiously avoided divulging the nature of his process in England, that he might be able to take out a patent for it, and only made it known when he found we had anticipated him.

I have been most anxious to do full justice to Mr. Osborne, as you will see by reference to the fifth page of the preface to the small work on photo-zincography, &c., which has been just published by Messrs. Longman, and of which I send you a copy.—I am, sir, your obedient servant,

Henry James, Colonel Royal Engineers.

*Ordnance Survey-office, Southampton, October 7, 1862.*

Without entering into the question of priority here, we may remark that Mr. Osborne made no intimation whatever to the effect that Colonel James's process was derived from his; but simply said, in answer to Mr. Wyld's question, that his own process was patented prior to the publication of that of Colonel James. Regarding the priority of publication we believe there is a doubt. We shall probably recur to this subject again.

## Scientific Gossip.

### Solar Phenomena—The Red Protuberances—Magnetic and Auroral Hypotheses.

Of late years the constitution of the sun has attracted considerable attention. Observers and speculators on its various phenomena were not wanting at any time, but the recent spectrum discoveries of Bunsen and Kirchhoff have endowed the subject with increased interest. To a photographer our central orb must always possess great attractions, both because it is the *fons et origo* of his art, and also because photography is peculiarly adapted to discover its hidden secrets. All our readers must remember the wonderful disclosures made by the camera on the occasion of the last great solar eclipse. The existence of the red protuberances, and their connection with the sun, were by that means placed beyond a doubt, and the photographic records then obtained have served as a basis for subsequent speculations and theories. In the last number of the *Philosophical Magazine* Mr. B. Stewart, M.A., F.R.S., has propounded a theory with respect to these remarkable appearances which appears to us to merit considerable attention. These strange and startling appearances have now been observed at least three times. The first of these occasions was during the total eclipse of the 7th of July, 1842, when their existence was revealed by the late Mr. Baily and the Astronomer Royal. The account of these philosophers was sufficient to rouse the attention of astronomers; so that during the next total eclipse, which happened on July 28th, 1851, there were assembled a large body of skilful and accurate observers well qualified to make the most of the few but precious minutes of darkness allotted them, in order, if possible to elucidate the nature of these striking appearances. From the observations of Mr. Airy and others it was rendered very probable that the red protuberances really belonged to the sun, while, from their vast magnitude, the idea of their being solar mountains was at once discarded. It seemed rather to be the impression among those assembled on this occasion that they were connected in some way with solar spots, some of which appeared on the sun's disc in places not far removed from those occupied by the red flames; and Mr H. Fox Talbot suggested that the latter might be heated vapours, which, rushing through the spots or openings in the sun's photosphere, ascend to the upper regions of the solar atmosphere in flames of immense elevation. The third and most recent occasion on which these protuberances were observed, was during the total solar eclipse of July 18th, 1860, which was attentively watched in Spain by eminent men from all quarters. It was on this occasion that Mr. De la Rue was enabled, by means of the Kew heliograph, to obtain a photographic representation of them; and from the very great care and labour which he has bestowed upon their reduction, no doubt can be entertained of the accuracy of his conclusions. By his labours, and by those of Mr. Airy and other observers, it is rendered certain that these prominences belong to the sun, and that they are not optical illusions, but represent actual changes of unknown nature, but stupendous magnitude, taking place in our luminary, and extending, in some instances, to a distance of 70,000 miles or more above the photosphere of the sun. It was also proved on this occasion that the light from the protuberances was unpolarized, and that it had very great actinic power. Many members also of the expedition supposed these appearances to be clouds in the solar atmosphere, to which idea they may have been led by the circumstance, that at least one mass, appeared to be floating quite detached, 14,000 miles away from the body of the sun. Mr. De la Rue also seemed to think that one of the most remarkable of the protuberances was connected in position with a mass of faculæ, which came round upon the sun's disc a day or two afterwards. These are the three occasions on which these phenomena have been observed; and it has been the nearly unanimous belief of all observers who have acknowledged their connection with the sun, that they represent great disturbances taking place in those regions of the solar atmosphere in which they manifest themselves. Since, therefore, argues Mr. Stewart, these are phenomena undoubtedly associated with our luminary, since, also, they extend to a distance of at least 70,000 miles above the sun's photosphere, and since we cannot well conceive them to exist without the presence of an atmosphere of some sort, however attenuated, we are led to the startling conclusion that the sun's atmosphere extends to at least this distance above its surface.

This result appears so strange that the mind can only admit it with reluctance; and, hence, Mr. Stewart has sought for an explanation consistent with the presence of a very attenuated atmosphere; and. guided by terrestrial physics, and looking to those phenomena which take place in our own atmosphere, at the greatest elevation above the surface of the earth, the aurora borealis will undoubtedly suggest itself, as an appearance which both observation and experiment, induce us to associate with the extreme limits of our atmosphere. There is, besides, another reason which might induce us to resort to this explanation: the observations of Schwabe and Sabine give us good grounds for supposing that the sun exercises a magnetic influence upon the earth. Now, Mr. Stewart, in papers which he has communicated to the Royal Society, has endeavoured to show that the terrestrial aurora is the induced effect in the upper regions of the atmosphere, of small but rapid changes, occurring in the intensity of the earth's magnetism which form what is known as magnetic disturbances, and occur simultaneously with auroras. It has also been shown, by General Sabine, that these disturbances have a daily period, thus proving their connection with the sun, and also a ten-yearly period coincident with that of the relative frequency of the solar spots. There is, therefore, little doubt left in the mind, that these changes in the earth's magnetism are due to similar changes in the sun's magnetic effect, and that both are connected directly, or indirectly, with those spots which appear on the surface of our luminary. Arguing on these grounds, Mr. Stewart, therefore, makes the suggestion, that those changes in the sun's magnetic effect, which, acting through the earth, produce an aurora in our atmosphere, exert a similar effect upon the atmosphere of our luminary, calling forth a simultaneous aurora there. According to this hypothesis, the red flames are supposed to be these auroras, and that this is not by any means impossible, the following points of likeness between the two will show. The extreme height to which the flames rise above the surface of the sun has already been adduced in favour of this hypothesis. It is strictly paralleled by the observed heights of terrestrial auroras. The great actinic effect which Mr. De la Rue showed was a characteristic of the red protuberances, is also another point of similarity, since Dr. Robinson and others have found the light of terrestrial auroras to possess similar chemical action. The red or violet colour of the solar flames is also in favour of the hypothesis. The light from each kind of aurora is likewise unpolarized; and lastly, some of the red flames present a curved appearance, similar to the auroral arch.

These coincidences are by no means very striking. Indeed, they can only be looked upon as points of likeness by physicists, who feel that any hypothesis is better than none at all, and that the solar phenomena, as recently exemplified by the red flames, and the willow-leaf appearances, are so startling that they warrant the indulging in strange and somewhat far-fetched theories. Several objections to Mr. Stewart's theory will at once occur to many of our readers. For instance, it is a necessary characteristic of terrestrial auroras, that they should be confined to the upper strata of the atmosphere; whilst in the case of the solar flames, they almost always appear to descend down to the photosphere; the above theory being, in part, built upon an isolated instance of one mass appearing to be floating quite detached from the body of the sun. Again, the sharp outlines of the red flames are scarcely comparable with the misty, uncertain, outline of an auroral display; and their position in respect to the poles and equator of the sun, can scarcely be reconciled to our terrestrial ideas of an aurora. However, as we said at the commencement, Mr. Stewart's theory merits considerable attention, as it is certainly the most satisfactory attempt at explaining these phenomena which we have as yet seen.

## NOTES ON ENLARGING PHOTOGRAPHS.

BY SAMUEL FRY.

The desire to produce large pictures is very general amongst photographers, whether amateurs or professionals. Many are deterred from attempting to work unusual sizes, from the expense involved, in the first place, by the purchase of the apparatus required; and in the next place, by the great labour involved in the operation when at a distance from home; for even when working 12 × 10, which is a very moderate size, a heavy stock of impedimenta is necessary, involving much expense and great labour. The specimens which have been exhibited of enlargements have been of a mixed character, many very good, and others unsatisfactory. The latter have arisen from several causes, amongst which may be named, choice of unsuitable subjects, carrying the amplification to an excessive degree, or having a poor or inartistic negative to start with. A small picture, inartistically treated, may be passed over amongst other prints, from the very fact of its smallness; but the same picture enlarged to 18 inches, and suspended in a room, is very undesirable, and tends to prevent the general use of a very beautiful and valuable branch of photography. The writer has been practically engaged in enlarging pictures for several years past, and on the announcement of Mr. Woodward's patent camera, he invited the attention of the proprietor to the process he was then using for enlarging photographs of the moon, and which had then been at work, with much success, for nearly two years. An idea is very generally prevalent, that large and costly apparatus is required for enlarging. This is a mistake; and it will be seen that with a stereoscopic camera and pair of lenses, and a little ingenuity from the operator, negatives of 18 × 15 may easily be procured.

The method we recommend, is that of obtaining a transmitted positive from a small negative, and then enlarging this positive to a negative. Two great advantages this method claims over the solar camera are, that a particular character of negative to commence upon is not required, any good, sharp, clean plate being suitable; and, in the second place, that sunshine is not required, or even desirable. The difficulties in this way of procuring a supply of solar prints are well known, and in dull seasons and in winter time, none at all can be done, or so few as to practically prevent commercial transactions being carried on. By the method about to be described, on the contrary, an ordinary moderately good light is always amply sufficient. In the City, at the writer's establishment, 20 seconds is an average exposure for enlarging from a negative plate 2¼ × 2 up to 15 × 12. The loss of sharpness is merely nominal, where the original plate is absolutely sharp; but where there exists only an approximate focus, the apparent loss is greater than might have been expected.

We generally obtain the transmitted positive by a long deal camera, having the lens in the centre, the negative in front, and the focussing screen at the same distance behind the lens that the plate is in front. We employ a Dallmeyer's Stereoscopic Lens for this part of the operation, and as it requires a very perfect positive, it is desirable to use a small stop, say three-eighths of an inch, and focus with extreme accuracy, pointing the camera at an angle of about 40 degrees towards the northern sky, from an open window, or, if the weather will not allow of that, placing the end of the camera very close to the panes of glass, which should previously be carefully cleaned, or much light will be obstructed.

It would be difficult to name a precise time for an average exposure, as everything depends on the density of the negative, and as great difference will be found in this as in printing on paper, where one negative may take 10 minutes, and another 10 hours, or 60 times as long. We develop the plate with protosulphate of iron, 10 grains, and acetic acid, 20 minims. The picture should appear very slowly, and the iron may be kept on, moving it constantly, until the minutest details are well out; then wash with extreme care, back and front, and finish with a little distilled water, as caution is necessary to prevent the slightest stain. The impression will probably require a little of a 2-grain solution of pyrogallic and acetic acid, with four drops of a 10-grain silver solution, to bring it to its full density; and it is here that considerable judgment is required, as upon this depends the success of the final operation. The very darkest portions should have their transparency unimpaired, as the tendency of the ultimate amplification is to produce rather harder lines than exist in the original; and by thus allowing a slight margin of softness in starting, we may attain to a very fine result in the end. We ought, by the way, to have specified, that it is extremely desirable that the original small negative should be fully exposed, and have the finest half-tones well indicated, or it will be clearly impossible to obtain a transparency having that proper balance of vigour and softness which go so far to produce the requisite rotundity in the print. It is well, before commencing to enlarge a series of pictures, to decide upon what will be the most convenient size, having reference to their ultimate destination.

Stereoscopic pictures, enlarged to 12 × 10, have a very pleasing effect; and one of this size, produced by the writer from a stereo negative, may be seen in the International Exhibition, by those who have the requisite temerity to ascend the threescore and ten steps leading to the "Photographic Garret." This picture is from the celebrated sculpture, "The First Cradle," by Auguste Debay, and is intended to illustrate the advantages of Mr. Swan's patent stereoscope. This picture defies examination as far as sharpness is concerned, and preserves in a remarkable manner, the style of the original negative, which was taken by Mr. Maddison, operator for Messrs. Negretti and Zambra at the Crystal Palace. For landscape subjects: a size of 14 by 12 mounted horizontally, is extremely pleasing and imposing , and a good sharp stereoscotive negative, to the corners and edges, will yield such a size easily, with gratifying results; but it is no use to attempt to work upon inferior, ill lighted, leprous, marky, inartistic pictures, however sharp they may be. Let the true definition of sharpness be what it may, we all know in these days of Dallmeyer, Ross, Grubb, Sutton, Voigtlander and others, what is meant by a sharp negative, and all admit that the second most desirable quality in a negative is sharpness, the first being always artistic treatment. Having now got up to the half-way house of the subject, the production of the transmitted positive, we propose in the next to consider the part requiring greater dexterity, and power of manipulation, and certainly as much judgment and skill, as that we have now touched on. At the risk of giving vent to heterodox views, we cannot but say that in our opinion, a good manipulatory powers, and sound judgment will in most cases be of more value to the practical photographer than profound chemical knowledge.

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—Although the fabric of photography appears to rest on a perfect system of toning being discovered, there is no brnach of the art where the chemical conditions of the solutions used are so imperfectly understood. Able men, thoroughly versed in chemistry, have, from time to time, endeavoured to solve the problem; but, after a volley of hard sounding words, attended by (what to the uninitiated appear) a long row of noughts and crosses, they have beaten a retreat, leaving us in the same amount of ignorance as before. I make no pretensions to the character of a genius, and, consequently, cannot be expected to undertake what others, whose road to the acquirement of knowledge has been less rugged than mine, have failed satisfactorily to elucidate; still a few points are left open, an examination of which may, in the absence of clearer light, prove a stepping stone to discoveries of a more important character—for the most mighty works extant are but accumulations of small things. Dividing, then, the toning bath, and examining its constituent parts, what have we?

first, water, then chloride of gold, followed by (say) carbonate of soda; let us now endeavour to ascertain the part each of these bodies has to perform in the process of toning; First, water, which dilutes and brings the remaining substances under control; secondly, chloride of gold, that imparts colour; and lastly, soda carb., which prepares the way for the last named agent to perform its part. But a difficulty here presents itself; carbonate of soda, except in contact with gold, refuses to act, still the gold of itself possesses no powers of reduction, neither is the soda capable of imparting colour; this question, apparently so perplexingly paradoxical, needs some explanation ere we can proceed further. Numerous experiments and close observation led me to believe that the soda partially decomposes the chloride of gold, $Au^2 Cl^3$; a portion of the chlorine unites with the soda, thus forming another compound, which prepares the surface of the paper for the reception of the gold; the remaining portion preserves the $Au^2$ and Cl, probably now standing $Cl^1$ in combination, that enables it to act, and its action seems to exercise a mechanical influence on the film of coloured matter that covers the high lights of the picture; but this influence can only be exerted when in contact with the primary reducing agent, a bath containing a few drops of hydrochloric acid with soda carb. to produce an alkaline reaction, without the assistance of gold, will clear the surface of the paper sufficient to secure even-toning, but this solution does not readily remove the coloured film spoken of. But if, instead of the acid, we employ chloride of gold with an excess of soda to destroy its toning action, the surface of the prints is cleared as effectually as can be accomplished by the usual method of toning, the action of course, being somewhat slower. This train of thoughts suggested the idea, that a paper given to mealiness, if submitted to the action of a newly prepared bath, with soda in excess, to render the gold inert so far as toning is concerned, it would prepare the surface of the paper and prevent mealiness when exposed to the action of a second toning bath, made in the usual way. On trial, I found such to be the case, although slow toning gave the best results; with a longer soaking in the first bath I have no doubt but a quicker toning might have been resorted to, although the second bath stand but very slightly alkaline; and this leads us to consider the conditions of the gold rendered inert by the decomposition above alluded to. I believe that so long as this substance retains a portion of chlorine, however small that quantity may be, a total decomposition cannot be effected; and when, by the addition of chlorine, either in combination with hydrogen or the precious metal, the balance is restored, it revives into new life, and works as vigorously as ever. I entertain a strong impression, that, if this subject was fully entered into by photographers enjoying the threefold blessing of time, talent, and money, they would be amply rewarded for their pains, for I believe those investigations would be the means of bringing about a complete revolution in our present system of toning.—Yours respectfully,

A Photo's Assistant.

## PHOTOGRAPHIC EXCHANGE CLUB.

Sir,—Twelve months having passed since the alteration of the rules of the Exchange Club, it may not be an inappropriate time to submit to the members, and likewise to the readers of your journal, a record of what has been done during that time.

In the first place, it is with great pleasure that, as secretary, I have to thank you for the great assistance you have afforded myself and the members of the Club by placing the columns of the Photographic News at our service; in advising and suggesting, at times when the Club was not working harmoniously, and in assisting at all times to promote what cannot fail to have afforded a great deal of pleasure to many amateur photographers.

Since undertaking the office of secretary, I have received communications, corresponded with, and received prints from exactly 50 gentlemen. I have received 1,801 photographs, of which the scrutineers passed about 1,450, which I have exchanged; about 250 were returned as unsuitable for exchange, and the balance I have in hand; the largest number received from one individual was 136. One gentleman sent 111, not one of which was from a bad negative, and were all most carefully printed. Another gentleman has sent me regularly 6 prints every month for some time past, amounting altogether to 62 prints, every one from a different negative, not one of which have been rejected.

Some of these details will be sufficient to show gentlemen who might wish to join, that both pleasure and profit may be obtained from good negatives that they may have by them, by joining the Club. As regards the merits of various processes, some information on that head is to be derived from inspecting so many prints, and may be of interest to the photographic world at large. The contributor last mentioned works dry plates, the collodio-albumen, the results speak for themselves. The member sending 111, works the wet, develops with iron, failures he appears to have none of. So much for wet or dry: now for dry processes. Surely, one could say, after the specimens of the collodio-albumen that bears off the palm, it does as to quantity, keeping in sight quality as well, until I come to mention a smaller contribution of 14 prints, from the far west of England, showing as good results with the Fothergill process; honey and gelatine come next as to results, and the last, both as to number and quality, is the tannin. As to the working of the Club, I trust that some satisfaction has been given. I am afraid I cannot say I am not aware of dissatisfaction having been expressed, upon one or two occasions, when prints have been returned. The great difficulty is still, as it used to be some two or three years ago, gentlemen will not look at their own productions with a sufficiently critical eye; half the labour would be spared the scrutineers, and all the unpleasant part of the work to the secretary, if this were done. Trusting that gentlemen, from whom I have not heard lately, will send me in some prints from the best negatives they have been taking this summer, as this last month or two we have languished a little, and several good prints are on hand waiting for equivalents; it is as I said would be likely to occur, two or three energetic good photographers send up month after month their good photographs, and bring me to a stand still for want of good material to send them back.

I will now conclude, with simply saying that members are contributors from all parts of England, Ireland, Scotland, and India, and that new members will be guaranteed that variety and novelty of subject abound if they should be desirous of joining the Club.—Yours respectfully,

Frank Howard.

10, *Lansdowne Road North, South Lambeth,*
*September 30th*, 1862.

## RESINIZED PAPER PROCESS.

Dear Sir,—In my last communication, there is a slight error in the formula, whether my own or the printer's, I know not. It should be one *scruple* of benzoic acid, instead of one *drachm*. I should be obliged by your inserting this note, as the latter quantity would make the prints very red, and very slow in printing.

As I promised, I have tried mastic in the place of Sœhnée varnish, and find it everything that can be desired. From half to one drachm to the 10 ozs. of spirit, according to the quality of the paper (a harder sample requiring less than a more porous one), is the quantity I would recommend.

The only thing that I am dissatisfied with in the process, is the chloride of cadmium, which is objectionable, not only on account of its expense, but also from the difficulty of ascertaining the quantity dissolved in the alcohol. It is, also, slightly deliquescent, which is another disadvantage. If any gentleman should think of any other chloride that would answer better than the cadmium, I should be glad if he would let me know. It must be pretty permanent in the air, and soluble to the extent of 15 grs. to the ounce in rectified spirit, provided that it contain as much chlorine as chloride of sodium; should it contain less, a greater quantity must, of course, be soluble in the alcohol.

I may as well here call attention to the fact, that methylated finish (which is very often sold for the methylated spirit, as the latter cannot be sold in less quantity than 12 gallons) contains a good deal of shellac, which would be detrimental in the resinized paper.—I am, dear sir, yours respectfully,

H. Cooper, Jun.

5, *Aberdeen Park, October 7th*, 1862.

P.S.—I had forgotten to state that the resinized paper will be prepared for sale by C. B. Francis and Co., 2, Upper Street, Islington, N.

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Dear Sir,—Permit me, through the medium of the Photographic News, to thank Mr. H. Cooper, jun., for his new printing formulæ. It promises well, and doubtless will supersede albumenized paper. I enclose a print, also a piece of the prepared paper for your inspection.

The paper is a bad sample of Rive, that has been laid aside between three and four years, as useless for all other photographic purposes to which it has been applied previously. I have not followed Mr. Cooper's formula exactly, having substituted chloride of zinc for chloride of cadmium. The chloride of zinc is very soluble in alcohol. I will here state the particulars of my proceedings:—

| | |
|---|---|
| Prepared gum benzoin ... ... | 4 drms. |
| Prepared mastic in solution ... | 8 grs. |
| Alcohol 825 ... ... ... | 8 oz. |
| Chloride of zinc ... ... ... | 120 grs. |

Dissolve and filter into a dish, the paper is then drawn through the solution and dried in a warm room; sensitized on a 60-grain solution of nitrate of silver, very impure, containing 20 per cent. of lead.

I found it necessary to print *no deeper* than the finished print would be required when toned and fixed. The print enclosed remained 25 minutes in a saturated solution of hyposulphite of soda, and was then washed for half an hour in the syphon trough. I am inclined to think that it will tend to whiten the high lights, as I have never found the benzoin become yellow, but always black by exposure to light and air, when carefully selected and prepared.—I am, sir, yours most obediently,

H. R. Nichols.

2, *St. Jude Street.*

[The tone and surface of the print enclosed are highly satisfactory.—Ed.]

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Dear Sir,—I have been much interested in Mr. Cooper's new printing experiments, with gums and resins, in place of albumen, and if it can be accomplished, will be an undoubted improvement on the old form; but it is my impression that varnishes darken by age generally, if not invariably, and will form an insuperable difficulty in the perfection of the process. Some method of producing a hard close texture in the paper itself I should prefer; is it possible to print on parchmentized paper? which seems to possess good physical qualities for producing prints.

The remarks on toning that have lately appeared in the News, tally entirely with my experience, although I have not before known the *rationale* of the action of various solutions. I have a long time employed the subcarbonate soda instead of the bicarbonate, and have been much more successful with it in getting prints free from mealiness; and its action, according to your correspondent's views, would be owing to its greater causticity and power of acting on the fibre and albumen of the paper. Whilst the hot water plan of development is so much practised to accelerate exposure, I cannot think why some do not try the use of an alkali in gelatine for dry plates, which, with cold development, is nearly or quite as rapid.—I am, sir, yours respectfully,

W. Bartholomew.

*Bentley, Hants, October* 8, 1862.

[Most resins darken more or less by exposure to the atmosphere, but some much less than others. The desideratum at present is to find that which, whilst suitable for the purpose, darkens the least. Mr. Cooper is inclined, at present, to the use of frankincense or mastic; some prints with the latter, which he has forwarded, are very good. The very small proportion of the resin necessary will not, we apprehend, except in the case of those which darken very rapidly, cause serious loss of purity in the whites.—Ed.]

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## COMPTOIR INTERNATIONAL DES PHOTOGRAPHES.

Sir,—After some months standing, we are happy to have to announce to you, that through the favour and sympathy that has everywhere welcomed our project of a *Comptoir International des Photographes*, we shall be able, from the present time, to open our first International Exhibition of Photographs, in a locality in the centre of Paris, namely, at No. 97, Rue Richelieu, a few steps from the Boulevard des Italiens.

All persons who may desire to exhibit prints are requested to address to the Director, at our Office, 46, Rue Bondy, Paris.

Portraits will not be admissible for exhibition, as the chief object will be to effect sales. The prices should be sent with the prints.

Hoping, sir, that you will give your great publicity to this letter, I have the great honour to remain, yours, the Director,

Edmond Potome.

*Paris, September 24th*, 1862.

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# Photographic Notes and Queries.

### Free Nitrate in Toned Prints.

Sir,—Having been away from home for a considerable time, I did not see Mr. Dawson's "Lessons to the Learned" till a few days ago.

Mr. Dawson appears to take it for granted, that the acetate of soda is the only ingredient in the toning bath recommended by him, which would decompose the nitrate of silver remaining in an imperfectly washed print. The chloride of gold would certainly be decomposed much more than necessary, and thus a considerable loss of this expensive material would be entailed.

His experiments are not at all convincing, that free nitrate of silver would remain in the paper after passing through the toning bath; for if any salt of silver be remaining, it would certainly be the acetate.

But whether nitrate or acetate of silver be present in sufficient quantity to induce sulphuric acid in the hyposulphite bath, it would be of very little consideration, as the sulphuric acid would be at once neutralized by the hyposulphite bath being, as it ought always to be, in a decidedly alkaline state.

If an unwashed picture be put into a toning bath of acetate of soda and chloride of gold, a milky precipitate will at once be formed. If this precipitate be *acetate* of silver, then the washing is not of so much consequence; but if it be *chloride* of silver, this must be formed at the expense of the chloride of gold, and hence the washing must be of very great importance.—Your obedient servant,

W. W.

*Bristol, September 30th*, 1862.

[There can be no doubt whatever of the propriety of careful washing; and no doubt has ever been raised. Mr. Dawson gave an untenable reason, however, for that washing, and has since defended that position by very inconclusive experiments; but it is not worth while to discuss the matter further.—Ed.]

## Talk in the Studio.

Conversazione of the Society of Arts.—The last conversazione of the Society of Arts of the season was held last night at the South Kensington Museum. It was intended to be a sort of farewell meeting to the many distinguished foreigners who it was supposed would be in London at the closing of the Exhibition. From the postponement of that ceremony, the foreign element last night did not so largely preponderate as was anticipated, though most of the foreign exhibitors and Commissioners where present. The company was received by Sir Wentworth Dilke, one of the vice-presidents of the Society, and by other members of the council. Of course, the noble collection of articles of vertu, antiquities, and relics which have been lent for exhibition by numerous noblemen, and gentlemen, both in this country and abroad, was the great centre of attraction. A cursory inspection of a few of these priceless gems of art enables the visitor to realise the soundness of the estimate which calculates the value of the articles thus lent for the gratification of the public at no less a sum than six millions sterling. The admirable bands of the 1st Life Guards, and of the Coldstreams, added considerably to the enjoyment of the visitors, by the capital style in which they performed a well-selected programme of popular and operatic music.

New Double Salt of Gold.—Mr. Sutton's new double salt of gold, the calcio-chloride, appears to answer well for toning purposes. In principle we apprehend it will form a solution very similar to that we recently described Mr. Lacy as using. The prints sent out by Mr. Sutton (for the double purpose of showing the quality of the sensitive dry process, described before the British Association, and of illustrating the difference between views of the same scene, taken by the ordinary view lens, and one by the panoramic lens), are toned by this salt. The tone is a rich deep sepia, which most people like. The subject is a rustic-looking old church in Jersey, which we remember very well.

Tannin and Honey.—A correspondent says "I have worked the tannin and honey process, with success, with very short exposures, from 5 to 20 seconds, but find they do not keep after exposure, as the image fades quite away in about 4 weeks." Mr. England has kept the plates many months before exposure without injury. It is a singular and unexplained fact that the latent image in very rapid dry plates has a tendency to disappear if kept long after exposure. This is the case with the rapid plates of Dr. Hill Norris. The same effect does not take place in the slow dry processes.

Illustrations of Enlargements.—At the closing soiree of the British Association at Cambridge M. Claudet exhibited by the aid of the oxyhydrogen light, the enlarged images of the solar camera thrown on to a screen. A number of *cartes de visite* were enlarged showing the great perfection of proportion and the natural expression which may be imparted to portraits when they are taken in a very short sitting, in order to show the working of the solar camera, it was placed in a room adjoining the great hall. M. Claudet exhibited in this manner pictures of persons enlarged to the size of nature, and some considerably larger from small *cartes de visite*. The effect was very striking and beautiful. He also exhibited some photographs, taken by the Compte de Montizon, of all the most curious animals of the Zoological Gardens, and some views of Java, taken by Messrs. Negretti and Zambra, with instantaneous views of Paris by Ferrier, showing the Boulevards full of carriages and people, as they are in the middle of the day. One of the principal objects of M. Claudet was to explain how it is possible to trace or draw with pencil on canvas those enlarged portraits when they are to be painted, and for this purpose how it is even more advantageous to apply the colours, not on a surface containing the chemical substances of photographic pictures, but on the usual medium employed by artists without the black shadows forming the delineation of photographs.

## To Correspondents.

J. C.—We do not see how a gutta-percha bath can be conveniently lined with india-rubber after it is made. The only plan we can suggest would be to make the lining completely first so as to fit inside the bath exactly; then drop it in and turn the top edges over. Sulphate of ammonia is an article commonly kept by most chemists, and sold at a penny an ounce. You surely must have made some mistake in asking for it.

W. S. C.—Volumes 1, 3, and 5 of The Photographic News are in print; their price is 8s. 6d., 11s., and 15s. each. The other volume is out of print.

Fantail.—The instantaneous dry plates recently referred to in a recent letter from Mr. Fowler were those of Dr. Hill Norris, with some peculiar method of development. 2. We cannot in this column enter into a description of an instantaneous shutter. There are various plans by which one can be made to open in the middle. Perhaps one of the best is that recently described in our pages by Mr. Mann, page 319, July 4th. 3. We do not know anything definite of the lens to which you refer. It is, probably, a pretty good second-rate lens. It cannot be more than that from the price.

J. H. Kedin.—The defect to which you refer arises primarily from defective lighting; the face is not sufficiently illuminated. There is also a little under-exposure, and the negative is too thin.

Annie or Janie (the name is not quite clear).—Water colours are very apt to work up when one is worked over another on albumenized paper. To prevent this, you will find the use of "Newman's Preparation" very valuable. A little of it, mixed with the colour first laid on, allows of washing or hatching over it, without fear of working up. In all cases the glaze of the albumenized paper is removed, more or less, when covered with water colours.

An Apprentice.—To obtain the silver from clippings of sensitive paper, first burn them; then take the ashes and place them in a crucible with a flux, such as borax, or carbonate of potash and nitrate of potash, &c., and subject the crucible for an hour or two to a bright, red heat.

Amateur.—Plain paper is excited by floating on the silver bath, in the same way as albumenized paper, but does not require floating so long. All the processes with plain paper may be managed in the same manner as with albumenized paper, and with the same negatives. To secure the best class of plain paper prints, the ammonia-nitrate silver bath should be used. Your glass shall be examined.

A New Subscriber.—Acetic acid once in a bath of nitrate of silver is very difficult to eliminate, and would be detrimental if present in the proportion you state, in a printing-bath, or one for collodion positives. If you neutralise it, acetate of silver is formed. This may be partially removed by placing the bath in a very cold place for a few hours, and then filtering. A portion of the acetate may be, by this means, removed, but not the whole. 2 The present volume of the News commenced at the beginning of the year.

Simple Simon.—Solutions of nitrate of silver may be reduced to the metallic state by various methods. The reason why the method of reducing it to a chloride first is generally recommended is, because the product is most free from impurities. 2. We will shortly give the method of precipitating a silver bath by means of bi-carbonate of soda, and re-dissolving with nitric acid in detail.

Cassandra —By filtering your turbid solution you lost a great deal of silver, as the brown turbidity was caused by oxide of silver. We have followed the same instructions with success, but there is a great tendency to the further precipitation of oxide of silver on adding the two parts together. We prefer the method recently described in our columns of making an ammonia-nitrate bath, and then adding nitric acid until it is nearly neutral. The result is a solution of oxide of silver in nitrate of ammonia, which gives very rich prints.

K.—We have not met with such a defect before. It is more likely to occur from some fault in the paper than from impurity in the nitrate of silver. The acidity may arise from acetic acid being added to the albumen, which is a practice with some albumenizers.

A Young Photographer.—The idea has often been considered: the chief difficulty consists in doing justice to the subject by means of wood-cuts to be printed with a newspaper. The subject shall be borne in mind, however.

James Drake.—Your washing apparatus has arrived, but having been at Cambridge during the last week, we have not had time even to unpack it yet. We will take an early opportunity of examining it and reporting.

J. F. L.—The method of preparing Dr. Hill Norris's extra sensitive dry plates is a secret, not a patent. His original method was patented, but whether the patent has been kept up or not we cannot tell: it is certainly not enforced. How the collodion is prepared we cannot tell, but it is certainly not simply iodized. We know this much from the Doctor himself.

Alpha.—If a suitable collodion be used, we do not think it is necessary to coat the glass with gelatine in the tannin process, especially for small plates An old and powdery collodion adheres best. It should always have a bromide as well as an iodide. 2. The object of preparing a concentrated solution of pyrogallic acid, and of citro nitrate of silver, is primarily convenience. Having these solutions at hand it is easy to mix them in a moment, in any proportions, and in any degree of dilution. It is always well to begin development with a very small quantity of silver. If the picture show signs of under-exposure, adhere to the small quantity of silver, and develop slowly; if, on the other hand, the image start out and show signs of over-exposure, the citro-nitrate may be added freely, to obtain the required density rapidly, and gain a well contrasted picture. 3. When there is any tendency in the film to leave the plate, it is well to varnish the edges of the plate. We have found Hughes's black varnish answer well for the purpose.

J. M. B.—You can belong to all, or any of the photographic societies, if you wish. You require to be proposed by a member. *The* Photographic Society of London, or rather of England, is the oldest. The subscription is a guinea a year, and a guinea entrance fee. If you join at the present time, you will only pay half a year's subscription, as the year commences in February. The meetings are held in Kings' College, from November to June, on the first Tuesday evening in each month. The North London Society meets on the last Wednesday but one in each month, from September to May, in Myddelton Hall; the South, on the second Thursday in each month, from October to June, in the City of London College. All the meetings are held at 8 o'clock in the evening. It is not absolutely necessary to be a member, in order to read a paper.

B. F.—You cannot precipitate the silver from your fixing solution as a chloride. It must be thrown down as a sulphide. We have repeatedly described the process.

Several correspondents in our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32, Paternoster Row, London.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 215.—*October* 17, 1862.

## THE FUMES OF AMMONIA IN PRINTING.

The value of a solution of ammonia-nitrate of silver in printing is well known by all photographers of any experience. Paper prepared with it is more sensitive, and gives more vigorous prints, and richer, deeper tones than can be obtained with the plate nitrate solution. Notwithstanding the various formulæ which have recently been given for the use of ammonia-nitrate with albumenized paper, many photographers find a difficulty in using it satisfactorily.

We have just received from Mr. Penny, of Cheltenham, a suggestion for the application of ammonia in a different manner, which, if a simple method of effecting it can be found, will, we think, prove valuable. Mr. Penny says :—

"While experimenting upon fuming dry plates with ammonia, it occurred to me to try the effect upon sensitized albumenized paper.

"The result was that it increased the sensitiveness, the colour of the print, when taken from the printing frame, was better, and the shadows richer. The paper tones in the acetate bath, quite as readily, and to the ordinary colours; but if the paper be damp at the time of fuming, it is apt to blister in the subsequent processes.

"I have not been able to carry out a course of experiments, but the suggestion might possibly be useful to some during the approaching dark days.—Yours truly, G. S. Penny.

"*Cheltenham, October* 11*th*, 1862."

Before going further, it is only right to say that this idea, although manifestly original with Mr. Penny, is not entirely a new one. Very recently, a distinguished American amateur communicated it to us as a most valuable secret, which he could put us in possession of, for our own use; but as it was given to him, to some extent, under the seal of confidence, he did not feel at liberty to communicate it for publication. As the matter is now suggested by an independent discoverer, we need not hesitate to add the confirmation of its value, which our friend's experience enables us to give. The results were described as possessing a richness and depth entirely unattainable by other means, and the printing was said to be effected in half the time. The mode of applying the fumes of ammonia was as follows :—A little of the strong liquid ammonia is placed in a saucer; for convenience, a piece of cotton wool may be saturated with it. This is placed at the bottom of a box with a well-fitting lid. To the centre of the lid, inside, is attached a clip to hold the paper. A sheet of paper is then taken, and two diagonal corners brought together, and placed in the clip, so that the sheet hangs loosely folded, face downwards. The lid is then closed, and the excited paper is subjected to the fumes for a few minutes. A very short time is sufficient, and too long exposure causes the albumen to be attacked. The operation should be performed just before exposing in the pressure frame.

We fear that where printing is conducted on a large scale professionally, this process will be considered to involve too much trouble. But with those to whom trouble is a secondary consideration, compared to obtaining the best possible results, this plan is well worthy of a trial. We were informed by the gentleman to whom we have referred, in reply to a question as to whether ammonia in his dark room, did not interfere with his negative process and cause fogging, that although theoretically he had feared such a result, practically he had not found any kind of inconvenience. We have an impression, which we cannot at this moment verify, that some time ago the same method was mentioned in the letter of our Paris correspondent, who stated, that a French photographer had used it with success. Photographers will be obliged to Mr. Penny for the readiness with which he at once communicated the idea to his bretheren, not the first good idea, by the way, which he has published.

Whilst referring to ammonia-nitrate for printing, we may mention that we have been using it recently on albumenized paper, with great success. We made an 80-grain bath and added ammonia until the precipitate was redissolved. We then divided it into two parts, to one of which we added nitric acid until it had a decidedly acid reaction. We then added this to the other: the result was a solution slightly alkaline, consisting of oxide of silver in nitrate of ammonia. The paper is floated from thirty to sixty seconds, not more, and prints and tones very satisfactorily. We had a visit a few days ago from Mr. Carbutt, a photographer in Chicago, U.S., who showed us some very excellent prints, printed, as we were informed, by a very similar method.

## REPRODUCTIONS. CLEARING UP NEGATIVES.

In the paper on photolithography read by Mr. Osborne before the British Association, there is a hint upon what is termed the "clearing up" of negatives, which we conceive to be of great importance, and which, by some of our readers who are not sufficiently interested in photolithography to read the paper carefully, may easily be overlooked. One of the troubles experienced in reproduction, especially of engravings, and other similar subjects, where the presence of pure blacks and whites is of great importance, consists in obtaining sufficient density in the whites, and clearness in the shadows. A slight tint on the whites, is very common in reproductions of engravings. The difficulty arises from various causes, such as the near proximity of the object, the long focus of the lens, the small stop desirable, &c. The use of old collodion, and long exposure is an uncertain remedy. Intensifying for the purpose of getting sufficient density, is the usual method adopted for getting purer whites; but this often brings another trouble, which renders it only partially successful. It almost invariably happens, especially where a very sensitive collodion and iron development are used, that there is a slight, although sometimes almost imperceptible deposit on the shadows of the negative, which, whilst insignificant in itself, becomes the nucleus of further deposit in the process of intensifying. As we have repeatedly before observed, any deposit on the deepest shadows, becomes equivalent to a given loss of intensity on the dense parts of the negative, inasmuch as it renders so much darker printing necessary to get sufficient depth in the blacks of the print. In reproductions generally, this trouble is felt, and in photolithography must imperatively be avoided, as the slightest tint in the whites would be fatal.

To surmount this difficulty, Mr. Osborne resorts to the "clearing up" process. This consists in flooding the iron developed negative, which at this time does not possess more density than an ordinary collodion positive, with a solution of iodine in iodide of potassium, one grain of the former, to two of the latter in an ounce of water, or more dilute as may be necessary. The slight deposit of silver on the shadows is by this means converted into an iodide of silver, which, on being treated with a very dilute solution of cyanide of potassium, is at once dissolved and removed. After thoroughly washing, the process of intensification may be effected, and it is now found that the utmost density may be obtained without any further deposit being reduced upon the shadows, which remain perfectly clear and transparent, and thus facilitate the reproduction of pure whites and deep blacks in maps and engravings.

It is scarcely necessary to remark, that this process would be unsafe if applied to ordinary negatives, containing half-tone instead of lines, &c. In such case, the delicate half tones would run great risk of being dissolved, leaving a hard negative without gradation. In very careful hands, and if used with great judgement, the process might be employed for removing the coppery deposit which sometimes occurs in intensifying; the process involves much risk, and should be practised first upon a worthless negative, to gain experieuce before endangering a good one.

## PHOTOGRAPHY AND FORGERY.

In a recent article on this subject, we took occasion to refer to the photolithographic reproductious of engravings of Mr. Ramage, of Edinburgh, as the finest we had seen, and remarked that, by the same method and the same manipulator, Bauk of England notes might be reproduced with such accuracy as to defy detection. In this compliment to his skill, Mr. Ramage, or some one of his friends, discovers an impeachment of his moral character; because we stated the unexceptional excellence of his work, he thinks we imply that he is capable of employiug it for dishonest purposes. As we never dreamed of implying anything of the kind, we unhesitatingly give prominence to his remonstrance. Here is his letter :—

Dear Sir,—Having beeu from home, I have only just noticed an article, in your impression of September 19, on "Photography and Forgery," to which my attention has been called by some of my friends as placing me in a somewhat curious light before the public.

The writer, after a few important blunders (such as making *two* processes out of photolithography and photozincography, while they are the *same* process—the mere transferring to stone, zinc, steel, or copper, making no difference at all), says, referring to Col. James and Mr. Osborne, "these are gentlemen, it may readily be said, from whom there is no danger of forgery," while you have "*no hesitation whatever*" in saying "Bank of England notes might be produced by me, which would entirely defy detection."

Now what I complain of is, that while Messrs. James and Osborne you very properly hold as "iu no danger" of committing forgery, yet I am separated and spoken of as one who "might" do so, by either of *their* methods, although I practice neither.

Had I not found that many others, before me, had been surprised at the matter, I would have taken no notice of it; but certainly, iu writing on such a subject, some little care should be used in the selectiou of language, not to confound moral character with questions on art or science.—I am, sir, yours truly, James Ramage.

8, *West Brighton Crescent, Portobello, near Edinburgh, October* 9, 1862.

We think it must have been apparent to any discriminating reader that what we meant to convey was simply this :—The processes of Mr. Osborne and Col. James having been mentioned, it might readily have been urged that both the gentlemen and their processes were in the employment of Government, and any forgery from such a source need not be feared. But there were various private persons, unknown to Government, who were practising similar processes with equal skill, of whom Mr. Ramage was an able example. That there was, in short, skill enough in existence to produce forgeries which were beyoud detection. As to Mr. Ramage's moral character we never implied a doubt, as we have no reason to believe that he is less honest than he is skilful.

As to Mr. Ramage's parenthetical remark, it is he who makes a blunder. Col. James's photozincography, and Mr. Osborne's photolithography are *similar*, but they are not the *same*, any more than the calotype process and the collodion process are the same. Both are based on the same principles, but they differ in some points of material, manipulation, and results. If we confounded Mr. Ramage's method of working with that of others, he has only himself to blame, as he has not published the details of his process, the results of which are so excellent.

## ALBUMINATE OF SILVER AND THE ABBE PUJO.

BY GEORGE PRICE.

Some some time since, the photographic jouruals published an article, entitled, "Positive Priuting on Albumenized Paper, by M. L'Abbé Pujo;" as it has since beeu often alluded to by various writers, and always in terms of commendation, I cannot but presume that the statements contained in it have been generally accepted as *facts* :—whereas, the most important one of them, is so utterly at variance with truth, as to deserve being placed amongst the "fallacies of the scientific,"—of which, methinks, a singularly curious and voluminous collection might be made without much trouble.

The Abbé Pujo says,*—"Albuminate of silver plays a very important part in printing positive proofs. And, moreover, every normal sheet of paper passed over a salted albumen bath, imbibes a quantity of liquid which varies from 4 to 8 cubic centimetres (67½ to 135 minims). Now under ordinary conditions, 5 cubic centimetres of albumen solution, contain 9 grains of pure albumeu, and 3 grains of salt; so that when a dry sheet of paper is placed ou the silver bath, albuminate and chloride of silver are formed, about three times as much of the former as of the latter."

The Abbé's statement therefore is, that the albuminate of silver will bear the *same* proportion to the chloride of silver, as the dry albumen on the paper does to the chloride employed in salting it.

It does not require *much* knowledge to say that this assertion respecting the proportions of albuminate and chloride of silver is *erroneous*. If, after sensitising a sheet of albumenized paper, the albuminate of silver *bears the same proportion* to the chloride of silver, as the dry albumen did to the chloride employed in salting it, it follows as a natural consequence, that the *atomic weight of albuminate of silver must be the same as that of chloride of silver*, and moreover, that *albumen must be endowed with the extraordinary property of being able to alter its atomic weight, so as to become the same as that of the chloride employed in salting it.* Under no other conditiou whatever, can the albuminate of silver bear the same proportion to the chloride of silver, as the dry albumen did to the salting chloride; the Abbé Pujo's statement that they will do so, is, therefore, *a very great fallacy*, and so transparent is its falsity, that it is astonishing how it could ever have been entertained for a moment, and much more so, that it should have been deliberately published.

The Abbé also says,† "a proof when taken from the printing frame is formed of three superimposed images, the first furnished by the albuminate the second by the chloride, and the third by the nitrate of silver."

Passing over the extraordinary idea of *three superimposed images* as being wholly untenable, I will proceed to show the *extent* of the error in the Abbé's statement respecting the proportion of albuminate and chloride of silver; but, before doing so, it will be necessary to make a few observations. Feeling convinced, at the time it was published, that the Abbé's assertion would cause much misconception, regarding the quantity of albuminate of silver which a given formula would produce, I entertained the idea of investigating the subject, but could not obtain any informatiou as to the *atomic weight* of albumen. I read in the photographic journals that, being a complex compound, its atomic weight

* Photographic News, Vol. v. p. 291.
† Photographic News, Vol. v. p. 303.

was *unknown*; as I was but little versed in chemistry, I could not gainsay this assertion; and as a mere *approximation* to the truth would be sufficient for the purpose I then had in view, viz., to give the proportions, *somewhat* nearer the truth than I felt assured the Abbé had done, I resolved to attempt its calculation myself.

I had met with the following analysis by Mülder, of the percentage constitution of albumen: carbon 53·5, hydrogen 7, nitrogen 15·5, oxygen 22, sulphur 1·6, phosphorus 0·4. From this being given in various works, I naturally concluded that it was generally received as being correct. I therefore calculated the formula that would *represent* this percentage constitution, and finding that phosphorus (which was the lowest in amount) was represented by only an *eightieth* of its own atomic weight, I multiplied my formula for each of the constituents, by 80, in order to obtain a *whole* atom of phosphorus, instead of a fractional part. Where my formula, expressing the percentage of any of the constituents, had a fraction representing *more than half*, I took that fractiou *as a whole number*; thus:—Carbon $8\frac{11}{12}$ I considered as 9, oxygen $2\frac{3}{4}$ as 3: but those with a fraction expressing *less than half*, I multiplied as they were; after multiplying by 80, if any *produced* a fraction expressing more than half, I took the next whole number above, thus:—Nitrogen producing $88\frac{4}{7}$ I considered 89; this gave me the following formula:—C, 720; H, 560; N, 89; O, 240; S, 8; P, 1. Reflection, however, soon told me that this was, in reality, only a formula representing the constitution of 8,000 parts instead of 100, and, therefore, I had no right to assume that the number, 8,206 resulting from it, was the *atomic weight* of albumen; I was thus compelled to let the matter rest until I could obtain better information.

Some time after this, Mr. Martin gave an article on albumen, in the *British Journal*,* with the following formula for its atomic weight:—C, 400; H, 620; N, 100; O, 120; P,— S, 2. *One* circumstance respecting this formula I thought tended to prove its incorrectness; therefore, under the signature "An Ignoramus,"† after pointing out an error in the equivalent, which was stated as 5,412 instead of 5,444, I mentioned that the formula given was simply the multiplication, by *ten*, of the numbers, in the column headed "Atomic Weight," giving the percentage constitution of *proteine*, but the added phosphorus was multipled by *eighty*, whilst the added sulphur was increased by only a fractional part, viz., *a fourth*. I asked *why* these latter should be increased in *different* and *differing* proportions. In Mr. Martin's reply, no answer whatever was returned to this important question, as I consider it; I have, therefore, rejected his formula as wholly untrustworthy, for the following reasons:—

In a formula for the atomic weight of a compound, common sense dictates that its constituents should be so represented as to have, as nearly as possible, *the same relative proportions as they bear in its percentage constitution*; but in this we have C, H, N, and O increased *ten-fold*, P, *eighty-fold*, and S receiving merely the addition of *a fourth*. Notwithstanding this, I calculated the albuminate of silver from this atomic weight of 5,444; but the more I consider the subject, the more do I feel convinced that it is based on error. I have, therefore, re-calculated it from my own formula, giving 8,206.

That I may not be accused of *presumption* for so doing, I may as well state that I have recently met with Dr. Löwig's "Principles of Organic and Physiological Chemistry." In this, he quotes the following as having been given for albumen:—$20\ (C_{36}, H_{25}, N_4, O_{10}, +2\ H\ O) + 8\ (N\ H_2, S) + N\ H_2$, P; upon analysing this equation, it gives C, 720, H, 558, N, 89, O, 240, S, 8, P, I = 8,204; this *is exactly the same as my own calculation in every particular, excepting* H *being* 558 *instead of* 560. This extraordinary coincidence, as it must be deemed, when it is borne in mind that I have *very* little knowledge of chemistry, has induced me to prefer my own calculation of the atomic weight of albumen, to that given by Mr. Martin.

I have been thus explicit in describing my "pursuit of knowledge under difficulties," in order to prevent having to give reasons in a promised future communication, for preferring my own formula. I will now return to the Abbé.

Three grains of chloride of ammonium, produces 8 grains of chloride of silver, therefore, 9 grains of dry albumen should produce 24 grains of albuminate of silver, according to the assertion that the albuminate and chloride of silver will be in the same proportion as the dry albumen and salt were; 24 bearing the same ratio to 8, as 9 does to 3. Taking the atomic weight of pure albumen to be 8206, 9 grains of dry albumen will produce only $9\frac{765}{4103}$ grains of albuminate of silver, which is but little in excess of the chloride of silver instead of *three-fold*; the 9 grains of albumen by becoming albuminate *are increased but* $\frac{487}{24{\cdot}618}$ths *more than one-sixth of a grain*, instead of receiving an increase of *fifteen grains*; the increase which the Abbé Pujo states they will receive, is, therefore, more than *eighty times* too much—a pretty considerable amount of error methinks.

It will no doubt surprise many persons to be told that whether the atomic weight be taken at 8206, as calculated by myself, or at 5444, as given by Mr. Martin, it will make but a *very slight difference* in the quantity of albuminate of silver yielded by 9 grains; taken at the latter they give $9\frac{765}{2722}$ grains instead of $9\frac{765}{4103}$, the difference is therefore only $\frac{1{,}056{,}465}{11{,}163{,}366}$th of a grain.

## NOTES ON ENLARGING PHOTOGRAPHS.

BY SAMUEL FRY.*

We had arrived last week at the finish of the transmitted positive, from which the enlarged negative is to be produced. We should just add to that, that if on careful examination, any minute flaws, such as pin holes or black spots, exist on the original negative, and of course become transferred to the positive, it is better to defer any attempt at touching them out until the completion of the enlarged plate. When a plate is to be simply printed on albumenized paper, it is easy enough to remove such slight blemishes, but for subsequent enlargement the case is different, a probability arising that the marks of the brush end will create rough edges, round the spots, which, when enlarged, become circles of appreciable dimensions, and are in that state difficult to deal with, except by those well accustomed to the work. There are two courses open to us, either of which may be available for the operation of enlarging the transparent positive, either a large deal camera placed at a suitable angle to face the northern sky, and provided with the usual slides and ground glass; or a vertical arrangement, in connection with the dark room, consisting of an aperture in the roof, having the transparency on the top, and below that the lens, beneath it a focussing screen, consisting of a table on the camera stand principle.

It is this form of enlarging apparatus which we ordinarily employ, and with great success. The simplicity of the arrangement, no camera being required, is greatly in its favour, but it is, of course, only available when the peculiar position of the developing room admits of it. The focussing is a matter of extreme simplicity, as the manipulation being inside the room, door and window closed, all is dark, except the image projected on the screen, and which under these circumstances, presents an almost magical beauty. The rough adjustment is conducted with the rising and falling motion of the camera-stand table, and an approximation being obtained, the fine adjustment is regulated by the screw of the lens overhead.

Both theoretically and practically, the thing is correct, with a Dallmeyer No. 1 B, we can enlarge a carte de visite picture up to 20 inches, without loss of sharpness, and with

* *British Journal*, Vol. ix., p. 251.
† *British Journal*, p. 321.

* Continued from p. 489.

perfect freedom from that falling off at the sides and corners which is so prejudicial to photographs. Those who examine the image on the focussing screen of the camera we have just described, will, we feel persuaded, agree that it leaves little to desire. It has been strongly objected to this vertical form of enlarging camera, that the zenith light is not that most suited to the purpose, but our practice shows conclusively to the contrary, and our own results are so much better with it than with a camera adjusted at an angle, that we strongly recommend it, not alone on account of its simple inexpensive nature, but from its great efficacy, the details of the enlargement comprising little more than the ordinary negative work.

We employ for all sizes larger than 10 by 8, a flat ebonite tray, to contain the nitrate of silver solution, as being more convenient than a dipping bath, and requiring much less solution. Those who doubt this, can satisfy themselves that such is the case, by experiment, when it will be found that a pint of bath will suffice for 18 by 15 plates, but if a dipping bath were used, a gallon would be necessary at least. The difference in cost being that between 4s. and 32s., This is rather beyond a mere percentage.

We immerse the plate, collodion side *downwards*, placing it first vertically, and lowering it with a silver hook very steadily, it sounds like a nervous operation, but it is as simple as possible, and in all probability the first attempt will be successful.

It is very necessary to skim the bath before immersing the plate, to remove all dust which may have settled thereon.

We generally hold the plate by the silver hook for one minute, and then turn it over, face uppermost, the removal of the greasy appearance upon the surface of the plate is readily effected, by giving a vibratory motion to the side of the dish; then, when ready, raise it vertically, and drain it much more thoroughly than is done for ordinary collodion work, as were this not attended to, on placing the plate in the horizontal position it occupies whilst receiving the image projected from above, the free silver would run into pools and irregular forms on the surface, and give rise during the development, to serious blemishes of like conformation. We often hold the plate for as much as two minutes and a half, to ensure thorough draining.

This effected, place the plate in the spot where it is to receive the impression, the inner end of the lens having been previously covered with a yellow glass cap, in order, that whilst the image is still sufficiently visible, to place the collodionized plate in its position, no actinic light approaches it. Now close the wooden shutter, covering the yellow window of the developing room, take out your watch, and remove the yellow cap from the lens, carefully time it, stand perfectly still during the exposure, in order to avoid causing dust or vibration, which latter might give reason to think "your sitter had moved."

In developing, "proceed with caution," observing the same rules as in ordinary development, the usual ferro acetic developer may be employed, and pyro and citric acid to intensify.

Any good collodion is suitable for enlarging, but we prefer a bromo-iodized. We might have stated in reference to focussing the enlargement, that we have found it better to focus on a spot one-third from the edge of the picture, than quite in the centre. Those accustomed to copying will readily perceive that a more general focus is obtained by this than by choosing the centre of the picture as the spot of sharpest focus, which will probably produce blurred corners, and want of definition at the extremes of the picture.

Considerable judgment is necessary in choosing the subjects for enlargement; those in which a great variety of subject is combined, present most facilities, as the inclination to coarseness which parts may display, from being partially out of focus, is concealed to a great extent by the multitude of details.

We are free to confess that in our own humble opinion the "human form divine," is less suited to enlargement than any kind of picture. The question of whether enlargements will ever come much into fashion is a knotty one; there are many reasons to be urged in favour of them, but we must bear in mind that they can never be produced as our "cartes de visite," for the million, and at such prices as to be within the reach of more than a few. Much has to be done, photographers must labour unceasingly in the artistic department; learn to look at pictures other than as photographs; there are points of importance besides having clean plates, good collodion, and an orderly bath, too much time has been spent in arguing paltry processes, which have been the bane of the science.

Photographers are too much given to wordy warfare; a very small number of those who write and talk most, are known by their pictures: this year has been fraught with a strange mixture of good and evil for the votaries of the black art.

Rebuffed by the Commissioners of the Exhibition, they have in reality gained ground in public opinion by the prominence given to the naturally rather angry words that rose: to English practitioners, it was peculiarly galling to find those of their countrymen who had the destribution of space, so far behind the Continentals in their appreciation of photography.

The French display of photography is truly magnificent, and the space allotted very large.

Should another International Exhibition take place in our time, photography will undoubtedly be allotted an important department in the best situation.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration, and Analysis.

*Baryta Salts.*—(Continued).—*Carbonate of Baryta* is valuable as a convenient means of removing sulphuric acid from solutions, which it does, owing to the great affinity which this base possesses for the acid. It is very readily prepared. If a solution of carbonate of soda be added to a soluble baryta salt, the carbonate at once falls down in the form of a heavy white powder, which only requires washing to free it from excess of soda salt, for it to be fit for use. There may, however, be some little difficulty in inexperienced hands, in freeing the carbonate entirely from soda salt by washing, and we therefore advise that photographers should prepare their carbonate of baryta. when they require it to be perfectly pure, from the caustic earth. If a solution of caustic baryta prepared as described in our last chapter, be submitted to the action of a stream of carbonic acid, or even if it be exposed to the air for some time, with occasional stirring, it is completely converted into the carbonate, which only requires filtering and drying to be perfectly pure and ready for use. Carbonate of baryta is a heavy white powder, insoluble in water and decomposed by all soluble acids. As mentioned above, its great use is to separate sulphuric acid from solutions, when this is required to be effected without introducing anything into the liquid. When, for instance, carbonate of baryta is placed in a solution containing a little dilute sulphuric acid, a decomposition takes place, owing to the powerful affinity which there is between the acid and the base, the carbonic acid escapes, and sulphate of baryta is formed.

*Sulphate of baryta*, is a perfectly insoluble powder, produced whenever sulphuric acid or a soluble sulphate comes in contact with a baryta salt. The affinity which baryta has for this acid is greater than that which it has for any other, and consequently sulphate of baryta is always formed in preference to any other compound, if the acid and base are brought together either free or in combination. It is important for photographers to recollect this point, for when chloride of barium is employed as a salting compound for positive paper the slightest trace of a sulphate in solution in the water will produce a decomposition, and give rise to a different effect to the one desired.

*Acetate of Baryta.*—In cases where a sulphate of a base is required to be decomposed, and a weak organic acid substituted for the powerful mineral acid, chemists make use of acetate of baryta. For instance, in the preparation of acetate of the protoxide of iron, for developing purposes, the best plan is to prepare it by means of double decomposition between acetate of baryta and sulphate of iron; upon filtering off the insoluble sulphate of baryta which will be precipitated, the acetate of iron is left in solution. Acetate of baryta is very easily prepared. Carbonate of baryta, or caustic baryta is mixed with a slight excess of acetic acid, and the whole evaporated to dryness over a water bath. The dry mass is then digested with hot water, and the liquid filtered from insoluble portions. The solution, which will contain the acetate of baryta, must then be evaporated again until it shows signs of crystallizing, when the heat is to be removed and the liquid left to cool. The salt separates in the form of flat foursided bevelled prisms, containing only one atom of water of crystallization, they effloresce in the air, but retain their form. They have a pungent odour, and produce a slight alkaline reaction with test paper. They dissolve in about an equal weight of cold water, but are scarcely more soluble in boiling water. Alcohol dissolves the salt but very sparingly.

The remaining baryta salts are of very limited interest, and do not require further description in this place. We therefore pass on to a much more important class of salts, those of lime. Unlike baryta, this earth in its caustic state is very common, and well known to all our readers. We may, however, give a few of the chemical properties of lime, which are not so well known as its physical qualities.

*Lime* is the oxide of the metal calcium. It is termed *quick lime* when free from water, and *caustic* lime when it contains no carbonic acid. It is prepared by heating the carbonate to redness. On a small scale, and if a pure result is desired, artificially prepared carbonate of lime should be used. This is packed in a crucible, heated to redness, then allowed to cool, moistened with water, and again heated for some time, to redness; by this means the last traces of carbonic acid are removed, being carried off by the steam. Lime on the large scale is made by igniting common lime stone (a native carbonate of lime) in kilns. When the lime-stone contains clay, the silica of the clay unites with some of the lime, forming a half fused compound, which prevents the mass from evolving heat when wetted with water. This is technically called "dead burnt" lime. Pure carbonate of lime, such as Carrara marble, does not become *dead burnt*, even if submitted to the highest attainable artificial heat. Pure lime is white, soft, and easily pulverised. It is infusable at any attainable temperature, and on this account has been employed by the French chemists as a lining for their oxyhydrogen furnaces, &c. When strongly heated, it emits a brilliant white light, which is so intense as to be employed for illuminating purposes, being known as the lime light. The ignited jet of combined oxygen and hydrogen gases, is used in this case as a source of heat. When a lump of quick lime is moistened with half its weight of water, this is at first absorbed by capillary attraction, into the pores which have been left in its substance by the escape of carbonic acid. The air contained in the pores is thereupon driven out with a kind of hissing noise, and in a few minutes combination between the water and the lime takes place, with evolution of great heat, the temperature sometimes rising high enough to inflame gunpowder, sulphur, or wood. The purer the lime the more rapid and intense is this heating. This phenomenon takes place even when ice is mixed with lime, and, therefore, cannot be explained by the passage of the water from the liquid to the solid state. The steam, which rises during the slaking, carries with it a considerable quantity of lime. When the phenomenon of slaking takes place in the dark a bright light is observed. The result obtained in these cases is a combination of the oxide of calcium with water in equal atoms, known as hydrate of lime. This hydrate, when formed by slaking quick lime, is a fine white powder, of an alkaline taste and reaction; it readily absorbs carbonic acid from the air, and becomes converted into carbonate of lime. It dissolves in water to a small extent, but is much less soluble than baryta. In order to prepare lime water for chemical or other purposes, it is advisable to wash the slaked lime once or twice with distilled water, in order to remove the alkalies, potash, and soda, which ordinary lime always contains. The best plan is to proceed as follows:—Place a small quantity of good slaked lime in a bottle, and fill up with water; allow it to stand for some hours in a cool place, shaking it occasionally during the time; then allow the excess of lime to settle, and pour away the pure supernatant liquid. Repeat the operation with a fresh quantity of distilled water, and then fill up the bottle a third time with pure water; and after allowing it to digest, in the cold, with frequent agitation, on the residuary lime for a day or two, filter the liquid quickly, and with as little exposure to the air as possible, into a well stoppered bottle, and preserve it in a cool place for use. We have specified the necessity for keeping the liquids cool in these operations, for the following reason:—Lime dissolves in 778 parts of water at the ordinary temperature, but requires 1,280 parts of boiling water for solution. Hence, lime water, saturated at the ordinary temperature, deposits, when heated to the boiling point, a considerable quantity of hydrate of lime, in small crystals. The mixtures known as *milk of lime* and *cream of lime* are prepared by stirring up slaked lime and water to the requisite thickness. They consist of mechanical mixtures of hydrate of lime and lime water.

## PHOTOGRAPHIC MANIPULATION. VARIOUS HINTS.

BY J. C. LEAKE, ESQ.*

When I undertook to provide a paper for this evening, I had no doubt but that I should be able to persuade some of our friends to come forward and place at your disposal, a paper on some subject of a far more novel and interesting character than I can hope to produce. In the absence however, of anything else, and rather than the meeting should go empty away, I will endeavour to make a few remarks, in the hope of raising a discussion which may elicit some useful information from those gentlemen present who are so well qualified to give it.

It has been said of photographers, and truly, that they are in most cases ignorant of the theories of their art. That this is so, is a fact much to be regretted. Yet, let a man be ever so good a theorist, he will in all probability be in the habit of doing a number of odd things from fancy, and if asked why he did so and so, his reply would be, "I fancy it is better," but can give no reason for thinking so.

This being my unfortunate condition, I propose stringing together a few of my photographic whimsies, and recounting them to you, if you will kindly listen for a quarter of an hour.

Beginning with plates. I have a prejudice against everything but the best polished plate glass. I have tried sheet and crown of almost every description, and in all cases have failed to produce satisfactory results. In fact I believe it to be impossible to produce as much fine and delicate detail upon either of the two last named varieties as upon the former. If, after development, a picture upon a piece of sheet glass be examined, it will be found that a film of reduced silver is deposited between the collodion and the glass. This being the case it is evident that some reducing action is set up, and that this is independent of the development, may be proved by taking a piece of sheet glass, exciting as usual, and after allowing it to remain in that condition a few minutes, fixing it, *without development*.

* Read before the South London Photographic Society, on Thursday, October 9, 1862.

In almost every case in which I have tried this experiment, a film of reduced silver has completely covered the plate. Glass of this description is therefore unfit for photographic purposes, and pre-eminently so for dry plates, which have to be kept a long time in a sensitive condition. I know many amateurs use sheet glass from motives of economy, and often fail through so doing, and I would certainly advise them to throw away all such plates, and betake themselves to patent plate, which will serve them better. Another subject upon which I entertain views which may be regarded as peculiar, is the preparation of the nitrate bath for negatives. I cannot make a bath work to my satisfaction without the addition of carbonate of soda. I have tried fused nitrate of silver, oxide of silver, and most other substances which have from time to time been recommended for making and mending baths, but in my hands none have been so successful as the addition of a small quantity of the carbonate. In making a new bath I proceed as follows—Having dissolved the nitrate of silver in the water, I add to each ounce of solution about a couple of grains of carbonate of soda, and a small quantity of the iodizing solution, with which the collodion to be used is iodized. Let the solution stand about twelve hours, filter, and it will be ready for use.

Negatives taken in a bath prepared in this manner, are of a rich creamy tint, very full, and deep in colour, and, what is of the greatest importance to the portraitist, the half tint and shadows of flesh are rendered with great perfectness. In a conversation with Mr. Blanchard, whose street views are now so well known, he informed me that his own experiments in this direction had led him to the conclusion that this method of preparing a bath was by far the best, giving a better quality of negative, and producing it in a shorter time than when the ordinary modes were used.

In connection with sensitizing, I have another whimsy, viz., that as a rule, plates are removed from the bath before the sensitizing process is completed. The time usually recommended, two or three minutes, is scarcely sufficient. I would prefer to allow five or seven. On immersion in the bath, the plate becomes coated with iodine, first in lines corresponding in direction with that of the dip. If the plate be taken out of the bath before these lines are removed, and an even coating obtained, the picture will be streaked, as the lines will appear in the finished negative. It is often said that the plate if left too long in the bath will become streaky, and this will certainly be the case if it be removed from the bath too soon.

I am a believer in long exposures. In my humble opinion, a large proportion of the cartes de visite offered for sale in our shop windows, are very considerably under-exposed. I know it is desirable to make the exposure as short as possible for many reasons, but nothing can justify the principle of so shortening the exposure as to make the resulting negative hard, with sooty shadows, and crude chalky lights.

The best results will be obtained by giving a lengthy exposure and a somewhat short development. If the development has to be pushed, the result is rarely satisfactory. It is far better to let the light act so long upon the plate, as that you have some energy to spare, and so can stop the development rather short.

I consider a picture under-exposed, unless the whole of the detail in the flesh and hair is distinctly and well rendered. Let the shadows of the flesh be well given, above all things. It is to this I look alone, in portraiture, dress and all must (if necessary), be sacrificed to this, as no beauty of detail, or brilliance of effect can compensate for a want of gradation in the flesh tints.

Another fancy of mine, is with respect to the iron developing solution. This I prefer to mix at least twenty-four hours before use. In the first place, this is better, because it will allow the sediment to deposit itself, and so save filtering; and secondly, and what is of more importance, the negatives will be finer in texture, and consequently softer. As far as I can ascertain, the particles of silver constituting the image, are much smaller than when the solution is freshly mixed.

As to intensifying, after all, I prefer the old system of "pyro," and silver, and of finishing the negative at once. If the exposure be correctly timed, and the bath, collodion, and developing solution in order, but very little will need to be done to obtain sufficient intensity, and what *is* wanted will most readily be obtained by this method. It has been argued that this method of intensifying is apt to clog up the fine lines and destroy the sharpness of the negative. Perhaps, if carried too far, it does, but, carefully done (as everything in photography should be), it will give very fine results, and I believe it to be, on the whole, the best method of intensifying.

For fixing, I always use hyphosulphite of soda. In the first place, because it is easier to use. I keep a dipping bath full of solution at the end of the developing table, and after the plate is intensified, just pop the plate in and leave it until the iodine is dissolved. A few minutes in excess will not hurt it. Secondly, it is cheaper, not costing a quarter as much as cyanide of potassium. And thirdly, and most important of all, it does not affect the health of the operator. If however, cyanide *be* used, it is better to use it strong enough to fix the picture quickly, for if a weak solution be used and the action be continued for a long period, the peculiar bleaching action will render the image grey, and the light will, in printing, permeate every part, and the resulting print will be flat and wanting in brilliance.

So much for negatives, now, if you are not tired, for a few whimsies about printing. And first, as to paper. When the disease known as "cardomania" set in, photographers were, of course, driven to use a paper upon which as much detail and brilliancy as possible could be obtained, and the variety known as rive, was at once acknowledged as the best, on account of its superior hardness and fineness of texture. For small pictures, it is undoubtedly the best; but I hope the day is not far distant, when, for everything above whole plate pictures, a paper will be used which has not the offensive gloss of albumen. Until however, we can prepare a paper, producing the same amount of depth and brilliance as albumen, we must perforce use it. Nevertheless, the gloss *is* a nuisance, and I recommend the subject—the production of a paper, giving the depth of albumen without its gloss, to the attention of those gentlemen present, who have time and inclination to experiment in that direction, and also to the Experimental Committee.

Starting with rive paper, then, I will proceed to state what I consider the best method of producing prints upon it. Always bearing in mind that I am considering printing portraits only. In sensitizing, don't be afraid of the silver. To produce the best results, from seventy to ninety grains to the ounce may be safely used. I have a fancy for using a bath of, say one hundred grains, and, instead of floating three or five minutes, floating only two. And I believe this to produce the best results, the print being more on the surface of the paper.

As soon as the paper is surface dry, it should be thoroughly dried by artificial heat, and the solution should *not* be allowed to soak into the paper. I think it will be found that most portrait negatives, good ones especially, will print best in the shade: the action is slower and more regular; and generally more satisfactory results will be obtained, than by direct sun-printing, Mr. Thomas to the contrary notwithstanding.

All having gone on satisfactorily to this point, I am inclined to think that here most printers commence the work of spoiling what they have hitherto done. Instead of quick and careful washing to remove the nitrate of silver, the prints are pitched into a pan, and left to soak for, perhaps, half an hour or more, during the whole of which time, the nitrate of silver is soaking into the pores of the paper, and laying the foundation of future mealiness and uneven toning. I believe it to be of the utmost importance to remove the whole of the nitrate of silver from the surface of the proofs; and that the more rapidly this is effected, the better. Quick and careful washing for ten minutes, will do more good than soaking the prints for half an hour. After a thorough washing in the manner mentioned, the prints may be considered ready for toning without any further treatment with acetate of soda, or chloride of sodium, which I am inclined to consider as unnecessary complications. Nearly twelve months since, I wrote a short paper on printing and toning, in which I stated my preference for the acetate of soda toning bath. During the last year, I have conducted a somewhat lengthy series of experiments, on the various substances used for toning, but I have not found cause to alter my opinion, and still believe the old formula, of thirty grains of acetate of soda, to each grain of gold, to be the best. One thing is imperative; the bath must be mixed at least twenty-four hours before use. A useful "dodge," however, if a bath be wanted to work at once, is to double or even treble, the amount of acetate. If this be done, a bath may be used as soon as mixed: and the action will be more rapid than if the bath has been kept. On the whole, however, I would not recommend this process, as, if great care be not taken, the prints will redden to a fearful extent in the hypo, and the whole process has more of uncertainty in it, than when the first-named bath has been used. As soon as the toning is completed, the prints should be well and quickly washed, before fixing.

Many persons do not think this important; I do. I have seen proofs taken from the toning bath, and placed on a plate of glass to drain, till some thirty or forty had accumulated; when the whole batch was placed in the hypo in a mass, and separated in the solution. I think nothing can be more dangerous than this method of procedure; and would recommend that the proofs be *well* washed before fixing, and placed in the hyposulphite solution singly. The usual strength, six ounces to the pint, will be found strong enough for this solution, and I would recommend that it be used fresh *every day*, and unmixed with either chloride of gold, or nitrate of silver, as has been recommended.

On removal from the fixing bath, each proof should be washed, back and front, on a glass plate under a tap, before being placed in the larger dishes to soak.

I have to apologise for having nothing more novel to offer you; but I hope I have said something from which many of you will disagree *in toto*. This being the case, my end will be attained, and we shall have a long and interesting discussion on the points you may think proper to dispute.

## British Association for the Advancement of Science.

### ON SOME OF THE DIFFICULTIES WHICH PRESENT THEMSELVES IN THE PRACTICE OF PHOTOGRAPHY, AND THE MEANS OF AVOIDING THEM.

BY F. MAXWELL LYTE, M.A., F.C.S.*

MANUFACTURE OF PYROXYLINE ONE CAUSE OF DECOMPOSITION.

One of the principal causes of the spontaneous decomposition of pyroxyline seems to be a remnant of acid left by imperfect washing.

In this condition pyroxyline, and especially that which has been prepared in weak acids, is very prone to decomposition, and possesses, moreover, another disadvantage, viz., that it produces a collodion which, when iodized, turns very red, and soon spoils the nitrate bath in which it is used.

It has been proposed, as a remedy, to add to the last washing water a few drops of liquid ammonia. Now, whenever this has been done, I have always found that much of the pyroxyline became insoluble, and that the portion which dissolves only produces a rotten film, easily broken in washing.

Another mistake in making pyroxyline is attempting to add too large a proportion of the material, whether cotton, paper, or flax, which it be intended to be converted. The proportion should never exceed 10 per cent. of the nitric acid employed, beyond this point, a further addition is nearly sure to involve failure of more or less of the product; and this is reasonable, for, in proportion as pyroxyline is formed, nitric acid disappears, and is substituted by the elements of water, or, what is the same thing, H is substituted by $NO^4$ and HO is produced. A point is, consequently, arrived at where the mixed acids become too dilute to produce any further action. Up to the addition of 7 per cent. the conversion of the pyroxyline is nearly simultaneous with its immersion, but for the remaining 3 per cent. of lignine added the conversion is more gradual, requiring four or five minutes to complete it, so that if we add rather more material the effect is distributed over the whole quantity, and a large portion remains insoluble.

The only sure plan is to add not more than 10 per cent. of the weight of the nitric acid employed, and instead of removing the last traces of free acid with ammonia, I am in the habit of adding a few grammes of an alkaline acetate to the last washing water. In this water I allow the pyroxyline to soak for a night, and then withdraw it and wash again and dry it. Pyroxyline so prepared is very stable, and if the temperature of the mixed acids has been correct, and their strength accurately examined before use, the pyroxyline will be found perfectly soluble, and will remain so for years.

SOURCE OF HALF TONE.

Much has been said about different samples of collodion producing one better half tones than another.

I believe the whole, or nearly the whole gist of landscape photography on collodion, as far as the obtaining of gradation of tint goes, to consist in obtaining the thickest possible film. My theory on the subject is as follows:—Iodide of silver is a yellow salt, and offers more or less resistance to the passage of the actinic rays. The greater, then, the body, so to speak, of the film, the longer the time which the rays require to produce their effect through its entire thickness. Now, in what consists the excellence of a positive print? Why, in possessing fine gradations of half tone blending insensibly into the deep shades and high lights. No sudden and severe contrasts exist, as a rule, in nature.

Now, we know by experience, that if a plate is over-exposed the high lights become solarized, as it is termed, and become transparent, printing through and destroying the brilliancy of the positive. While, on the other hand, if a plate be under-exposed the half tints never appear at all. Now, in landscape we have often, at one and the same time, deep greens or red rocks in the foreground, the details of which must be given in order to produce a harmonious picture; and blue distances, which must be given in order to give character to the landscape.

The reproduction of such a combination is looked upon by many photographers as a complete paradox, but use a thick film and the difficulty is solved. The yellow iodide of silver offers the necessary resistance to the actinic rays to impede solarization in the high lights while we are enabled to expose the plate sufficiently long to impress the details of the deep shadows. Our choice should then fall on that quality of pyroxyline of which we can introduce the greatest proportion without rendering our collodion too glutinous, and, in this point of view, I find that prepared from paper to be much superior to any other, as I have remarked in other papers on the same subject.

CAUSE OF SOLARIZATION.

Having mentioned the subject of solarization, I may be excused for venturing a new view as to its cause. We all know that by various degrees of exposure the sensitive atom of iodide or bromide of silver, whichever it may be, assumes successive tones of colour, in which one or more of the primary colours prevail. Now, may it not be that the superposition of these various tones of colour, as would obviously

* Read at the British Association.

occur in a plate where the actinic influence had not penetrated too completely the collodion film, and produced the ultimatum of effect, should produce opacity, whereas, if the ultimate effect had traversed the entire thickness, a yellowish or reddish transparence might be the result; or, in other words, when the molecules of reduced silver are all in one and the same position, they may become capable of transmitting certain luminous vibrations, when their position is variable they cut every vibration off.

UNEQUAL DRYING OF FILM.

In hot climates a difficulty presents itself, the means of obviating which it may be useful to describe. When we attempt to work in a tent under the influence of a hot sun, the collodion on the upper part of the plate dries before that on the lower part, from which the collodion was last poured, is sufficiently set to permit its immersion into the bath. To obviate this, I observe carefully when the collodion at the lower part will permit the plate to be turned upside down, without flowing back, so as to cause a return ridge. By then turning the plate so that the part least set is uppermost, the heavy vapour of ether, given off as the film dries, falls on to the part of the plate already getting too dry, and slightly moistens it again, and so equalises the degree of dessication all over the plate.

The plate also is frequently found to have become so far dry on removal from the dark slide, that when we attempt to pour on the developer it flows unevenly, and the finished negative shows rings of unequal development, and it often happens, under the same circumstances, that the nitrate of silver solution accumulates at the lower edge of the plate, and, mixing with the developing solution, flows back in streaks over the plate and produces dark lines and marblings. Further, it frequently happens that in our attempts to obviate these defects, the developer is thrown too suddenly on to the plate, and, washing off all the nitrate, produces a transparent spot where it falls, and often a sort of mark on the centre of the plate as if a fine comb or a brush had been passed over it.

Now, in order to obviate these defects the best mode of proceeding is to pour over the plate a little water, to which has been added a small dose of acetic acid, say 0·1 per cent., and when the plate has been thoroughly washed with this solution to then apply an iron developer. The nitrate of silver having been for the most part removed, a very feeble image only appears, but on the application of a solution of pyrogallic acid with addition of a little free nitrate, the image comes out in far finer detail than by any ordinary treatment that can be used, and with a harmony of effect which is quite surprising. In the top of the tent in which I work I have a sort of chimney of linen, into which I stuff a tuft of grass, or of fern, and which, while it effectually bars the entrance of light, allows a free circulation of air.

PER-ACETATE OF IRON SOLUTION.

I find that the protosulphate of iron, which is somewhat reddened by the presence of a persalt, is that which answers best for the development of negatives, and with this view I keep a solution of the peracetate of iron by me, which I add to my iron developer if the protosulphate with which it has been made be of too pure a nature.

VARNISHES.

It has always been a problem among photographers to find a good varnish. The amber varnish, which is decidedly the best hitherto described, is faulty in many respects.

1st. It is very expensive to use, both on account of the primary cost of the materials, and of the extreme volatility of the ether and chloroform which form the solvents.

2nd. The negatives varnished with it are liable to crack in frosty weather should the slightest condensation of moisture take place in the box in which they are stored, and the same effect often arises where they are placed in contact with a sheet of positive paper not perfectly dry.

The solution of gum benzoin in alcohol is liable to cover the negative with minute pinholes from the crystallization of the benzoic acid it contains. The crystals breaking up the film in numerous minute points, and, lastly, the solution of bleached lac is inadmissible, as, in a hot sun, it becomes tacky and sticks to the positive paper.

The same defect belongs to the varnish of Sœhnée, freres, of Paris. In the South of France, where I work, I have lost many fine negatives through each of these causes. I now use a varnish, which I consider perfect in every respect, made by dissolving 10 to 12 per cent. of the purified resin of jalap in alcohol of 95 per cent. This varnish, while it does not seem to have as great a liability to chill as some other varnishes, is hard and resistant, and gives a body to a negative such as few others will give, and it never adheres to the positive paper under the influence of the hottest sun.

PRINTING.

Now, as to printing positives, I wish to draw your attention to one or two points, but time will not allow me to do more. I wish to speak, in the first place, as to the necessity of adjusting the strength of the nitrate sensitizing bath to the amount of chloride contained in the paper which is to be prepared upon it. The moment the paper is laid on the nitrate bath, it decomposes the nitrate of silver on the surface of the solution with which it comes into immediate contact, with formation of nitrate of sodium and chloride of silver. The solution of nitrate of sodium thus formed possesses a far less specific gravity than the nitrate of silver below it, and does not so easily mix with it as might be supposed, and, consequently, forms a film on the top, which, lying between the surface of the paper and the nitrate of silver below, forms a sort of carrier which dissolves out the salt without decomposing it, and disintegrates and dissolves the albumen instead of coagulating it. Under such circumstances a white precipitate of chloride of silver often renders the bath turbid, and the finished proof has a dull, grey, cold tone. This defect is only to be remedied by so proportioning the nitrate of silver in the bath to the chloride in the paper, that the paper shall find enough nitrate in the part of the bath into direct contact with which it is brought, to convert all its chloride into chloride of silver, and even leave a small excess.

By adding to the albumen about 0·1 per cent. of the crystallized phosphate of soda—$2NaO\ HO\ PO_5 + HO$—it will be found that the discoloration by albumen is nearly entirely prevented, and if the bath ever becomes coloured, it may always be completely discoloured by adding to it a solution of a mixture of the crystallized carbonate of soda with crystallized phosphate of soda in about the proportion of 2 to 5 and dissolved in water in the proportion of 7 per cent.; for every 10 grammes of such a solution added 1 gramme of solid nitrate of silver must also be dissolved in the bath in order that it may not become weakened, and the bath filtered till it becomes clear.

At the conclusion of the paper

Professor Emerson, of Troy Univerity, U.S., said there were some points in Mr. Lyte's paper of the correctness of which he was not certain. In the first place, as to the advantages claimed by a thick film, he thought the theory could scarcely be maintained, and in his own practice he had obtained equal gradation with a thin alcoholic collodion as with a thick one, and for the tannin process he preferred it. The method of preventing stains by first treating the film with a little distilled water he could cordially endorse, having practised it himself with success. As to the preparation of the nitrate bath so as to suit different samples of paper, he had given great attention to the subject; but had come to the conclusion that actual experiment with each fresh sample of paper was necessary, as manufacturers varied so much in the proportion of salt they employed. The best plan, in his hands, of keeping the printing bath clear was to add from one-fourth to one-third its bulk of alcohol.

Mr. Lyte said that he had found alcoholic collodion gave a film too rotten to bear washing, and the image was not so delicate; but, so far as his theory was concerned, he thought the experience of Professor Emerson had confirmed it, as alcoholic collodion, even when thin, had generally a good deal of body. In reference to paper, it would be a great advantage to photographers if manufacturers generally would state the proportion of chloride employed in the preparation of their paper. In the absence of such information a very simple rule might be adopted. If a 20 per cent. silver bath were used, and one sheet of Saxe paper excited upon it, if the amount of silver withdrawn from the bath were found to be four grammes, then the paper had been prepared with 4 per cent of chloride. Taking this as a standard, calculations for other proportions could be easily made.

Mr. Wharton Simpson asked if in this calculation Mr. Lyte had taken into account the varying quantity of albumen present, and the proportion of silver it absorbed.

Mr. Lyte said he uniformly used albumenized containing the same quantity of albumen. It is very highly albumenized.

Mr. Simpson said, had he then ascertained the combining proportions of albumen and silver, and the amount of silver required by the albumen of his paper, independent of the chloride.

Mr. Lyte said that this was an interesting and important point, but he had not yet examined it.

## EXPERIMENTS ON PHOTOGRAPHY WITH COLOUR.*

An abstract only of this paper was read before the sectional meeting. It commenced with an extract from Sir David Brewster's recent article in the *North British Review*, in which a hope was expressed that natural colours might be produced, and intimated that they were a ligitimate object of scientific research. Proceeding, then, with a theory derived from Dr. Young's Bakerian lecture, to the effect that radiant coloured light consists in undulations of the luminiferous ether, and that all material bodies have an attraction for the ethereal medium, by means of which it is accumulated within their substance, and exerts its influence upon them. This theory led to the conviction that it was within the the laws of physical science to suppose that the collodion film might retain within itself the varying undulations of the coloured objects whose images they receive, and communicating those undulations to the ethereal medium without them, thence transmit colour to the eye. The writer then adds:—

"In the course of the present week, I happened to obtain unusual traces of colour in photographic portraits. The chief difference in manipulation was a slight excess of the iodizer in the collodion, and the addition of acetic acid and acetate of soda to the bath. And in order more fully to test the effect of the cadmium and bromo-iodizers, I increased the quantity until natural colours ceased to be strengthened. The final proportion of iodizing solutions gave the portrait which illustrates these few remarks. The general warm colours of the forehead and face of the sitter are fairly represented, and the varying tints of the hirsute ornamentation correspond with the original. The tone of the shooting coat is also correct. I have also obtained coloured pictures of buildings, and a good representation of autumnal tints."

The specimen exhibited was a collodion positive portrait, the tone of which in the lights was of a buff tint, but in the opinion of most present, so far as could be gleaned, and certainly in our own opinion, before expressed, was in no sense a reproduction of natural colours as usually understood.

## AUTOGRAPHS OF THE SUN.

Professor Selwyn showed and described (Section A), several photographs of the sun, described as autographs, taken by Mr. Titterton, of Ely, with his "heliautograph," which consists of a camera and instantaneous slide, by Dallmeyer, attached to a refractor of $2\frac{3}{4}$ inches aperture, by Dollond; the principle being the same as that of the instrument made, at the suggestion of Sir J. Herschel, for the Kew Observatory. The autographs are of July 25, 26, 28, 29, 31; August 1, 2, and August 4, 10.15 a.m., and 11.30 a.m. (a series of bright days coincident with a large group of spots); August 19, 20, 23 and 25, where the same group reappears much diminished; September 19, 23, 26 and 30, in which is seen a group of 118,000 miles in length. On the 23rd three autographs are taken, two of them with the edge of the sun in the centre of the photographic plate, showing that the diminution of light towards the edges of the disc is a real phenomenon, and not wholly due to the camera. In the two of the 4th of August, where the great spot (20,000 miles in diameter) appears on the edge, a very distinct *notch* is seen, and the sun appears to give strong evidence that the spots are cavities; but eye observations and measurements by the Rev. F. Howlett, and others, tend to show that this evidence is not conclusive, for there was still a remaining portion of photosphere between the spot and the edge. The phenomena shown in these autographs appear to confirm the views of Sir J. Herschel, that the two parallel regions of the sun where the spots appear, are like the tropical regions of the earth, where tornadoes and cyclones occur, and those of Wilson in the last century. The *faculæ* seem to show that the tropical regions of the sun are highly agitated, and that immense waves of luminous matter are thrown up, between which appear the dark cavities of the spots, whose sloping sides are seen in the penumbræ, as explained by Wilson and others. Other analogies between solar spots and earthly storms were pointed out, and reference was made to the glimpses of the structure of the sun, exhibited by Mr. Nasmyth as confirming the above views.

* Read before the British Association.

# Proceedings of Societies.

### South London Photographic Society.

The first meeting for the present session of this society was held on the evening of Thursday, the 9th instant, at the City of London College, Leadenhall Street. The Rev. F. F. Statham, M.A., F.G.S., President of the Society, in the Chair.

The Chairman, referring to the open air meetings of the summer, regretted that he had been unable to attend any of them himself. Some of the meetings, he understood, had been very successful, one at Charlton especially. He called the attention of members to some excellent photographs taken on that occasion by their Secretary, Mr. Harman, which, both from the scenery and the number of portraits they contained, were very interesting. The Society's annual dinner, at Dulwich, had been a very pleasant meeting, he only regretted that more gentlemen were not present. He called the attention of members to some excellent photographs by Mr. Martin, taken during a tour in North Wales, and in the neighbourhood of Liverpool. These prints Mr. Martin had presented to the folio of the Society, a practice he commended to members as worthy of imitation. The prints were $7\frac{1}{4}$ by $4\frac{1}{2}$, and described as taken by Horne and Thornthwaite's panoramic lens.

Mr. J. C. Leake, Jun., then read a paper on "Photographic Manipulation" (see p. 497).

After a vote of thanks had been passed to Mr. Leake—

Mr. Harman, examining the negatives produced as illustrative of the effects of the different baths, said he thought the difference in colour must be accounted for, rather by difference in exposure than by difference in the baths. He objected moreover, to the use of carbonate of soda for neutralizing a bath. He always, in making a new bath, used oxide of silver, followed by a little nitric acid, and thought the plan was most philosophical and effective.

Mr. G. Wharton Simpson said, the use of either carbonate of soda or oxide of silver, should only be resorted to as a remedy for something wrong. It was manifestly an error to regard the use of either of them as always necessary in making a new bath. If pure nitrate of silver were used, no such application ought to be necessary. If the bath were not in good working order, the application of a remedy was necessary, and the selection depended upon the condition of the bath. If it simply contained too much nitric acid, then the addition of oxide of silver was the simplest, and best method of neutralizing it, as nothing was added but the proper constituents of the bath. But there were cases in which carbonate of soda was valuable, as performing another office besides neutralizing any free acid. It was well known, that the formation of an insoluble precipitate in any solution, had a tendency to throw down other particles of matter present, in suspension, or even in solution. In preparing metagelatine, for instance, the solution always retained an opalescent turbidity, which no filtration would remove, until cleared by a method of this kind. The addition of a little white of egg, and then boiling, at once rendered the solution clear and transparent. The coagulated particles of albumen were thrown down, and with them, the matter which caused the opalescence. It was so, he apprehended, with the addition of bi-carbonate of soda to the silver bath. Traces of organic impurity, which unfortunately, were sometimes present with commercial nitrate of silver, were precipitated with the insoluble carbonate of silver formed, and thus a bath was sometimes very easily purified by the use of bi-carbonate of soda. In reference to Mr. Leake's remarks on albumenized paper and the importance of getting a substitute to supply its place for large prints, he cordially agreed with him, and might take this opportunity of calling attention to a dozen or two of the early experimental prints, taken by Mr. Cooper, on resinized paper, an account of which members had doubtless read in the pages of the Photographic News.

Mr. Harman said that reference had been made to some slight yellowness in the paper. By artificial light they could not see the exact tint. He asked Mr. Simpson if that were insurmountable.

Mr. Simpson said that in the benzoinized paper that tint was apparent. But in some subsequent experiments with frankinsence and mastic, immunity from yellowness had been secured.

Mr. Price had some of the prepared paper by him, which he was keeping in order to test, and it remained perfectly white.

Mr. A. H. Wall had hoped to have brought with him a solar camera picture, taken on resinized paper, which would have illustrated its value. He thought it was a most important process, especially in an artistic sense.

Mr. Price said, in reference to the yellow tint in benzoin, he believed the first gatherings of the "tears" were quite white. If these were kept separate instead of being mixed with the darker portions subsequently gathered, they would answer the purpose well.

After some further conversation on the subject, in which several members spoke very hopefully of the promise of the resinized paper,

Mr. Frank Howard said Mr. Leake's paper was a very valuable one, dealing as it did with many minor points of importance. There were some parts of it, however, in which he could not entirely agree with Mr. Leake. One was as to the use of plate glass. In his own practice he had used the crown glass for stereoscopic and other negatives, up to 5 by 4, without experiencing any of the disadvantages to which Mr. Leake had adverted. Again, as to adding to the bath a little of the iodizer of the collodion intended to be excited in it, he thought the plan was inconvenient and unnecessary, and in some cases, where the nature of the iodizer was a secret, impossible. He thought there was no readier and simpler means of making a bath than that recommended by Mr. Simpson. He dissolved one ounce of nitrate of silver—always weighing it himself—in twelve ounces of common water. This of course caused a precipitate. To this quantity he added one grain of iodide of potassium, and after agitating at intervals for half an hour, he filtered through two thicknesses of paper, and found the bath ready for use without further waiting. There was another point he would name in reference to exciting paper. A suggestion which appeared a short time ago in the News he had found most valuable. It was to the effect that if the paper were drawn very slowly from the surface of the silver bath there would be scarcely any waste of the solution, as the paper would come away without bringing more than a drop or two of solution running down its surface. He believed a saving of 25 per cent. might be effected by this method.

Mr. Harman remarked that, if the drainings were caught in dishes it did not matter, as they were then saved.

Mr. Simpson suggested, that Mr. Harman was looking at the matter from the professional photographers' point of view, his operations being conducted on a large scale commercially, whilst Mr. Howard was looking at it as an amateur. It would scarcely answer the purpose of the amateur who was about to print, perhaps, a score of prints, to place dishes to catch the drippings from a few pieces of paper.

Mr. Wall thought many mistakes and many discrepancies of opinion arose from the cause just adverted to: the difference between amateur and professional opinion. Take the question of glass, for instance. He (Mr. Wall), for economy, had thought he would get crown, and test it, as he had seen recommended, in the pressure frame, before using. Unfortunately, such a test was not always trustworthy, as he had found to his cost; for he had lost four or five guineas, only recently, by the breakage of a negative, on common glass so tested. He (Mr. Wall) thought professional photographers, to whom negatives were money, would find their account in using plate-glass.

The Chairman asked to what such breakages were due?

Mr. Harman said, invariably to unequal pressure, from some cause. If the glass were quite flat, and perfectly even, no matter how thin it might be, there was no danger of breakage.

Mr. Fitch said he used common glass up to whole-plate size, and never had breakages.

Mr. Simpson said that, even if plate-glass were used, there would always be a certain percentage of breakages from various causes, where much printing was done. The fact, therefore, that a certain negative, or negatives, had broken and caused loss, was not, necessarily, an impeachment of crown glass.

Mr. Foxlee said, that he thought the film on common glass, to which Mr. Leake had alluded, was caused by the effect of smoke condensed on the surface in the manufacture. He had found that, in cleaning glasses, this smoke could only be removed by mechanical action. If well cleaned with tripoli he (Mr. Foxlee) thought the flattened crown was as good as patent plate.

Mr. Simpson said, in reference to this foggy deposit, alleged to be caused by common glass, he (Mr. Simpson) thought it must be due to other causes, and for this reason:—Flatted crown was the glass universally used by positive operators for collodion positives, and, as was well known, the slightest fog or deposit in the shadows of a picture was far more fatal to its excellence than it would be in a negative, and much more easily detected. But collodion positives of the utmost brilliancy were constantly taken on flatted crown.

Mr. Price said, that plate glass was not always of an even thickness. He (Mr. Price) had seen a piece of plate glass double as thick at one edge as the other.

After some further conversation on the subject,

Mr. Harman, in answer to the Chairman, said, that intense negatives required to be printed in the sun, and weak ones in the shade.

Mr. Wall said, that he had recently prints from the same negative—printed one in the sun, one in a diffused light, and one in the shade in a room; the last was decidedly the best print.

Mr. Simpson said, he thought it was well understood by practical photographers, that an intense negative required printing in direct sunlight, and a weak one in diffused light. But, other things being equal, it was generally a better class of prints which was produced in the shade. The reduction was slower, and the molecules of reduced silver seemed smaller. The print produced was more delicate in its detail, and even sharper looking.

The Chairman asked, if the effect of temperature on printing had been observed?

Mr. Leake thought it did not make much difference.

Mr. Martin said, since heat augmented the energy of most chemical reactions, he thought it would only be fair to assume that it had some influence in printing.

Mr. Howard said it was evident it had, as excited paper decomposed much sooner in warm weather than in cold.

Mr. Price said he believed that sun-printed pictures were the first to fade. That opinion was put forth by the editor of one of the American journals some time ago—Mr. Snelling, he believed, the paper was published some time ago in the News—that some prints were like over-quickly cooked steaks, the outside was done before the rest was perfect, and he believed that a want of permanence was the result.

Mr. Howard referred to the causes of mealiness, which he believed to be carelessness and haste in the washing before toning. Washing in luke warm water he found beneficial in preventing it.

Mr. Fitch preferred very slow toning, which was analagous in principle to the plan Mr. Howard had described.

Mr. Harmer thought very thorough but rapid washing was important, the shorter the time prints were in the first washing water the better, as otherwise a film of insoluble carbonate or chloride, adhered to the surface, and caused irregular toning.

Mr. Wall has found that keeping the toning solution before use, was the best remedy for mealiness.

After some further conversation on the subject,

Mr. Leake briefly replied to various objections. He thought that notwithstanding all that had been said, a microscope examination of the surfaces would prove the superiority of plate glass. As to toning, he believed the best results were obtained by using a bath made some time, but if it were necessary, to use it as soon as mixed, a large excess of acetate of soda would give similar results to age. As to the use of carbonate of soda in the toning bath, he believed it to be the worst thing which could be used.

After some further conversation,

Mr. Wall, referring to the process of printing on resinized paper, thought that societies might with propriety, at times, step out of their routine, to thank individuals for liberally giving to the public valuable processes, through other channels than their own meetings. He therefore begged to propose a vote of thanks to Mr. Cooper, for the account of his process published in the Photographic News. The vote of thanks was passed by acclamation.

Mr. Simpson exhibited a panoramic picture taken by Mr. Sutton on one of his dry plates, with just the same exposure as he would have given to wet collodion. The picture gave general satisfaction. Mr. Simpson also showed a variety of charming card pictures, by Window, Robinson, and Southwell.

Mr. Carbutt, of Chicago, showed an album with many very fine card pictures, which were much admired.

Messrs. Schnadhorst, J. Chaplin, and W. Chaplin, were elected members of the society.

The proceedings then terminated.

## Correspondence.

### IODIDES AND BROMIDES IN COLLODION.*

Dear Sir,—Since writing to you a few days ago, I have more closely examined the "Proceedings of the South London Photographic Society," published in the Photographic News of the 16th May, 1862.

I shall remark, categorically, on Mr. Blanchard's experiments, the results of which were then laid before the meeting. Without intending anything in the way of offence, I must record my opinion that the publication of the results, backed by Mr. Blanchard's reputation, have caused, doubtless, much heart-breaking and vexatious disappointments to all those who have taken them as conclusive. And conclusive they must have been considered, especially when you and Mr. Fry endorsed those results.

In the first experiment of Mr. Blanchard, the necessary equality of conditions in the iodizing and bromo-iodizing solutions, insisted on in my preceding letter, has not been observed. In the one case the salting solution is 3½ grains; and in the other 5½-grains, a little less than double. Now I ask Mr. B., in all fairness, how the result could be otherwise than in favour of the 5½ grain collodion, even if there had been no bromide in the latter? And if, as I understand him, 2 distinct samples of collodion were used, how could the results of the one be reasonably arrayed against the other?

In the second experiment the error is repeated—no less that 6½ grains in one case, and only 3½ in the other—but no mention either is made whether only one collodion or two were used. Irrespective of the great difference in results, this matter alone would cause—an iodide of potassium is selected against a sensitive bromo-iodizer! Now if Mr. Blanchard had taken the iodides of potassium and cadmium in equal proportions for his iodizers in the one case, against his bromo-iodizers of ammonium and cadmium (by way of approach to equality of conditions), he would have found the results very difficult of decision one way or the other. Nor does he say how much cadmium was in the 4½ grains of ammonium and cadmium of his bromo-iodizers, for the more cadmium the more sensitive the collodion. In short, by a still further consideration of the matter, the amount of bromide is so large, that the proposed iodizer of half potassium and half cadmium would have proved superior to his bromo-iodizer.

In experiments 3 and 4, if, instead of taking potassium only for one half the plate, he had added 1¼ grains iodide of cadmium to it, and arrayed its results against those of the bromo-iodized half plate, he would have found them run parallel to each other, for there would have been intimate equality in the two solutions. And indeed my own experience would point even to a superiority of the iodized collodion over the bromo-iodized one, simply on account of the excess of bromide.

Experiment 5 proves simply the correctness of Mr. Sutton's experiments, that bromide alone is insensitive to light, or rather causes insensitiveness. But if Mr. B. had been aware of the principle of excitation propounded by me in my previous letter, he would have been fairer to poor bromide. He would have not used bromide of cadmium alone, but a mixture of the bromides of ammonium and cadmium, and the resulting produce would not have been quite so feeble as it turned out.

Although the result of experiment 6 was not produced at the meeting, Mr. B. has given sufficient particulars regarding it. Like the preceding ones, I must, at the risk of a charge of rudeness, pronounce it utterly unfair. No approach to equality of conditions in the iodizing and bromo-iodizing solutions are observed. If, instead of simply 3½ grains of potassium in the one case, he had added 1¼ grains of iodide of cadmium to the same, and then developed with pyro, he would have found the result superior to the bromo-iodized half plate: for the proportion of bromide used is too large to array against the said simply iodised collodion, although the latter were under pyro development. Still less would it have stood against the same iodized collodion, if iron development had been used with the latter, as in the iodizers of the preceding five experiments.

And now, as regards the whole of these experiments conjointly, the marvel is, how the coating and developing of these plates was satisfactorily done. There must have been a hitch somewhere. The coating first—how were the two collodions applied? if simultaneously, how was the excess poured off, and a proper uniform coating given? and under any circumstances the two collodions, whether of one sample or not, being differently iodized, and having therefore different setting properties, how was this part of the process regulated, so as to ensure the necessary amount of setting to each half of the plate? if lowered into the bath by one of the long ends downwards to allow of this, how was the excitation regulated? And in the case of the last experiment, how were the iron and pyro developers prevented from running into each other, and the necessary amount of development given each half of the plate.

It occurs to me that the experiments in question should have been performed with *one* sample of collodion, *variously iodized and bromo-iodized, as required, and with the necessary equality of conditions for a fair trial*, with *separate* plates with *one bath* and one strength of developers.

Trusting that you will find a corner for this letter also—I remain, dear sir, yours truly, Augustus Webb.

*Meerut, N. W. P. India, 29th July*, 1862.

* Continued from p. 479.

## Photographic Notes and Queries.

### Resinized Paper.

Dear Sir.—By correcting an error, in the 23rd line you will oblige. As I have never found the benzoin become yellow, but always *black*, it should be *bleach or whiten by exposure to the light and air*. I am proceeding very satisfatorily with this process. I have also much improved the formula, or I may say remodelled it, as the salting solution is not in the substance of the paper, but entirely on the surface. The finished print much resembles ivory. I shall forward results and particulars at my earliest opportunity.—I am, sir, yours obediently

21 *Jude street.* H. R. Nichols.

## Talk in the Studio.

Dagron's Micro-photographs.—The Abbé Moigno gives a most enthusiastic account of the new method of preparing and exhibiting micro-photographs invented by M. Dagron. After describing a process by which a series of the minute sun pictures are taken in rapid succession, he proceeds to inform us that a number of "cylinders of common or flint glass are prepared in advance, about five or six millimotres long and two thick. The second extremity of these cylinders is spherically rounded in a hollow, to transform it into a magnifying lens. To one extremity of the cylinder a microphotograph is fixed with Canada balsam, and the edges ground by an optical tool to efface the marks of the union. 'This is the photo-micrographic cylinder, one of the most delightful conquests of science and art. * * * If we look at the plane end of the cylinder we see the picture with great difficulty as a black almost imperceptible point, and M. Dagron was naturally led to do for the second extremity what he had done for the first. He fastened on a second picture with Canada balsam, he rounded the glass in another hollow, and he obtained a cylinder which twice performed the functions of microscope and object holder.'" In other cases, he fixes the picture so that it can only be seen when the glass is held at a particular angle. As the originality of these methods was disputed, and their merit referred to, Sir D. Brewster, who gave some similar hints, the Abbé Moigno obtained a letter from that philosopher, vindicating M. Dagron's claims to the invention.

Photozincography.—Mr. Osborne has addressed the following letter to the *Times*, in answer to one from Col. James, which appeared in our last:—Sir,—On my return from Cambridge, yesterday evening, I observed in your columns, a letter from Colonel Sir Henry James, referring to a notice in *The Times* of my paper on Photolithography, read before the British Association, in which he expresses the fear that a wrong construction may be put upon your report of the discussion which ensued upon that occasion. As to what transpired in the Chymical Section, I have simply to remark that my paper was a dry detail of facts, bearing exclusively upon my own process; but, that in answer to a question by Mr. Wyld, M.P., I made the statement published in *The Times*, and not contradicted by Colonel Sir H. James—that mine was six months antecedent to the Southampton process. I did not in any way imply that the latter process was based upon mine, nor did any other person present, both question and answer having reference solely to priority of invention. Trusting that this explanation will satisfy Colonel Sir H. James that the originality of his process was not impeached by me, I remain Sir, yours obediently,

J. W. Osborne (in charge of the Photographic Office, Survey Department, Melbourne).

Chanter's Collodion Pourer.—Mr. Solomon has recently manufactured the most perfect collodion bottle we have seen, the invention of Mr. Chanter, of Southsea. About half way down the bottle is a funnel-shaped partition, extending nearly to the bottom of the bottle. Through the small orifice of this funnel all particles of sediment fall, and when the bottle is turned up, for the purpose of pouring, these particles naturally fall to the side, and, instead of being poured out with the collodion, are stopped at the point where the edges of the wide mouth of the funnel are attached to the inside of the bottle. A stopper, at the bottom, can be removed to permit the occasional removal of all sediment.

Photographic Allegory.—Mr. Rejlander has recently executed a very fine allegorical photograph entitled "A Vision from Aspromonte." The champion of Italy's liberty and unity is reclining wounded and desponding on the ground. He is supported by a female figure of classical outline, evidently intended to typify hope, one arm holding an anchor, pointing to the distance, through which dimly looms the dome of St. Peters, and we see that she points to Italy. Garibaldi is personated by the artist himself, to the likeness of whom he bears as we have before observed, a strong resemblance. The picture is a whole plate, but is reproduced in card size for publication.

## To Correspondents.

Amateur has forwarded a piece of glass for examination in the spectroscope. It is of a deep orange colour, and cuts off all the chemically acting rays in a very perfect manner, and may safely be employed in the window of a photographic laboratory.

C. Bryan.—The specimen of glass sent is of a pale yellow colour, and is only a little less transparent to the chemical rays than is common window glass. For photographic purposes it is valueless.

M. R.—Mr. Lovell Reeve publishes the *Stereoscopic Magazine*, illustrated with stereographs. The price, if we remember rightly, is half-a-crown monthly. The object of the News is to circulate photographic information, not photographs. Most of our readers take pictures for themselves.

G. S. Penny.—We do not know of any place in this country where the solidified milk can be purchased; but it is not improbable that some of the emigration outfitters to be found in the neighbourhood of the docks may keep it. Mr. Thompson describes it as simply fesh milk and sugar, boiled down to the dry point, and then boxed up for keeping. The plan of making the coating for dry plates, he recommends, is to fill a convenient bottle one-eighth full of ground white sugar, and then add seven-eighths of fresh milk, and shake until the sugar is dissolved. The solution is then ready for use. 2. Kerosolene is simply a hydro-carbon, similar to benzole. Either chloroform or benzole, will answer the same purpose as a solvent for india-rubber. It is a somewhat singular fact that all samples of india-rubber do not equally dissolve. Dr. Diamond showed us some a few days ago, which has simply swelled up to a spongy mass, instead of dissolving.

A. D. J. states that he has found an old solution of acetate of soda added to fresh chloride of gold prevent mealiness. We fear that he arrives at conclusions from insufficient grounds. Isolated facts are insufficient data for generalization.

Excelsior.—The partition must be in its place in the camera whenever you take stereoscopic pictures. 2. The facility to separate the lenses further is thought an advantage by some photographers, but it is not absolutely necessary. Suitable compound lenses may be used for views with advantage. 3. The rusty tone of your print arises from the negative lacking intensity, which does not permit the print to be printed deeply enough; and without sufficiently deep printing you cannot get deep toning. Nevertheless, by toning a little deeper, you would get better results.

E. A. R.—Information on glass-rooms, generally, is scattered through the pages of each volume of the News. You will find, however, a specific article on their construction, on p. 73 of our third volume, No. 59.

Phos.—The negatives are, fortunately, still in existence. We will leave them at the office, addressed to you.

Fred. Davis.—Your experience is somewhat inexplicable. Fifteen minutes' exposure in sunshine, for a tannin and honey plate, ought to have given an over-done negative, instead of one with scarcely a trace of an image. Have you not mismanaged the development in some way? Do you adhere to the method described by Major Russell? Your next difficulty we have met with. If any trace of free nitrate remain in the film, the plate will often turn brown in patches. The remedy is, more perfect washing. Some samples of collodion retain the silver after very long washing. The powdery and permeable kind is best. Wash in a series of dipping baths, without ever removing the plate from the dipper, as recommended by our American Correspondent (Mr. Thompson). Iron may, sometimes, be used for developing dry plates; but, as a rule, pyrogallic acid is better. Mr. Bailey is a manufacturing chemist, at Wolverhampton.

Joseph Lewis.—We believe you may practise, for your own amusement, any patented invention, without risk. But we are not sure that the law gives you that permission.

D. M. A.—If you wish to intensify before fixing, use 2 grains of pyrogallic acid, and 1 grain of citric acid, in an ounce of water, and add a few drops of a 15-grain solution of silver. The same solution may be used after fixing, but it will work better if, prior to applying it, the plate be flooded with a solution of 1 grain of iodine and 2 grains of iodide of potassium in an ounce of water. In all these cases wash the plate very thoroughly before applying each fresh solution.

St. Denis.—Photography is used in various Government departments, but we cannot tell you how to obtain a Government situation as photographer. 2. You may, with propriety, use the bromo-iodized collodion of either 1, 4, 5, or 6; and probably of the other makers, but we have not tried them.

H. V. R.—A good thick coating of shellac varnish, or, better still, a thin lining of sheet gutta-percha will preserve your zinc tray from the action of various solutions.

Beta.—Your specimen is not bad; but there is room for improvement. A little more perfect definition of the head, and, indeed, throughout; a cleaner background, and warmer tone, are required for good results.

F. Vincent.—The varnish to which you refer, has proved sticky in our hands and spoiled us one or two negatives. It is a somewhat difficult thing to get a good varnish. The Sœhnée varnish, which used to be so good, has lately often been tacky. Amber varnish, when good, is very good; but it cannot always be relied upon. The varnish recommended by Mr. Fitch, which you describe as running unevenly and drying must have been too much diluted with spirit. The irregular flowing and dull drying indicate too much alcohol. We have not tried Ponting's varnish. The print is in many respects very good; the definition is very satisfactory, and the print is free from mealiness. The bright leather covering of the chair reflects too much light, and disturbs the harmony of the picture a little.

D. A.—An ordinary quarter-plate portrait lens is not well suited for full length standing card portraits. Your only plan to improve the definition will be to use a small stop.

Phist.—Photographer by all means, not photographist. Both analogy and euphony forbid the latter.

R. G.—A little thin gum-water should be mixed with lamp-black for painting on negatives. Or the cake lamp-black of the artists' colourman may be used. Letters addressed to Paternoster Row reach us the same day they arrive, or the following day. Communications to reach us at once may be sent to our private address, 18, Canonbury Park South, N.

Photo.—Mr. Sutton's new book on photography is not yet published, but will be shortly we believe. Kerosolene is a fluid analogous in its character to benzole. The latter may be used in most cases for the same purpose.

Justitia.—The defect of which you complain arises from the collodion, which is not sufficiently limpid. A more highly alcoholic collodion would give an even film with less trouble, but some samples of a pyroxyline will give a collodion of that character with almost any proportion of solvents. The difficulty may be got over, to some extent, by skilful manipulation, but it requires tact and skill. Pour a large quantity of collodion upon the plate, so as to get it covered rapidly, there is less danger of setting in those unequal ridges in such cases. Another sample of collodion is the best remedy.

H. Regnier.—We are obliged by your offer of back numbers, but have some copies of those you name. No. 79 is not yet reprinted.

Buchanan Smith, A Photo's Assistant, E. E. L., and several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 216.—October 24, 1862.

## BROMIDES IN COLLODION.

We once more recur to this subject, although we think it is, in the minds of the majority of photographers, a settled question. In recent numbers of the News we have published two very long letters from Mr. Augustus Webb, some of the arguments and conclusions in which were, in our conviction, so persistently wrong, that but for the earnestness and manifest honesty with which they were written, and our desire to do all sides of all photographic questions full justice, we should not have felt justified in giving them publicity.

We are not now about to follow Mr. Webb throughout his various experiments and arguments; but just to point out one or two errors he makes, and one or two plausible fallacies of which he is guilty.

In the first place, in reference to his remarks upon Mr. Blanchard's experiments, detailed at a meeting of the South London Photographic Society, a few months ago, Mr. Webb entirely misappreciates their avowed character. Mr. Webb is angry with them for not being what they did profess to be. Mr. Blanchard very carefully guarded his position, by stating that his engagements had prevented him from preparing a paper of any completeness on the influence of the bromides, but that he would place before the meeting the results of some of his experiments in the crude form they then possessed, these experiments having been made with reference to questions which had recently excited attention. On the general question they were not put forth as conclusive. But they were held to be tolerably conclusive as to this fact, that bromides and iodides in combination were more sensitive than either bromides or iodides alone. Again, Mr. Webb appears outraged at Mr. Blanchard's unfairness in having in one experiment, tested collodion with a simple potassium iodizer against a sensitive bromo-iodizer, and urges that to give the simple iodide fair play, it should have had a cadmium base, or cadmium and potassium mixed. But Mr. Webb altogether overlooks the fact that the experiment in question was made simply for the purpose of testing a theory often reiterated by more than one photographic authority, to the effect that a potassium iodizer gave by far the most sensitive collodion, an opinion which used to prevail, indeed, amongst all the advocates of a simple iodide.

The next error Mr. Webb commits is an amusing, although by no means an uncommon one. He states his own experiments, and draws his conclusions therefrom with the manifest conviction that they are unchallengeable. In referring to Mr. Blanchard's experiments, however, he unhesitatingly challenges both the experiments and conclusions. He disputes the fairness of what is explained, and surmises the unfairness of what is not explained. As regards the mode of manipulating he is convinced that "there must have been a hitch somewhere." He says:—

"And now, as regards the whole of these experiments conjointly, the marvel is, how the coating and developing of these plates were satisfactorily done. There must have been a hitch somewhere. The coating first—how were the two collodions applied? if simultaneously, how was the excess poured off, and a proper uniform coating given? and under any circumstances the two collodions, whether of one sample or not, being differently iodized, and having, therefore, different setting properties, how was this part of the process regulated, so as to ensure the necessary amount of setting to each half of the plate? if lowered into the bath by one of the long ends downwards to allow of this, how was the excitation regulated? And in the case of the last experiment, how were the iron and pyro developers prevented from running into each other, and the necessary amount of development given each half of the plate."

These questions are asked with so much *naïveté*, that although the method of manipulating in such experiments appears simple enough, we are tempted to explain them for the benefit of others wishing to repeat the experiments, and feeling any uncertainty about the mode of doing so. We cannot say with certainty how Mr. Blanchard went about the matter, but we can describe the mode in which we have gone through the same and similar experiments dozens of times. We use for testing collodion, a binocular stereoscopic camera, with a pair of lenses of ascertained uniformity of action. One half of a stereoscopic plate is coated with one collodion, and the other half with another; the two are then excited together, exposed together, and developed together. Under these circumstances, however, it follows that one collodion is set more than the other before it is plunged into the bath. It is necessary, therefore, to repeat the experiment under exactly the same conditions, simply reversing the order in which the collodions are poured on to the plate, in the second experiment coating first with the collodion which before was last. This principle should always be observed: wherever varying conditions necessarily arise, the experiment must be duplicated, to give to each sample of collodion its trial under each phase of variation. If, in such experiments, one collodion requires a longer time for setting than another, it is obvious that such collodion should be poured on first. In using one half of a plate with an iron developer, and the other with pyrogallic acid, it is simply necessary, before coating the plate, to make a diamond cut down the centre. This will not interfere with the manipulation until it is required; and then, before development, it is simply necessary to apply the proper pressure to divide the plate into two pieces, each of which can be easily developed with its own solutions, without the fear of mixture which Mr. Webb anticipates. Wherever it is possible, simultaneous exposure is highly desirable, as removing one or two fertile sources of error—unsuspected inaccuracy of timing, and unperceived variation of light.

Mr. Webb further says:—

"It occurs to me that the experiments in question should have been performed with *one* sample of collodion, *variously iodized and bromo-iodized, as required, and with the necessary equality of conditions for a fair trial*, with *separate* plates with *one bath* and one strength of developers."

In making comparative experiments, the first step will necessarily always be, to maintain equality and uniformity in all the conditions, in all points except those under trial; the same pyroxyline in the same solvents, and in the same proportions; the same bath, lens, light, exposure, developer, and manipulation. This is all very necessary, and will satisfy Mr. Webb's demands; but is by no means enough, and will not satisfy ours. It is not simply sufficient to test two different collodions under the same conditions; but they should be tried *each under its own best conditions*, and these will not always be the same for both. A bromo-iodized collodion, for instance, works best with nitric acid in the bath; to a simply iodized collodion this would be fatal. In maintaining, as we have steadily done, the advantage of bromides, we have done so from conviction based upon very numerous experiments, tried not only under the same conditions, but under every varying condition likely to give an advantage to either iodide or bromide. We have repeatedly admitted, that a simply iodized collodion, under its own best conditions, is as sensitive as can be desired, but that these conditions are difficult to secure and impossible to maintain; and that they are frequently accompanied by a host of troubles in the shape of spots, streaks, and comets, which have often well-nigh driven the photographer frantic; whilst a bromo-iodized collodion is more uniformly rapid in action, almost entirely free from speck or spot, and more harmonious and satisfactory in general result.

We do not attempt here to enter into some of the theoretical questions raised by Mr. Webb. We are content to look to the facts. Bromo-iodized collodion and iron development are now almost universally used by professional photographers, who are generally tolerably quick to perceive in which direction their interest lies. We receive almost every week letters from able and experienced amateur photographers, stating that they have renounced pyro and the simple iodide, and henceforth swear by iron and a bromo-iodizer; and not a few thank us for our persistent advocacy, which has induced them to change their faith and practice in this respect. We repeat, as we have often done: let all who have time try each method, each under its own best conditions; and let those who have not time for experiment look to the results in the works of the best operators. In either case there will remain little room for further indecision.

## Scientific Gossip.

For some months past a paper war has been waged in periodicals more especially devoted to pharmacy, respecting the employment of methylated spirits in the preparation of tinctures and extracts, one party advocating its use and urging the proper authorities to legalise its introduction for this purpose, whilst other sections of the disciples of Esculapius indignantly protest against such an innovation, and prophesy every imaginable evil as the result of employing such methylated medicaments. It is doubtless well known to all our readers that methylated spirit, which is allowed to be sold duty free, is spirits of wine, to which a small portion of methylic alcohol, or wood naphtha, has been added. This was originally done at the recommendation of several eminent chemists, who were engaged to report on the subject to the chairman of the Inland Revenue. Wood naphtha is very similar in chemical properties and behaviour to wine alcohol, being, in fact, the alcohol next below it in the series; it has, however, hitherto been believed to possess an odour and taste peculiar to, and inseparable from, itself. This being of a somewhat nauseous character, and the problem of separating the two bodies being at that time unsolved, the Excise authorities felt themselves secure in permitting the untaxed sale of ordinary alcohol which had been mixed with the methyl compound; "in fact," write Messrs. Graham, Hofman, and Redwood, in their report on the subject, "the more highly purified the naphtha is, with which the spirit is mixed, the more difficult will it be to effect the alteration of the mixture, in the way contemplated, by any chemical process." In the notices of the photographic chemicals, in the Exhibition, at South Kensington, we drew attention to a case of "potable wood naphtha," exhibited in the Eastern Annexe, and pointed out several applications for which this material would be useful in photography. In connection with the subject of employing methylated spirits in pharmacy, this specimen of wood naphtha is of considerable interest, in fact, much of the discussion could not have taken place had this purified spirit previously received the attention which it deserved. The subject is of almost equal importance to photographers as it is to druggists, and we are, therefore, glad to be enabled to lay before our readers a few additional facts respecting this spirit. The spirit has been recently chemically examined by Mr. Harry Draper, who obtained specimens of the liquid large enough to serve for several experiments. It is reported as being colourless, its odour suggesting nothing but alcohol, and its taste but the very faintest suspicion of pyroxylic spirit. It has a specific gravity of ·805. When diluted, both the scent and taste of wood spirit become more perceptible; but, so little so, that the slightest addition of an aromatic essential oil is enough to conceal them effectually; and, it is certain, that there is no single tincture in the pharmacopœia, which, if made with this spirit, could be distinguished from the officinal preparation by its sensible properties. This spirit was prepared under a patent taken out during the present year. Mr. Draper gives the following outline of the patentee's method of "treating wood, and other vegetable spirit," premising that the specification offers no evidence that the patentee considered wood spirit as anything but some very impure form of ordinary alcohol, which, like that prepared from beetroot and madder, it would be desirable to render potable. Specimens of beet and madder spirit are, in fact, exhibited in the same case.

The specification states that the wood spirit is first diluted with from 75 to 80 per cent. of water, allowed to repose for twenty-four hours, and then passed through a succession of filters containing coarsely-granulated wood charcoal. The only novelty claimed by the patentee is, the very ingenious arrangement of the filters, which are so placed that the spirit in the process of purification shall continually come in contact with cleaner charcoal, and that one, the first of the series, can be replaced, when foul, by a new one, not in its place, but as the last of the series. After purification, the spirit is, of course, distilled. On the small scale, and with a series of seven filters instead of fifteen, as recommended by the patentee, a spirit was obtained nearly as free from taste and smell as that exhibited at South Kensington, and there is little doubt that even this latter can be still further deodorized.

Here, then, is proof positive, that the mixture containing but ten per cent. of methylic alcohol can be successfully purified, and that wood spirit itself, as found in commerce, can be made to so closely resemble wine alcohol, as to be when undiluted, indistinguishable from it, save to the most sensitive and tutored smell and taste. Not only is there a specimen in the Exhibition, which upsets all the calculations of our revenue chemists, but the published specification of the patentee, details minutely the process of manufacture which can be successfully repeated by any chemist. Whilst this discovery promises to interfere somewhat with the revenue derived from wine alcohol, it has especial interest for the lover of science, in that it points to a new chemical truth. Mr. Draper says that it is impossible to avoid the conclusion, that the body which is described by chemists as methylic alcohol, *plus* a minute quantity of a strongly odourous hydro-carbon (probably the same which exists in the crude wood spirit to a large extent, which has so great an affinity for the alcohol, that not only does the ordinary process of purification by dilution with water and distillation, fail to remove it, but that the most powerful oxidising agents are equally unsuccessful. If the dilution however, be followed by an interval of repose, and the fluid be then percolated through charcoal, at a low temperature, and in such a manner that the partially purified filtrate shall not re-dissolve the separated hydro-carbon, the result is a body, which, while we can no longer attribute to it the peculiarities of taste and smell, by which methyl alcohol is now recognised, and which it is described by chemical writers as possessing, is still methyl alcohol in all its chemical characteristics and reactions.

If this purified wood-naphtha can be prepared by the patentee, at a price at all approaching that of wine alcohol, it could not fail to be of great value to photographers. Its high volatility—exceeding that of alcohol, would enable a great saving to be effected in the consumption of ether, in collodion, and we cannot imagine that a collodion prepared with so pure a methylic spirit as this, would be any less sensitive a photographic agent than when made with ordinary alcohol.

## PHOTOGRAPHY IN AMERICA.

*New York, October, 7th*, 1862.

My Dear Sir,—I imagine you, as you see this letter among the rest on your morning table waiting to be opened, saying with a frown, "Monsieur Tonson come again! Confound that Thomson, he is an unreliable, irregular fellow, I wish we could depend on him or get rid of him." All I can do is to doff my hat very meekly, and like a sorry school-boy, say "I can't help it."

We are in a very bad way this side of the Atlantic, my dear sir. We think no more of killing off five-thousand men per diem, for ten days at a stretch, than you would of killing off red ants.

Our President calls for a fresh million of men as coolly as he does for a dinner; and those who don't volunteer, are drafted into the ranks, so it all ends the same. Our Congress passes tax laws that leave Old England away back in the shade. Our Secretaries issue paper money of all kinds without limit. A man having a gold coin, preserves it in his family as an ancient relic, and a silver half-dollar is a curiosity. But yet we all jog on, and of course, money being manufactured by the simple power of a thousand printing presses, we are richer, more prosperous, and busier than ever. We Yankees adapt ourselves to anything; like the eels, we get used to being skinned. Some old fogy fellows look ahead, and say "where are we drifting to?" I acknowledge I am one of the old fogy kind. We will quell rebellion without a doubt, but at what a cost! We will totally extinguish slavery, that curse of our country, but what seas of blood must be the element of purification. Every family in our land has a member in the army; every person can tell you of a friend buried on the battle field, or what is worse, the Chickahominy swamp fever. Do you wonder when I say that photographic interest is somewhat drowned by the continual tramp! tramp! tramp! of armed men, and the sharp rattle of the drums through our streets? Do you blame me if I turn with disgust from amateur photography, or any other amusement, when I hear the now hourly sound of the muffled roll, and the solemn dead march, as the close platoons of soldiers with reversed arms, follow some gallant officer to his last home?

My own regiment having returned to this city, I hope to be more regular in writing to you hereafter, although we have received orders to draft our ranks full again, and stand ready to move at ten hours notice.

Now about photography,—I enclose herewith a print by H. T. Anthony; it is one of the gems of the Club, and as a sample of the *milk process* fully sustains the superiority of those plates. The vignetting of this picture is done in a very simple and easy manner, by pasting on the back of the negative several layers of white tissue paper, each one overlapping the other towards the centre, and a whole piece over all the rest. The general shading is finished with blue water-colour washed over the edges of the vignette with a soft camel's hair brush; or this vignette can be made on a plain piece of glass, and used to lay over the negative in printing. This is the most convenient vignette I know of and is worth a trial.

I also enclose a couple of my own pictures, to show you a new method of toning I have discovered. It is done by the usual alkaline gold bath. Having added to the soda solution some *nitrate of brass* (if there be such a chemical), that is to say, I dissolve some brass filings in nitric acid, and add this solution to my bi-carbonate of soda bottle. The acid is neutralized with great fermentation, and a clear blue liquid is left. This I use with one half the usual quantity of chloride of gold, and a bath is the result which tones almost instantaneously, and of a beautiful colour. I omitted to state that I add a pinch of common salt to each half pint of toning bath, which seems to preserve the surface of the paper cleaner. *A half-grain of chloride of gold used in this way wi l tone sixteen stereo prints.*

The fixing bath is: one part hypos. sodae, one part, 95° alcohol, and five parts water. I never use this bath a second time. When my prints are toned and washed, they are put into the alcohol and hypo. bath, where they do not change colour at all, as in the old fixing bath, but retain their brilliancy throughout. The whites are excessively clean, and the shadows very transparent. But you judge by the prints herewith. This is not the first instance where *brass* has passed for *gold*. It is an every-day occurrence, elsewhere than in the Photo's chemical den.

That dry-plate changing box I have in my possession, has done wonders on this side of the ocean, in converting old, and making new amateurs. Perhaps since Sellers has described it so well, the English maker will recognise his work, and let us know him.* Such deserving ingenuity ought to be made public. More from me soon.—Yours respectfully,

F. F. Thompson.

## MR. SUTTON'S RAPID DRY PROCESS.

BY MAJOR RUSSELL.

The process which Mr. Sutton described at the meeting of the British Association, is one with which I am quite familiar, as I worked a good deal with it between 2½ and 3 years ago. It is doubtless a good method for some kinds of subjects, but, as far as I can judge from my own experience, it will scarcely justify Mr. Sutton's sanguine expectation. A plate prepared with gum arabic is no doubt a trifle more sensitive than if tannin had been used on the same collodion. My principal reasons for preferring tannin for general use were the following:—

It is difficult, when gum is used, to prevent loosening of the film; a thin coating of india-rubber did not always produce sufficient adhesion, and a thicker coating was apt to crack when the negative was finished and dried; a substratum of gelatine did not always answer; it was, therefore, necessary to use collodion in a particular condition, or to have a previous coating of coagulated albumen, which involved great trouble. I found the plates prepared with gum to produce most excellent results with great certainty, when the subject included little or no sky, but otherwise fogging or reddening all over the upper parts almost always appeared, especially when any objects were near and dark enough to require a rather long exposure. Again, if the gum was not thoroughly washed out, it usually made the developing liquid turbid.

I found, by many comparative experiments, commenced nearly 3 years ago, that the use of bromide in about the same proportion which is now recommended by Mr. Sutton greatly accelerates dry collodion, and for 2 years I have used and recommended it, but I do not find that it gives nearly as much sensitiveness as can be obtained with wet collodion.

Mr. Sutton's theory that an equal number of atoms of iodine and bromine, gives the greatest sensitiveness, may very probably be right, but practically no great nicety is required, as little difference can be perceived in different proportions, between one part of bromide to two of iodide, and equal parts of each. I have generally used from two-thirds to three-fourths.

Finding that the sensitiveness gained by the use of bromide was not so great as was desirable, I have been for a long time endeavouring to find means of increasing it, until very recently, with but little success, but at last have found a method of developing, which will bring out a picture after a much shorter exposure than usual, and which promises other advantages. As, however, nothing is easier than to make mistakes in such matters, I delay publishing the method, until there has been time to test it further, and to find out the best way of working.

## IMPROVED APPARATUS—A FEW HINTS.

BY JAMES L. LANE.

Sir,—I have great pleasure in forwarding you the enclosed

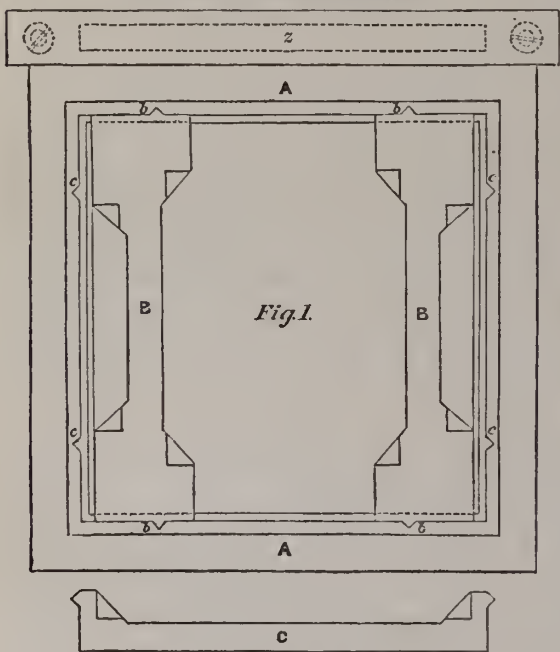
* Our correspondent will have learned ere this that the Englishman is found.—Ed.

diagrams, and particulars of some improvements in photographic apparatus, and to indulge in the hope of a space in your valuable journal, should they be worthy of your notice.

Four years ago I commenced operations as an amateur photographer, with a common made French camera, having the carriers of the ordinary description, except that the corners of the glass were made to rest on pieces of bone, which were secured to the back of the carrier with *iron* screws. Now, the nitrate of silver which drained from the glass, coming in contact with the screws, produced very ugly stains on the collodion film, and very quickly destroyed the screws, and allowed the pieces of bone to drop off, and the mitres becoming disunited, rendered the carriers perfectly useless. In this dilemma, I was compelled to contrive something in lieu of them, when I hit upon the following cheap and simple contrivance, which has answered the purpose exceedingly well, and can, in cases of emergency, be constructed with a penknife. They should be made of hard wood, and coated with shellac varnish. I do not consider silver rests necessary, as I have not been troubled with stains since I have had mine in use. I trust the annexed diagram will explain the plan I propose.

A A fig. 1 is a collodion back of a quarter-plate square camera. B B, pair of my carriers for glasses $3\frac{1}{4}\times2\frac{3}{4}$ and

BACK FOR A QUARTER SQUARE CAMERA.

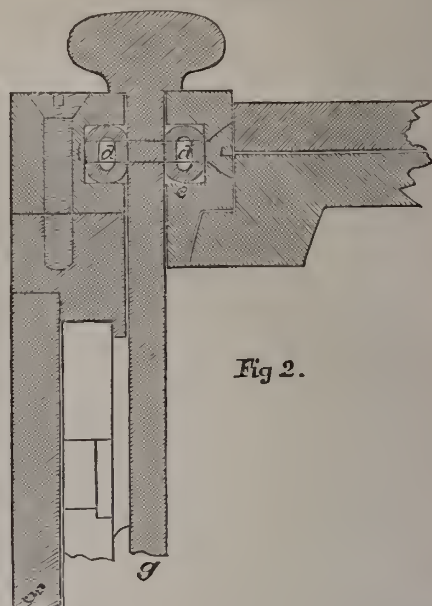



*s* Groove for Gutta Percha Tubing.

$2\frac{1}{4}\times2$. To take plates of the latter size, the carriers have only to be reversed. They have a projection at each end to fit the notches *b*, to prevent them from shifting. C, one of a pair of carriers for glass $4\frac{1}{4}\times3\frac{1}{4}$, these are to be inserted in place of the above; these have projections at the ends, which also fit the notches *b*. The plates can be placed horizontally for views or groups, by placing the ends of the carriers in the notches, *c*.

The next modification is in the sliding shutter of the camera back, to obviate the "stars and comets" which most photographers complain of, and, I believe, attribute chiefly to the dust caused by the friction from the working of the sliding shutter, which I have found to be the case if it fits tight enough to exclude the light from the camera. Fig. 2 represents what I suggest. The shutter should be french-polished, and made to work perfectly easy through the groove; then, in a recess on each side of the shutter, is inserted a piece of vulcanized india-rubber tube, about 5-16 outside diameter, and, to protect them from friction, they should be covered with silk ribbon of the required width, so that the edges nearly come together. Their elasticity causes them to press the shutter, allowing it to work

SECTION OF NEW IMPROVED BACK.



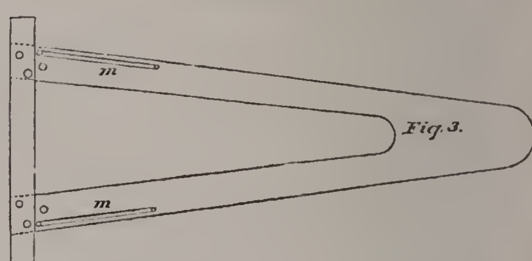

*d* Gutta Percha Tubes. *f* Door. *g* Sliding Shutter.

very soft and easy, avoids friction and dust, and effectually keeps the light out of the camera. I prefer the shutter without a hinged joint, especially in small cameras. The piece, *e*, which contains one of the tubes, is secured with a screw at each end, so that the tubes can be taken out occasionally, and freed from any dust that may have accumulated.

The tubes may be applied to any ordinary back, by enclosing them with strips of wood outside the frame.

Fig. 3 is a half-plate dipper, which answers exceedingly

WOODEN DIPPER.




*m* Silver Wire. *o* Wood Pins.

well; it is made of hard wood, coated with shellac varnish, on the projecting piece at the bottom are two silver pins, to keep the glass from wearing off the varnish; and I should also recommend two pieces of silver wire to be laid on the stems, extending upwards, say two inches from the projecting piece of wood, and the ends taken through the stems and rivetted.

Small dippers may be made of the usual shape, and the projecting piece at the bottom dispensed with, simply having the two silver pins projecting to support the glass.

Want of experience, or even carelessness, may have been the chief cause of all my mishaps and failures; but if they have been overcome by contrivances which may prove serviceable to any of your numerous readers, no one will be more gratified than myself.

*The Grove, Battersea Rise.*

## ELECTRICAL THEORY OF TONING.

Sir,—When we seek for an explanation of many of the most common, but little understood phenomena attending photographic operations, we find it difficult, if not impossible, to explain them by any known action of chemical affinities or decompositions. Were we, however, to pay more regard to the many careful observations of skilful experimentalists, it would be less difficult to trace a more intimate connection, than is at present admitted, between the electrical and chemical sciences.

It is to the first of these sciences, that I have long believed we owe the success of that part of our operations, known as "toning," in those cases where the tone is obtained by the deposit of a metal, and the facts recently brought forward in your excellent journal seem to me as so many proofs tending to a confirmation of this opinion; that what we call "toning" is not, as is usually stated, a process of substitution, but is really a process of electro-gilding, in which the gold of the toning bath is deposited by *electricity* in a minutely divided state on the ready formed image of *metallic* silver. This would, I believe, explain the fact that an addition of free acid, or solution containing free acid, renews the action of the toning bath, by setting up anew the electrical current, which has been *gradually* overcome by the addition to the bath of a negative element, for although the bath may appear neutral to such tests as we possess, experience teaches us that the effect of adding alkali is not so immediate as the test paper would lead one to believe. To point out all the known facts that would appear to lead to a confirmation of this view, would occupy too much of your valuable space; but it will be remembered that with the old hypo bath and the sel d'or bath, in which the acid was rarely, if ever, neutralized, we never had so many difficulties in toning proofs, to any desired tone or colour, evidently showing, with recent observation, that the presence of free acid in some form is an important element in easy toning, and which will, I believe, be found to arise from the power possessed by acid solutions of conducting currents of electricity.

The addition of an alkali I take to be simply a means of checking or regulating the rapidity of the deposit, for if the acid be in excess and the gold, consequently, deposited with great rapidity, it will be found that the lights as well as shadows of the proof will become coloured, and this in cases where there cannot possibly be any sulphur present. But if there be an alkali present, the deposit will take place only on those parts where the electrical affinities are strongest, *i.e.*, on the shadows of the proof, and the photograph will be toned before the feeble affinities that may exist in the lights can overcome the presence of the detergent.—Yours respectfully,

E. E. L.

P.S.—By this theory also we may explain one of the most troublesome amongst the numerous difficulties that beset the process. We well know, from experience, how hard it is to maintain intact the tone and strength of the proof until it shall have passed through the process of fixing.

Now, currents of electricity passing through solutions invariably decompose some small portion of the fluid through which they pass into their orginal elements, such action taking place in the gold solution would set free minute quantities of oxygen, hydrogen, chlorine, &c. Chlorine and silver, having such strong affinities, the small portion of the former set free (and it would be freed in proportionate quantities to the activity of the bath), would seize on the equivalent of silver not yet acted on by the toning, which would be in great measure the lighter tones of the proof, always last to be acted on by the gold bath, and would form with this untoned silver, chloride of silver; and as every photographer now knows, chloride of silver being soluble in hyposulphite of soda, we can easily perceive why the proof suddenly loses much on immersion in the fixing bath.

We may observe that this theory does not in any way interfere with the many suggested or proved causes of failures in printing, since I have only taken the proof in a state of perfect readiness for the toning process, and the suggestion that foreign salts are formed on the surface that interfere with toning, only strengthens this theory, since electricity will only form deposits on clean surfaces.

## LIGHTING THE SITTER.

Sir,—I do not wonder at the perplexity felt by those unacquainted with art, at the conflicting statements that appear in the various journals devoted to photography, respecting the lighting a glass room, or in other words, lighting the subject. To artists generally, there can be no difficulty attending it, it being well known to them, that the most beautiful effects are produced by the principal light falling on the object at an angle of 45°, or thereabouts, on the *side*-front. Want of time only, prevented me writing in confirmation of your remarks, No. 3 of the reply to questions put by "H. G. B.," in the September 19th number of the Photographic News.

After thirty years practice in giving lessons in drawing and painting, and in rooms as variously lighted as the residences entered, I am quite prepared to say that a *front* light will never produce a pleasing effect, any more than light falling particularly from the top will do it. It will be easy for anyone, however uninstructed in art, to satisfy themselves, at the cost of a shilling or two, laid out in the purchase of a moderate sized plaster bust, and placing it where the sitter should be, and trying it in various positions, lighting it in various ways, and occasionally hanging a white blind or sheet at a little distance from the shaded side, to give reflection. It is a pity, with such easy means at disposal, that so much uncertainty should prevail. In a paper I read on the subject, when a member of the Greenwich Photographic Society, I illustrated what I am now advancing, by shading in chalk, on a large scale, a ball, a cube, and a cylinder, in three characters of light and shade, viz., *front*, *top*, and side-front light; and it required no other confirmation than comparing one with the other, to show that the light falling on the side-front, at the angle mentioned, was the most pleasing, as well as the most effective.

I hope I have been sufficiently plain in what I have written, for, in pity to the bewildered, I would do all I can to help them; and as I think, if one can make himself understood, the *less* verbose the better, I will conclude, hoping the subject will be satisfactorily determined by each one for himself.—Yours truly,

Buchanan Smith.

*Blackheath Park.*

[We cordially endorse the advice of our correspondent. Let readers try the experiment for themselves. Wherever the attempt is at all practicable, no matter whether in chemistry or art, our advice is: make the experiment, and inform yourselves of the result. But remember, that in matters of art, the eye wants educating. The eye can only see that it brings with it the power to see. But this is a reason for perseverance, careful observation, and art culture; not for indifference or despair.—Ed.]

## PHOTOGRAPHIC DELINEATION OF MICROSCOPIC OBJECTS.

BY GEORGE S. BRADY, M.R.C.S.*

To be able to produce with rapidity and faithfulness representations of such objects and phenomena as are visible in the field of the microscope, is a matter of great importance to the labourer in almost every branch of natural science. Some observers are content to discard all adventitious aid, and to draw from the microscope in the same way as they would from an unmagnified object, relying for success on their own skill as draughtsmen. But though this method

* From the *Intellectual Observer.*

when well practised gives results, perhaps more spirited and life-like—more artistic in short—than any mere camera drawing can do; it is evident that the skill required is greater than can be brought to bear by the greater number of microscopists, and, moreover, in the best case it offers no unquestionable guarantee of faithfulness. To obviate these difficulties, to lighten the labour on the one hand, and to ensure perfect accuracy, at least of outline, on the other, the instruments in common use are the camera lucida of Wollaston and the steel disc of Sömmering. These are adapted to the eye-piece of the microscope, and by throwing the image down on to the table, so that its outline may be easily traced on a sheet of paper, they offer very great advantages. But even with these appliances, when the object to be drawn is very elaborate in its details, the labour involved is great, and in the case of living organisms their movements are a source of great perplexity, as an unlucky twitch of a limb may in a moment render useless the work perhaps of hours. Photography of course very early suggested itself as the remedy for all these hindrances, and a very encouraging amount of success attended the first attempts which were made in this direction. Mr. Shadbolt, many years ago, published, in the *Microscopical Society's Journal*, one or two very good photographs of microscopic objects, with an account of the process which he adopted, but it does not appear that any great practical results have followed so auspicious a beginning. For a long time, indeed, the cumbrousness of photographic appliances was a sufficient bar to any general use of them. In the midst of microscopic investigation, to have to busy oneself with preparing sensitive plates, and going through the whole processes of exposure, development, and fixing, was more than could be tolerated; but now that iodized plates can be kept always ready for use, and after exposure may be left any length of time for development, there is very little to be urged as to the *unhandiness* of the process, which is indeed exceedingly simple.

The body of the microscope being brought to the horizontal position must be inserted into the front of an ordinary portrait camera, from which the lens has been previously removed. In the absence of a special adapter, the aperture round the tube must be stuffed with some convenient material so as to exclude light. The image of the object is then to be accurately focussed on the ground-glass by means of the ordinary coarse and fine adjustment-screws of the microscope.* After focussing, however, it will be found necessary to make a trifling alteration in the adjustment, for the object-glasses being made with an "over-correction," in order to compensate for the "under-correction" of the eye-piece, their visual and chemical foci do not correspond; and thus the actinic rays are brought to a focus slightly beyond the visual rays. On this account the object-glass will need a certain amount of depression varying with the power, and the higher the power the less alteration will be required; usually, with a quarter of an inch objective, the chemical and optical foci are so nearly coincident, that the difference may be overlooked in practice. The amount of depression required for each lens can only be ascertained by repeated experiment, but the following data which apply to my own object-glasses (Powell and Leland's) may be taken as an approximation. The one inch glass requires a depression amounting to one turn and a half of the fine adjustment screw (about one seventy-fifth of an inch). The half inch requires about half a turn of the same screw.

The most satisfactory illumination is a strong sunlight, reflected directly upon the object by the concave mirror. Light reflected from a white cloud opposite the sun, will indeed answer the purpose, but the time of exposure is necessarily greatly increased, and the impression, when obtained, is much inferior in point of brilliancy and distinctness.

The "collodion" process is doubtless the best that can be used for microscopic purposes. Indeed, if the direct sunbeam be employed as the illuminating agent, no good result can be obtained with a less sensitive material, for the situation of the image on the prepared plate is continually altering with the altering position of the sun. The time of exposure must differ considerably according to the intensity of the illumination, the medium in which the object is mounted, and the nature of the object itself. When using the direct rays of the sun I have generally found from fifteen to forty-five seconds sufficient for a collodion negative.

Recent discoveries, by means of which sensitive plates may be constantly kept ready for use, have, as previously stated, removed one great impediment to the prosecution of microscopic photography. The point to which attention should now be directed, is the attainment of some simple method of artificial illumination. The illuminating agents now in common use are all greatly deficient in actinic power; and though photographs have been taken by their light, they are practically unavailable. It is evidently impossible that this application of photography should become at all general so long as it is entirely dependent on a brilliant sunlight, or on such agents as the electric or oxyhydrogen light, but if some easily produced flame, rich in actinic rays, could be devised, then we might reasonably look for a very extensive development of this branch of the art. It could then be practised in all weathers, and at all hours, and there are few objects which could not be represented successfully by its means.

* It is not the aim of this paper to explain the details of ordinary photographic manipulation. For information on these points, the reader must consult some one of the numerous manuals of photography.

## CURE FOR A FOGGY BATH.

BY F. B. GAGE.

[We repeat the following, which appeared in *Humphrey's Journal* some time ago, because we have been repeatedly asked to give the details of this method of purifying a disordered bath]

Put the foggy solution into a strong bottle, about three times larger than the bulk of the solution; then pulverise and add pure bi-carbonate of soda, until the silver is all precipitated to the bottom, in the form of carbonate of silver. If there is any acid in the solution, the soda must be added with caution, (stirring mean while, with a glass rod), as the soda will dissolve "fuming," and boil up and run over to your loss. After you have added soda until the silver is all precipitated,* fill the bottle with soft water, stir it up thoroughly with the glass rod, then let the precipitate settle. When it has done so, pour off the water, as closely as you can, without letting any of the precipitate escape.

Repeat this six or eight times, so as to be sure of washing off all the free soda. Now drain off all the water as closely as possible.

It would be well to use distilled water for the last washing, or the kind that you intend to make your bath with. After having drained it as closely as possible, proceed to add chemically pure nitric acid, to dissolve the precipitate, add it stirring with the glass rod at the same time, and with some caution, as it will fume strongly; continue to add until the precipitate is nearly, *but not quite, all dissolved.*

The solution at this point of the proceedings will probably be opaque and almost inky-black. This need not cause any alarm, as it will filter out clean and pure. Then take a quantity of clean cotton in your hand, hold it under water and squeeze and work it in your hand until it is thoroughly saturated, then press out the superabundance of water, put it into a funnel and filter the solution through it, test it with the hydrometer, and add water until it is of the right strength, wash your funnel, and put in some clear cotton, filter it again thoroughly, and it is right for a negative bath. For positives, it is only necessary to add one drop of nitric acid, chemically pure, to each three ounces of the solution. Baths for negatives treated in this way work decidedly clearer, better, and quicker than in any way I have ever tried. It also gives better delineations in positives. The experimenter, by this method, will be astonished at the amount of black or green matter that will be found in the funnel after filtering the first time, and will be able to see what fogged his pictures.

* Add the soda until you are sure the silver is all thrown down. Any excess of soda will be carried off in the subsequent washings, and will do no harm.

There are some points of importance to be attended to in this process. They are these:—

1st. That the bi-carbonate of soda be pure.

2nd. That the resulting precipitate be well washed, to free it from all soda that is not absorbed and combined with the silver.

3rd. That the precipitate be *not all dissolved* before it is filtered. If this part is not attended to, you will lose your labour. The theory of this is, that the *organic matter* in the bath is *soluble in acid* and cannot be filtered out while the bath is acid. There need be but very little precipitate left in, as the least amount undissolved will leave the bath perfectly neutral.

## ON THE SENSIBILITY OF IODIDE OF SILVER.

BY M. MC. A. GAUDIN.

Having resolved to study the German language, in order to be able to translate the valuable articles on Photography which appear in that language, the first chapter which I endeavoured to decipher was that published by Mr. Sutton, "On the Sensibility of Iodide of Silver;" and the attention I was compelled to give to it forced me to examine into the matter, and induced me to reply to his statements.

According to M. Monckhoven and Mr. Sutton, iodide of silver, by itself, is entirely insensible to light, while nitrate of silver, on the contrary, is very sensitive by itself, and a combination of the two will give the maximum of sensibility. I do not believe this theory to be true; and as the subject deserves examination, I, in my turn, proceed to discuss it.

First, I maintain that pure nitrate of silver, that is, free from organic matter, is insensible to light. Everyone may have remarked that this salt, kept for many years in a white glass bottle, invariably retains its purity, and that if, in some cases, it blackens, it is on the surface of the crystals, when the organic matters in the atmosphere have been deposited upon them. If ordinary paper which has imbibed nitrate of silver shows itself very sensitive to light, it is solely the effect of its sizing; for unsized white paper, in the same condition, is insensible. I believe, therefore, that all pains taken to guard this salt of silver from light, either in crystals or in solution, are of no use. Having left a bath of silver uncovered for many months, exposed to the dust, I evaporated it to dryness; after diluting it with water, and filtering it, I found it to possess extraordinary sensibility, and gave me proofs in which the details of a meadow were perfect, and without the direct rays of the sun, for the sun was not yet risen. I mentioned, long ago, these remarkable results.

To prove the insensibility of iodide of silver to light, M. Monckhoven relies upon the persistence of its natural colour. In this respect it is distinguished from the chloride and the bromide, but its transformation exists none the less. I have satisfied myself that there exists three iodides of silver; one white, another bright yellow, and a third of a fawn colour, which is the most sensitive to light.

To prove that the iodide of silver is insensible to light, Mr. Sutton produces it by decomposing nitrate of silver with an excess of iodide of potassium. This is exactly what he ought not to have done, as he must know that iodide of potassium possesses the property of *reducing, in presence of light, the iodide of silver already impressed by it*, even in contact with nitrate of silver; and he even admits, that notwithstanding the most careful washing, he finds some free iodide of potassium, which is inevitable. Experiments thus made can have no value. If it be desired to experiment with iodide of silver thus prepared, the whole of the iodide of potassium must be saturated beforehand, by boiling the washed iodide with a slight excess of acetate or nitrate of lead; then only will all trace of the iodide of potassium have disappeared, and the iodide of silver will be accompanied by a minimum quantity of iodide of lead, forming a body inert under the action of light.

Mr. Sutton has not been happier when he wished to remove the objection so clearly resulting from the effects of the daguerreotype, which for a long time rested exclusively upon the sensibility of iodide of silver alone to the action of light. This process permits, in fact, of our preparing a film composed entirely of iodide of silver, without the intervention of any salt; and this film has always shown itself endowed with sensitiveness. To remove this important objection, Mr. Sutton argues, that the polished silver is black and not white, and consequently, is *oxidized*. This is only a play upon words; the silver plate, transformed into a mirror, has taken, as we say commonly, a black polish; but if we view it reflecting a sheet of paper, it is perfectly white. According to Mr. Sutton, it contains oxide of silver, and this oxide, by intervening during radiation, performs upon the iodide of silver the same office as the nitrate of silver in the actual process; but that cannot be, for it is well known that the free iodine displaces completely the oxygen of the oxide of silver, and this oxide remaining upon the plate, there will remain no trace of the first action of the iodine upon the surface of the polished silver. It is certain, nevertheless, that the iodide produced upon a silver plate is in an exceptional condition, being engendered by a kind of cementation, which establishes a peculiar tension between the atoms; but I have proved the sensibility of iodide of silver in quite another way: by exposing silver foil to the vapour of iodine, it is transformed into semi-transparent pale yellow pellicles. This iodide, rubbed upon paper with a tuft of cotton, adheres to it with the greatest regularity; and if, after having thus prepared a sheet of paper, it is exposed to diffused light under a negative, we may afterwards produce a picture by developing in the usual manner; thus, the iodide of silver is sensitive to light without the intervention of any other compound of silver.

It is true, that in the daguerreotype, and in the case just instanced, the sensibility is very far removed from that which constitutes the basis of photography upon collodion; but it must be remarked, that here we operate upon dry iodide, that is, entirely exempt from water of combination, which is more than can be said of the iodide of wet collodion, or even of that of dry collodion. And, in fact, the intervention of water is supreme in photography, as in the great majority of chemical re-actions of an entirely different order.

This question is important, inasmuch as it connects itself directly with future improvements in collodion. It will be very useful to know if iodide of silver, rigorously deprived of nitrate of silver in excess, is as sensitive as that which is impregnated with the silver bath. Everybody denies it, and the great disproportion in sensibility which manifests itself in dry collodions prepared by different processes, and even by similar processes, which are attributed to the more or less perfect elimination of the nitrate of silver in excess, may rather depend upon the more or less complete impermeability of the collodion to the reducing agent.

The production of iodide of silver with excess of nitrate of silver, which takes place in ordinary practice, is a perfect means of having no earthy or alkaline iodide in excess; for, inasmuch as iodide of potassium, in presence of light, destroys the impression already undergone by an iodide, it is very probable that all the other soluble iodides produce *analogous* effects; that is to say, that if they cannot destroy, in presence of light, an impression already effected, they can at least, by their presence, prevent this impression from being produced. All the solvents of this iodide are in the same position; consequently, chloride of sodium itself, if employed to saturate entirely the nitrate of silver in dry collodion, will not fail to destroy the natural sensibility of the iodide of silver; and also, in a higher degree, do hyposulphite of soda and cyanide of potassium.

Accordingly, the best means, at present, of eliminating the nitrate of silver in excess, to work dry collodion, is a prolonged washing in water; the more perfect the washing, the better the plate will keep; and after all that has been written and tried to increase the sens*ib*ility of collodion, it appears very probable, that it is not so much in leaving free nitrate, as in having a collodion which does not become impenetrable, and transformed, in drying, into a *compact horny* substance. Albumen appears to act in this direction, and also tannin, and the addition of resinous substances; the employment of warm water has the effect of opening the pores of the collodion, and bringing it to a soft or permeable condition.

I conclude that the nitrate of silver is, by itself, insensible to light. We cannot say the same of iodide of silver. Although the presence of nitrate of silver is indispensable to effect the development, nothing has yet proved that the part of the nitrate of silver is the same during exposure in the camera. For my own part, I believe it goes for nothing at that moment, and that we shall soon arrive at knowing how to prepare a dry collodion, without albumen or tannin, as sensitive as wet collodion, by employing means susceptible of softening the collodion, and permitting the nitrate of silver to penetrate it as completely as at the moment of sensitizing.—*La Lumière.*

## Photographic Tourist.

### A PHOTOGRAPHIC TRIP TO THE PITCH LAKE, TRINIDAD.

BY W. TUCKER.

The Island of Trinidad, as yet, is but little known to the non-commercial European world; although from its geographical position and the fertility of its soil, it is one of the most valuable colonies belonging to the British in the West Indies. Commercially, the island is known to produce the finest cocoa for home consumption. Its area is about 2000 square miles, it is well watered and covered with magnificent virgin forest, even to the summit of its mountains, the highest range of which stretches along the whole of the northern coast, being the continuation of a spur from the South American Andes, and separated from them by the narrow mouths (*Bocas*) leading from the Carribean Sea into the Gulf of Paria. Only one eighth of this fine island has been brought into cultivation, although, from its position, it will eventually become one of the principal depots of agriculture and commerce for this part of the world, commanding as it does, the mouths of several rivers, the principal of which is the Orinoco; and a large section of the Venezuellan coast. Not only from its position will it become more known, but its natural products, viz., coal, recently discovered near the surface, valuable timber, and its still more valuable and wonderful—lake of asphalt.

In July 1861 I readily accepted the offer of Mr. C. F Stollmeyer to join him in a trip to the Pitch Lake for a few days. This gentleman is commercially engaged with the lake, and understands its, as yet, discovered uses; and is thoroughly acquainted with everything that is interesting and curious on or about its surface. The trip offering a good opportunity to take a few photographs of this really natural curiosity, I prepared the requisites for taking a few stereo pictures by the wet collodion process. We embarked from Port of Spain on board the steamer *William Burnley*, at 7 a.m., on Saturday, 13th July. This vessel plies daily to and from the next important town in the island (San Fernando), and twice every alternate week past La Brea or Pitch Point.

The steamer on her departure from town, took a southerly direction, coasting along within two miles of the shore, stopping first at Chaguanas, where a boat awaited her, some distance from the land. Several passengers disembarked, and we proceeded. Next called at New Bay, boat waiting as before; here cultivation first appears; up to this the coast is low and covered with forests of mangroves. From this point to San Fernando, sugar estates appear in succession, and present many picturesque spots, from the undulating nature of the land. Before reaching San Fernando, we partook of a hearty breakfast, considerable zest having been given to our usual appetite by the cool morning breeze, and the easy movement of the steamer over the tranquil Gulf of Paria. Arrived at the San Fernando jetty at 10 a. m. The town as seen from the gulf, forms a pretty picture; the houses built on the hill-sides appearing over one another, topped on one side by a Masonic lodge, on another by the hospital, and wholly backed by the Naparmia Hill. On this hill the first trace of asphalt is said to appear. After leaving San Fernando, the coast takes an abrupt turn west; and the low point seen in the distance is our destination. On reaching opposite the Point D'or estate, before reaching the point, a strong smell of pitch is first noticed. We passed over a pitch bank, where a thin scum of petroleum was observed floating on the surface of the water. Rounded point La Brea at about 11 o'clock. Mr. Stollmeyer's boat was in waiting, and we were safely landed on the village beach. Truly, pitch is the prevailing element here—landed on pitch rocks—the beach formed of pitch pebbles—the huts pitch-floored, and, in some cases, pitch-roofed. Pitch roads, and to a stranger, the very atmosphere smells pitchy. La Brea village is about 27 miles south of Port of Spain, in a direct line by water, and consists of about fifty huts, or rather tropical village houses, Roman Catholic church, and police station; and derives its name and importance from the Pitch Lake in its vicinity (Lac du Brea). The inhabitants are mostly fishermen; some cultivate small patches of ground, and raise provisions for their own use, and work for wages as pitch-cutters and boatmen. The principal resident of the village is a negro named Nimrod, who, since the export of pitch, has been Mr. Stollmeyer's foreman and contractor. Point La Brea, a few hundred yards north of the village, is a deposit of pitch, fifteen feet deep, extending over seven or eight acres. Its surface is covered with small trees and shrubs, nourished by the earth formed by the pitch being exposed to the action of the elements, which causes it to lose its oily and carbonaceous nature, and forms earthy matter, the same as that formed in partial combination with the raw asphalt. From this point, and not from the lake, pitch is at present shipped; consequently, a large portion of the point has disappeared. The pitch from the lake is less suitable for shipment in bulk. On the south side of the village, the Paris Asphalt Company have erected works near the beach, where the pitch from the lake is refined for exportation. During the prevalence of northerly winds, a high surf runs on the beach, and makes landing difficult. A few days before our visit, several large boats were wrecked on this spot. We rested in Nimrod's house, in the principal room of which—half shop, half bed-room and parlour—we partook of refreshment, prepared by our host's *married* wife—a fine-looking creole woman. After purchasing at a Chinese shop, eggs, fowls, &c., to complete our provisions, we started in a boat for Mr. S.'s country residence on Point Rouge, about two miles south of La Brea. This was our head-quarters during the sojourn. After leaving the village, the beach regained its sandy appearance, and at Point Boyer we came to the first pitch-nugget, or boulder, projecting into the sea. These continue along the coast, at intervals of twenty or thirty yards, to Point Rouge. The coast, although now covered with fine forest trees, was, some thirty years ago, cultivated sugar estates, all traces of which have now disappeared, and nature resumed her sway even to the producing of goodly trees on the bare pitch-boulders. Point Rouge is a perpendicular cliff, washed by the sea, and formed of different layers of clay, which have undergone the action of subterraneous heat, and become burnt to the consistency of soft brick of a bright red, and, in some places, of a yellow ochre colour. In some of the layers semi-jaspers have been found. We reached the house, which is situate on the top of the point, about one hundred feet above the gulf, at 6 p.m. From this spot we command a splendid view of the opposite coast of Guapo. The stillness of the water in the bay below, formed by the point, recalls to mind the small lakes of Switzerland.

The coast of Guapo (site of the observations taken of the eclipse of the sun on the 31st Dec., 1861), covered with dense forest, where men hardly ever penetrate, present pictures worthy of the best landscape painter, or photographic tourist. A few hundred yards from the land, and in the bay, lies a cluster of peculiar rocks, rising a few feet above the level of the water—formed by a combination of pitch and sand into stone, exceedingly hard. These rocks are at all times covered with numerous pelicans. Early on Monday morning we returned to the village, and my operations commenced with taking a view of the village from Pitch Point; one of the points and another of the village looking towards Point Boyer. Nimrod obtained for us men to take up the requisites for the day to the lake—he condescending to escort us—assuming the command of the party.

The road from the village to the lake is about 1¼ miles long, and has an appearance resembling a flow of pitch the whole length, and certainly favours the popular opinion of an anterior eruption, and overflow of lava from a pitch crater, leading all in one direction, in the form of a broad river, to Point La Brea. This view is not adopted by the Government geologists, who lately made a survey of the island. They regard all the pitch, though identical in its nature with that of the main lake, as independent nodules, or pitch-nuggets.

On the sides of the roads, and on the pitch, high, rank, grasses grow; and every dry season these so-called savannahs are burned off. The earth farmed here is similar to that of the Point La Brea; and produces the cushew and pine-apple, yams and manise in perfection. On reaching the top of a rising bank we enter upon this wonder of nature. The lake now before us, 131 feet above the level of the sea, completely surrounded by forests, contains upwards of 100 acres of asphalt, millions of tons of which is applicable to many useful purposes. To visitors, the first appearance of the lake is disappointing, they generally expect to see something *exceedingly wonderful and curious*, and are surprised to find it only a lake of hard black pitch, which, indeed, they very seldom venture upon, although it is quite hard, and will bear standing upon for several minutes before making an impression. Loaded carts often pass over parts of its surface. From this spot I took a view. Nimrod now informed me that as I wished to cross the lake and retain dry clothing, I must doff my nether garments and wade through the fissures which intersect the lake in all directions. Lady visitors, however, are generally supplied with a plank to form a bridge over the numerous cracks, and which is carried by one of the attendants, and, of course, used by the whole party. This was not used in our case. The probable cause of these cracks or fissures is owing to the gradual evaporation of water, which is in large quantities mixed up with soft pitch, it then contracts, sinks, in the centre, forming convex sides, and meeting at a point two or three feet below, and leaves a basin for rain water, the width of which, on the surface, is from six to twelve feet. In the dry season the water in the smaller crevices evaporates. I tasted the water contained in these fissures, it has a saline acid taste, not altogether disagreeable, and somewhat the taste of mineral water. It has a dark-green hue, but perfectly clear when taken up in a glass, and has been recommended for ablutions to persons deceased of the skin. I observed, in some places, many bubbles rising to the surface of the water. This proceed from gas which blows from small holes below in the pitch. Whilst crossing the lake we passed several several groups of Negro women, almost in a nude state, busily engaged washing clothes in the larger fissures, chanting their wild "*Belle airs*," and keeping time by beating the clothes on the pitch, as they usually do on large stones in the running streams in other parts of the island. My friend managed to keep, but with great difficulty, one of these groups sufficiently still to enable me to take a photograph. Every step on the lake causes a popping sound, from the breaking of some of the numerous gas bubbles formed on the surface. As the weather now looked threatening, we left the lake and proceeded to Point Rouge, overland by the Guapo road, which skirts the lake on the eastern side, and leaves it at the south eastern point. Before leaving, Nimrod had every article used on the lake stowed away in the brush near the road, and covered with the leaves of the wild banana.

(*To be continued.*)

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—In a former letter I had occasion to remark, that an excess of soda carbonate being added to the toning bath for the purpose of preventing mealiness, is a source of difficulty not easy to overcome. An explanation renders it necessary for a reference once more to be made to the subject of decomposition, produced by the alkaline agent when brought into contact with chloride of gold; and having a few moments of leisure before me, I propose entering somewhat minutely into the chemistry of this interesting, and, to photographers generally, most absorbing topic. My last hastily written letter was intended to meet the requirements of the general reader. I now write for the benefit of those whose tastes lead them to dip beneath the surface of hidden mysteries, effects of which are visible, whilst the causes remain concealed from the eye of a superficial observer.

Chloride of gold, in the symbolic language of chemistry, is stated thus: $Au_2\,Cl_3$; which, in plain English, means, two atoms of gold in combination with three of chlorine. Carbonate of soda is a compound substance, in symbols given thus: $NaO\ CO_2 + {}_{10}HO$; that is to say, an atom of sodium, one of oxygen (that forms plain soda), with carbonic acid one atom, and water 10, in combination, the whole forming the substance known as carbonate of soda. The chlorine introduced with the gold has a great affinity for sodium. In the case before us, oxygen is liberated to make room for the chlorine, whilst the oxygen enters into a new combination with the hydrogen, which most samples of gold in combination with chlorine doubtless contain. The produce of this connection is HO, or water. Now, let us suppose eight or more ounces of water, holding in solution 10 grains of soda carbonate to two grains of chloride of gold; taking it in rough numbers, we have about five equivalents of sodium, ready to unite with an equal number of chlorine, and five parts of common salt, Na Cl, will be produced by this process of decomposition, leaving but one equivalent of chlorine to form, in connection with the gold, a subchloride of that metal. By the addition of more soda, a further demand for chlorine is created, and the gold, deprived of its sustaining power, speedily decomposes. This process of decomposition, where the quantity of gold and soda are well balanced, appears to proceed slowly; and I am strongly inclined to believe, that the agitation (if I may so speak) excited by the disunion, although not perceptible to the eye, exercises a caustic or bleaching influence, that prepares the surface of the paper for the reception of the gold, which, being thus rudely torn asunder from its associate, seeks refuge with the subchloride of silver, access to which has been opened up by the agency of soda, whilst engaged in deadly combat for the possession of the slowly advancing chlorine. Arguments are not wanting to support this somewhat novel view of the subject. If a caustic agent alone could remove the "surface impediments," my theory immediately falls to the ground; but, as I have before observed, a solution of soda, minus gold, cannot accomplish the work. Hydrochloric acid improves, but its action does not produce the marked effect caused by the soda when in contact with gold. Why? because, in the former case, decomposition is effected too rapidly, the hydrogen yielding up chlorine without a struggle, to unite with the liberated oxygen, for which it has a greater preference, as the following symbol may prove. The results of this union and disunion may be rendered thus: $HCl + NaO = HO$ and $Na\,Cl$ (without naming the various atoms, the meaning is this: hydrochloric acid, in contact with soda decomposing, forming water and common salt). We have reason to believe that gold separates from the chlorine more tardily, and if the soda is saturated with chlorine produced from another source, the gold is left untouched. Professor Hyme has proved this fact by his interesting discovery. He has shown, that if, by reason of an excess of soda, a bath refuses to act, although abundantly supplied with gold, by acidifying with hydrochloric acid, and again rendering alkaline with soda, toning proceeds with renewed vigour. How is this change brought about? A large excess of soda rapidly deprives the gold of its chlorine; with but just sufficient of this agent to prevent total decomposition, it remains inert, and when the acid before named is added, it takes its fill of chlorine; but no action ensues, because the sodium is also saturated. Having dismissed its late companions in favour of chlorine, it has now become a new substance, viz., Na Cl. By once more adding soda in sufficient quantity, chlorine again tardily removes from gold, and toning recommences. An objection here suggests itself: if an excess of soda deprives the gold of the greater portion of its chlorine, why does it not at once take possession of the whole? In the first place, the soda loses power in proportion to the quantity of chlorine it has absorbed; the gold, on the contrary, acquires power in proportion to the amount of chlorine it has lost; therefore, as a subchloride, it is enabled to resist, for a considerable time, the power exercised by the remaining small portion of undecomposed soda. But this agent finally proves the conquerer. The gold, released from its last tie, decomposes, and no doctoring can revive its exhausted powers. I shall conclude this part of my subject next week.—Yours respectfully,

A Photographer's Assistant.

## IS MR. J. W. OSBORNE AN INVENTOR OF A PHOTO-LITHOGRAPHIC PROCESS.

Sir,—It may be of interest to you to know how Mr. J. W. Osborne's so-called discovery of a photolithographic process, was received by photographers and others, at Melbourne. As soon as Mr. Osborne announced, by advertisement, his intention to apply for a patent, Mr. G. W. Perry (a highly respected gentleman, and the best photographer in the colony) doubting the originality of the process, went, accompanied by a friend, to the office where the specifications of patents are kept, to learn what Mr. Osborne claimed as his own discovery or invention, intending, if there were sufficient grounds for so doing, to oppose the granting of the patent. They were not allowed to see the specification; and not knowing what Mr. Osborne claimed, they felt that it would be a waste of time and money to oppose him. In due time the patent was granted. Having thus secured the exclusive right to the use of photolithography in the colony of Victoria, Mr. Osborne was still far from satisfied. Backed by his friends, particularly by the Surveyor General, such representations were made to the Government as to induce the Treasurer to put down in the estimates a thousand pounds as a reward or recompense to Mr. Osborne, on account of his (?) great invention of a photolithogrophic process. Mr. Perry again took action, for having then read the specification of Mr. Osborne's patent, he (Mr. Perry) knew that Mr. Osborne's process was the same *in principle* as M. Asser's, of Amsterdam, a notice of which having arrived in the colony *before* Mr. Osborne advertised his intention of applying for a patent, convinced Mr. Perry that M. Asser's *principle* had been adopted by Mr Osborne, and that he was, therefore, not entitled to the honours and rewards of an independent discovery. Mr. Perry wrote to the colonial Treasurer, and to other influential gentlemen, and was the means of having the grant of money delayed, and ultimately of having a Board appointed to enquire into the advantages the public service was likely to derive from photolithography, and, also, into "the merits, originality, and value of Mr. Osborne's invention." Mr. Perry then called a public meeting of photographers, lithographers, and others, which was numerously attended. After hearing a lengthy statement from Mr. Perry, the meeting unanimously resolved that, in its opinion, Mr. Osborne was not an original discoverer, and that the time had come for the formation of a photographic society, in order that photographers in a body might be ready at all times to resist all such false claims to originality as that put forth by Mr. Osborne. Mr. Perry also received full powers to act for the newly-formed society, as he might think fit, in resisting and exposing Mr. Osborne's claims as a discoverer, before the Board. I may remark here, that it is known too well that Government Boards and Commissions are not the best of modes of getting at the truth. They too frequently know at the beginning of their labours what verdict they have to return at the close of them. This Board was no exception, for, ostensibly appointed by the President of the Board of Land Works, but really by the Surveyor General (Mr. Osborne's particular friend and patron), consisted mostly of persons holding Government situations, and others who were more or less predisposed in Mr. Osborne's favour. Of course such a Board reported in Mr. Osborne's favour, and recommended the Government to give him a thousand pounds. The Legislative Assembly, on being told by the Treasurer that Mr. Osborne's process would be the means of saving a large sum annually to the Surveyor-General's department, by Photolithography, at once voted the money—not caring at all whether he was the inventor of the process, or merely the introducer. Mr. Osborne saved the country's money—that was enough for honourable members—he was worthy of reward on that account. In reading the Report of the Board, no one can fail to see by the substance of the questions put to the witnesses for and against Mr. Osborne, that the Board knew they had to return a favourable report. The manner of some of the Board towards some of the witnesses (especially towards Mr. Perry), was at times neither courteous nor civil. Now, sir, as you have the Report before you, I shall not quote much from it. Although I believe it to be impossible to prove *absolutely* that Mr. Osborne is not the original inventor of the Photolithographic process he has patented, yet, on such kind of evidence as has often hung men in the absence of *real* proof (I disclaim any desire to hang Mr. Osborne on any kind of evidence or proof), I think that I can show that there exists strong presumptive proof that he is not the inventor. In all the papers Mr. Osborne has written on the subject of his Patent, and in his evidence before the Board, he has much to say about Mr. Poitevin's process, which differs from his; but of M. Asser's, which is the same in principle as Mr. Osborne's, he says but very little. Indeed, I believe Mr. Osborne kept a profound silence about M. Asser's process, until the sitting of the Board, when being questioned thereupon, he answered in an off-hand sort of way (*vide* question and answer No. 19, of the Report), and said as little as possible. Is it not strange, is it not suspicious, that Mr. Osborne when reviewing in his published papers, what had been done prior to, or contemporaneously with his own discovery, should have omitted all mention of a process, of which Mr. Hardwich says ("Photographic Chemistry," sixth edit., p. 252): it (M. Asser's) "in its essential features resembles that of Mr. Osborne?"

For some months, Mr. Osborne was prosecuting experiments in Photo-galvanography, trying to work out the process from the particulars of it scattered throughout the various journals and books. His endeavours led to no other result than to familiarise him with such experiments, the great value of which he would probably feel on taking up M. Poitevin's Photolithographic processes, for his success therein seems to have been very rapid. It is necessary now to pay particular attention to the dates. Mr. Osborne says, that on the 8th of August 1859, he first turned his attention to Photolithography, and that on the 19th he produced his first result with the *transfer* paper; so that he would have us believe that in *eleven days* he worked out M. Poitevin's processes, found out their great defect, and supplanted them by the invention of the *transfer*, which you are aware is the important part of his process. Quick work, that! He declares positively that the accounts of M. Poitevin's processes did not suggest the idea of a transfer to him. Strange, that Poitevin's processes should suggest the idea of a transfer to others and not to M. Osborne, for the following extract from the Report, will show that another gentleman at Melbourne, did, by Poitevin's processes *and the transfer*, produce a Photolitbograph contemporaneously with Mr. Osborne's first announcing his intention to apply for a patent. Mr. Perry is the gentleman under examination, and he is asked, Question:

"1097. You do not know that Poitevin's processes have been done in the way that Mr. Osborne's process is, that is, taking the picture on bi-chromate of potash paper, and transferring it to the stone—are you aware of that being done? Yes.

"1098. By Poitevin?—By Poitevin's process.

"1099. At what time?—Last year, by Mr. Himan, at the Government railway lithographic office.

"1100. At what time?—About this time last year (early in Sept. 1859), previously to the publication of this patent. I have an impression produced by him, a Coat of Arms. I was in communication with Mr. Himan a short time since, when, in fact, the very subject we are alluding to just now, was brought under discussion. I put the question in such a way, that if there had been any doubt about it, his answer must remove it, for I asked him if he did not coat the stone with gelatine, he said, "No, decidedly not, I produce the impression on the paper, grease it with ink, and *transfer* it to the stone.'"

I know Mr. Himan to be a very respectable man, and that his interest lay rather in making out a case favourable to Mr. Osborne. I saw the coat of arms (which was used on a Government document) which was quite equal to any photolithograph Mr. Osborne had at that time done. Here, then, was a man who had no means of knowing what Mr. Osborne was doing, who had worked out M. Poitevin's processes about the same time, in the same way, and with as successful a result as Mr. Osborne, but with far less means at command, and who had taken the idea of the *transfer* from one of the different published accounts of Poitevin's processes; and yet Mr. Osborne asserts that he did not get the same idea from the same source, but that he invented it! Is it not incredible that two men should be studying the same subject from the same books, and that one of them finds therein all that is required to lead him to success; but the other only finds a part, and has to invent the other and most important part? and invented it so rapidly too! From the foregoing it appears that M. Poitevin's processes really contain or hint at all that was necessary to lead Mr. Himan to do successfully, and in the same way, that which Mr. Osborne patented as his own invention. Although Mr. Himan never claimed the least originality, but openly stated that all his information had been derived from books and journals, yet great merit is due to him for having successfully worked out Poitevin's imperfectly described processes. But I will now quit M. Poitevin, and take up M. Asser.

In the report of Mr. Perry's examination before the Board, you will see that he stated that the first notification of M. Asser's process appeared in one or more of the English journals, of May, 1859; well, the mail that took those journals to Melbourne would be due there about the 8th of August, the very day that Mr. Osborne says he began his photolithographic experience. But most likely the mail was a few days late (it generally is), and that it arrived about the 11th or 12th. Mr. Osborne would then have been 4 or 5 days employed on Poitevin's processes; he had succeeded in printing the negative in lithographic ink, direct on the stone; but as that method would give prints with the right side of the map on the left, and the left on the right, he would be again brought to a standstill. Whilst in that dilemma, just in the nick of time, the May mail from England arrived, bringing the journals containing a notification of the *principle* of M. Asser's *transfer* process. Supposing that Mr. Osborne had not taken the idea of the *transfer* from anything he had read in the accounts of Poitevin's processes (as Mr. Himan did), is it not natural that he would seize upon Asser's idea with avidity, and that he would immediately set about working it out? in which he quickly succeeded, for, on the 19th, just eleven days from his first experiment in photolithography, he says he produced his first result with the *transfer* paper. Bearing the foregoing in mind, is it likely that in *eleven days only* he worked out the best known photolithographic processes, but finding them deficient, that he *promptly invented* a new process, that is generally allowed to be superior to all others. Can you believe it? I can't without positive proof. There are other statements of his equally doubtful; for instance, he says he obtained his first result with the *transfer* on the 19th of August, and yet twelve days afterwards he was still working Poitevin's process of printing direct on to the lithographic stone, for I have seen a map marked in his handwriting as his fortieth experiment, and dated August 31, which was done in this manner, as the sides were reversed, the names of the towns, &c., being backwards. Why should he continue wasting time and materials in experimenting in a useless process for twelve or more days after he had invented the new transfer paper process? The two assertions won't agree. (See question and answer of the Report, 1129.)

I have seen Mr. Osborne twice or thrice, and perhaps should know him again. A photographer at Melbourne for a considerable time used to borrow my photographic books and journals, as I thought for his own perusal, but on asking him to return them two or three times, he said he had lent them to the Surveyor-General, if he had said to Mr. Osborne, it would have been more correct (see Question and Answer, 1327.) When I heard that Mr. Osborne by his patent, would prevent me from using the very same information that he had taken from my books, I did feel some indignation, but that soon passed away, for I had no intention nor desire to enter into Photolithography. Therefore his patent did not interfere with me in the least. No personal feeling can possibly be imputed to me in this matter; it is solely in the cause of truth and justice that I have written this statement. I could have written it before, but I felt it would be unfair to oppose the claims of a man fifteen thousand miles off, who could not reply until months afterwards. But Mr. Osborne's presence in England removes my hesitation. I think I have now laid before you strong presumptive proof of Mr. Osborne not being the inventor of a Photolithographic process. In assigning him a place in the annals of Photolithography in Australia, I should place him in a lower degree, in much the same honourable position that Caxton occupies with respect to Printing, in England, namely, as the practical introducer and improver, but not in the higher position of an inventor.—Melbourne.

P.S.—Mr. Osborne says he sent the first account of his process to England, by the mail, which left Melbourne on the 17th September, 1859, to a Mr. William Dowden, of Cork, hoping to be able to fetter the process with a patent in this country. He heard that Mr. Dowden communicated the discovery to some one, for that gentleman "instantly wrote to me, stating that my process was anticipated, and therefore was not capable of being patented." (See Report, 23 to 27.) Of course, the publication of the *principle* of M. Asser's process, in May, 1859, was a complete *settler* to Mr. Osborne's intentions of taking out a patent in England. Let us be thankful to M. Asser for having saved us from another man's gross selfishness. There is plenty of this latter article scattered throughout the Report. Again, he could not say that Colonel James could not have been acquainted with his (Mr. Osborne's) process at the time Colonel James was conducting his own experiments. Now, I should have thought that the date on which secresy was removed from his specification at Melbourne, would have made him *sure* that Colonel James could *not* have known his (Mr. Osborne's) so-called discovery, unless he would have us infer that the secret passed from his own friend, Mr. Dowden to Colonel James, a most unlikely thing. He also fully believed (this was on the 28th August, 1860), that Colonel James would give up his own process in favour of Mr. Osborne's. (See Report, 110, 111, and 112.)

## Photographic Notes and Queries.

### Preventing the Silver Bath from Discolouring.

Sir,—In last Friday's News, I noticed a paragraph, among the "Answers to Correspondents," about the discolouration of silver printing baths, as to whether one made with common pump water, added to another made with distilled water, would discolour. I find it does *not*. About three months ago, I added 10 ounces of silver solution (90 grs. to the ounce), made with common *hard* water, to 20 ounces of an old printing bath, which was originally made with distilled water, and was of a very deep colour; on mixing, shaking up, and allowing to settle, the whole became quite colourless. After each time of using, I do the same, and the bath is now as clear as when first made.

I cannot understand some parts of Mr. Harmer's paper in your last issue; the mode of printing vignettes with brown paper, and then black paper; if the print is the proper depth at first, why is it to be printed deeper? I cannot make it out at all. Would you or Mr. Harmer kindly help me? for I am very partial to vignetted pictures.—Believe me, sir, yours obediently, W. G. G.

*September 30th*, 1862.

[If you state your difficulty more clearly, we will try to explain, or Mr. Harmer will doubtless be willing to do so. But we do not quite see where your difficulty is, as you state it.—Ed.]

### Cure for Negatives Breaking in the Printing Frame.

Sir,—My method consists in simply cutting off the four corners with a diamond. The plate thus rests in the frame on eight corners instead of four. I have had no broken negative since I adopted this plan. If it has not been published before, it will possibly help some brother photo. D. M. A.

## Talk in the Studio.

Photographic Portraits and Pen-and-Ink Portraits.—It is said that the photographic portrait of Victor Hugo, the celebrated author of *Les Misérables*, is not like the original. Photography is capricious, and sometimes favours most the most worthless subjects. The long beard, it is said, looks rough and spare in the photograph; the hair, which he wore short at that time, gives an unusual character to the head; the face seems without muscular firmness, and the eyes have no brilliancy. The following is the pen-and-ink portrait sketch by M. Theodore Banville, taken at the Brussels banquet:—"The fine head is now in its zenith of expression—when he rose to speak it was magnificent. The hair is longer than in the photographic portrait; its wave is crisp and vivacious, and yet it is as fine as silk, and *d'une blancheur auguste*. But the whiteness inspires admiration rather than respect or veneration, for the determined carriage of the head is expressive of the hardy combatant, who has still many a struggle to encounter. The forehead is fuller and more thoughtful than of old, and the increased prominence of the eyebrows conceals their sparseness, and adds firmness to the general expression. The eyes are full of will and energy, but sometimes assume an expression of tenderness and pity for all that suffers. The complexion, once so pale, has become hale and boldly coloured, and the outline of the face is robust. The winds of the sea, and the snows of the north, and the suns of the south, have left their traces upon it. The nose has assumed a bolder, and, as it were, a kind of imperious character, and the mouth has an expression that is at once that of resignation and joyousness. There is an occasional smile, half *spirituel*, half ironical, seen under the shade of the broad silky moustache, which is still brown, while the beard below is white; the beard itself undulating in fine masses like the beards in ancient sculpture." The sketch is rather elaborate, but there is no doubt that it beats the photograph both in truth and spirit.—*Literary Budget.*

South London Photographic Society.—The open-air meetings of this society were concluded by an excellent dinner at Dulwich, when the Rev. F. F. Statham, M.A., F.G.S., occupied the chair, and Mr. Frank Howard officiated as vice-chairman. Loyal toasts, photographic speeches, fun, and good fellowship prevailed during the evening. From several letters we have received we ascertain that the recommencement of the society's winter session has not been generally known. We would call the attention of members to future meetings, on the second Thursday in each month, until next June, at eight o'clock in the evening. The meetings are held in the City of London College, late Sussex Hall, Leadenhall Street. The address of the secretary, Mr. Alfred Harman, is 3, Albert Cottages, Hill Street, Peckham.

## To Correspondents.

A Blockhead.—If your painting be an original one, and it was not sold before the 29th of last July, you can secure the copyright, which will involve the sole right to photograph it and publish the prints, by registering at Stationers' Hall, which will cost one shilling. See The Photographic News, August 8th and 22nd 2. A picture the same as Landseer's, with the substitution of a stump of a tree in the place of a few stones, is, we fear, simply a colourable imitation. You had better not publish it. 3. We have seen very fair pictures taken with Moule's photogen; but not, of course, equal to those produced by sunlight. 4. If a negative have been sufficiently exposed, and well developed, it may be intensified after fixing, without disadvantage.

E. A. R.—We do not know any builder who devotes himself especially, or exclusively, to building glass-houses. Mr. John Cundall, architect, of Leamington, has given a good deal of attention to the subject, and is, at present, superintending a very perfect structure of the kind for Mr. H. P. Robinson.

Anxious.—The pictures have many good qualities. The tone is very excellent; perhaps a little deeper printing would be an improvement in some instances. In No. 1, 2, and 3, the vignetting is a little too regular and formal. The lighting of No 1 is best; in the others there is a little excess of front light, so that the figures are illuminated too evenly all around. No. 5 is the best lighted figure of those in the new room. 2. For lenses, A. in our judgment.

N. H. Harrison.—We referred to Ponting's usual collodion in recommending the addition of bromide for dry plates. You may safely add a grain to each ounce, and try it. Use, in that case, the bromide of ammonium. If you have time to wait, add it direct to the collodion and agitate well. It will require a few hours to dissolve, and a few more to settle. Or it may be dissolved in the smallest quantity of alcohol, and added in that way. 2. We have not observed much difference in the photographic results of the different bromides. The chief difference is the degree in which they are respectively soluble in alcohol, and also in the effect on the fluidity of the collodion. Cadmium is more apt to make some collodions gelatinous than ammonium. 3. The method of developing we recommended gives great latitude as to exposure. 4. We prefer the bi-lens-[illegible]scopic camera. It will always give the same relief which is pre[illegible] eye in nature. Relief should be secured by some foregroun[illegible] be required. 5. Preliminary coatings do not affect the definiti[illegible] all. 6. We have not tried it, but in damp weather it might be desirable to warm the plates. 7. The collodion we recommended contained iodide of cadmium, as well as iodide of potassium. If a collodion contain iodide of potassium only, and bromide of cadmium be added, at all freely, a precipitate of bromide of potassium is apt to fall, especially if the solvents be very highly rectified. You need not apologize at all for asking advice.

C. J. W.—You may procure a lens which can be used for taking card portraits, and also small landscapes. We cannot recommend a maker by name in these columns. A good one for the purpose you name will probably cost £5 or £6. The method of taking small negatives, and, subsequently enlarging them, is an attractive process, and will, at some time, probably, come into general practice. But there is still room for improvement in it before that time comes. At present you cannot do better for large landscapes than use dry plates. We have not yet tried Mr. Sutton's process, but have seen good results.

Cornish Chough.—We generally use kaolin; but we cannot undertake to say which is the best plan. Some prefer citric acid, some salt. It is somewhat a matter of taste. 2. We do not quite understand what you mean as to paper being greasy. It should not be so, unless it have been handled, which ought never to be done. 3. There is no objection, that we know of, to the use of pure fused silver for the printing bath.

R. Hanks.—The reticulated cracks are probably due to the presence of too much water. The solvents have not been sufficiently rectified. Some samples of pyroxyline also favour the same result. Try keeping the plate longer out of the bath, and letting it set well, before immersion.

Subscriber.—Any unused gold in the toning bath may be thrown down by means of protosulphate of iron. The iron remains in solution, and the gold is thrown down as a dark powder, which may either be sold, or may be redissolved in nitro-muriatic acid and formed into chloride of gold. The silver and gold in the hypo bath may be precipitated with liver of sulphur as we have often described. 2. We cannot give you the recipe of any negative varnish, which we can verify by personal experience as quite perfect.

N.—We are obliged for the hint. We have seen the small picture by Ghémar to which you refer. It is very exquisite. The glass ware in the Zollverein we have not yet examined, but will do so. The tilting dishes or baths of Elliot and Co. we noticed some months ago, before we saw them in the Exhibition. Our attention was drawn to them by Bland and Co., the agents. They are admirable for exciting plates with a small quantity of solution, and, therefore, especially valuable for experimental purposes. Some of our friends use them in the laboratory constantly for wet plates.

J. Peakman.—That to which you affix number 2, by al lmeans.

J. F. N.—We cannot, of course, be answerable for the ability of those who advertise in our columns. The specimen you enclose is unquestionably very poor. We saw, on the other hand, some very fine tinting indeed a few days ago by another advertiser, and on the same terms. We regret, however, that we cannot charge ourselves with the responsibility of either recommending or condemning particular artists. 2. The best light for your glass-room will be a combination of top light and side light. We shall always have pleasure in helping you.

W. G. G.—Mudd, or Brothers, both of St. Ann's Square.

J. Jones.—When the prints require so long a time before they acquire sufficient depth, the activity of the solution may be slightly increased by adding a few drops of a fresh solution of chloride of gold. We have never noticed discoloration at the back, except when the paper had been excited a few days.

Calx—Two cameras may be used for enlarging in the way you describe. The only doubt which exists, in our mind, is as to the suitability of your stereo camera. We fear that it will not extend sufficiently. You have not stated the equivalent focus of your lens; but, suppose it be six inches, then, in order to get a transparent positive the same size, both cameras will require the bodies drawing out to the extent of twelve inches. If your small camera will not allow of the required extension, the only plan will to take an enlarged transparency, and then an enlarged negative of just such proportions as you can.

A Royal Enthusiastic Amateur, Secunderabad.—The black powder precipitated by the iron from your toning bath is finely divided metallic gold, which, by the addition of aqua regia may be converted into chloride of gold. 2. Crystal varnish may be applied to positive prints, or a varnish made by diluting Canada balsam with turpentine. 3. Ordinary spirits of wine, in rather larger proportions may be added to the nitrate bath in place of ether or alcohol. 4. We regret that we cannot with certainty recommend any especial varnish that will not become tacky under the heat of an Indian sun. A coating of albumen or gum arabic, applied before drying the plate will resist its action best. 5. Either of the lenses will answer the purpose, but the latter gives the greatest freedom from distortion.

Joseph Lewis, of 29, Dane Street, Dublin, writes to state that he is not the Joseph Lewis who asked in last weeks News if he might practise a patented invention for his own amusement, and adds that he would consider such amusement to be felony. As the letter we received last week is superscribed with the same address as the present, but in a different handwriting, we are a little puzzled as to the purpose of this complication.

W. D.—The top design is best. Six feet over head opaque, each end opaque, you will then avoid direct front or top light. All the rest, top and both sides, glass. This, with a good arrangement of blinds, will give you a well-lighted room. 2. We have had many complaints of bad varnish lately. We have not tried the diluted white hard carriage varnish, but have heard good accounts of it. We cannot tell you the exact amount of dilution it will require. It is probable that different samples will vary. We will examine the jalap resin. 3. The foggy deposit on the shadows may proceed from a variety of causes, all, or the majority of which are treated of in an article on p. 361 of the present volume.

Philos.—Number 2 on your list, decidedly, so far as our experience and information go.

A Photographer.—We do not know any one in London who enlarges negatives. If you require enlarged prints, we do not, at this moment, remember any one who uses the solar camera in London, but Mr. Sydney Smyth, George-street, Euston Road. There are several houses in London who undertake printing, such as Cundall and Downes, and McLean and Melhuish, Wellings, and others. See our advertisement columns.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 217.—*October* 31, 1862.

## PHOTOGRAPHY AND THE CONTEMPORARY PRESS.

Photographers always read with interest the criticisms of the general press on the productions of their art; and they have, on the whole, reason to be satisfied with the estimate in which it is held. Now and then a truculent outburst of spleen, probably, as it has been suggested, from some gentleman whose counterfeit presentment as produced by the camera is not flattering, does find vent; but on the whole, the press as well as the public, estimate the art with tolerable fairness. A notice of British Photography in the Exhibition which recently appeared in the *Times*, and which we reprint in another column, is for the most part appreciative and satisfactory. There are, it is true, a few errors of omission and commission. Some names are not mentioned which are deserving of high praise, and there are a few blunders: but these are not serious. We have, for instance, the touched specimens of Mr. Mayall, which are so worked up in neutral tint, as to leave scarce any trace of the photograph, set before photographers as standards of excellence to which they should endeavour to attain. Doubtless this class of work answers Mr. Mayall's purpose, and we have nothing to say against it, except that it is not photography, and that Mr. Mayall does not, in exhibiting it, do justice to the really excellent photographs which are thus obliterated in the process of retouching; but we must, nevertheless, protest against pictures which are covered up with pigment, however skilfully applied, being held as models of perfect photography. We have next a somewhat amusing blunder, in which the excellence of the admirable untouched portraits of Williams is regarded as due to his "exquisite method of printing." The printing is, doubtless, exquisite, but without the equally exquisite negatives; it would serve but little purpose. There are in the article one or two other technical errors, but it will, nevertheless, be read with interest and satisfaction.

The *Athenæum*, which has generally been distinguished by its intelligent criticism on photography, is, in a recent notice of the British department at the Exhibition, less than usually appreciative, and, except where it is unjust, more than usually uninteresting and commonplace. The notice presents some such extraordinary specimens of bad writing, that it is a charity to suppose that the matter had been trusted to some incompetent subordinate during his chief's autumnal holiday. Here is a sample in which ill-nature and bad English culminate :—

> Mr. H. P. Robinson illustrates, more completely, perhaps, than anything else can do, the fallacy of expecting a mental operation, such as the results of pictorial art are, from a chemical process. In this case the operator has placed some models (children and others), according to a pictorial arrangement, in the hopes (*sic*) of making a picture. His "Holiday in the Wood" (131), and others here, with their set of portraitures, stiffness, and fixed smiles on the models' faces, are miserably depressing to the spectator. This failure of intention is the more observable, seeing that the operator has taken great pains to obtain a contrary result.

Of course the critic has a right to his opinion on the subject; but we might desire some consistency in that opinion. Now in the same journal, some time ago, we find the same photograph described as "most successful and effective," and as possessing a "sunniness beyond the reach of art." However, let that pass: and let us ask what the critic means by telling us, that "the results of pictorial art are a mental operation?" We fear the mental operation of which this criticism is the result, was not of a character so exalted as it was ill-natured. The bad English and bad humour are "depressing" enough, and the writer should remember, that a stereotyped sneer may be more offensive than even a fixed smile in a model. Mr. Robinson may take heart of grace, however; his work is not entirely bad: Here is another remark in the same article :—

> Mr. H. P. Robinson's "Album Photographs" show exquisite taste in toning, and choice of theme.

Mr. Robinson received the only medal awarded for card pictures. How satisfied he must feel to think that it was due to his "exquisite taste in *toning!*" The article presents some other choice specimens of lucidity in style; for instance :—

> The Earl of Caithness's Snow Scenes (100) are fine and broad in choice of effect, clear and well toned.

Now, what is a "broad choice?" Breadth of effect we can understand, but a broad "choice of effect" puzzles us. A paragraph in a more recent number of the same journal treats Mr. Rejlander with about the same amount of consideration as the above sentences treat Mr. Robinson, as though two of the most artistic members of the photographic guild were selected for especial slight. There is, moreover, an insufferable air of patronage and *knowingness* which is very offensive. Here is the paragraph :—

> Mr. O. G. Rejlander is a good manipulator, and we have sometimes found ourselves able to praise his photographs; but he must be told, in very plain words, that the English public will not tolerate his tricks. He must not try to pass, as portraits of Garibaldi, studies from an artist's model, paid for playing the hero of Marsala at fifteen pence an hour. The "Vision of Aspromonte" now in the shop-windows, is a nuisance. The woman is not an Italian. The man is not Garibaldi. The drapery is indecent, and the composition is bad in taste.

To speak of Rejlander simply as a "good manipulator," is to credit him with skill in one of the very smallest departments of the art, whilst his real excellence is displayed entirely in its highest and most artistic branches. Besides, there is no attempt to pass off the picture as a *portrait* of Garibaldi; nor is Mr. Rejlander, who, in the allegorical sketch alluded to, personates the hero, an artist's model at fifteen pence an hour. We were not aware that the figure representing "Hope" required to be an Italian, nor that there was anything indecent in drapery which loosely, and in ample folds, covers the figure from head to foot. There may be differences of opinion about the taste of the composition, but there can be none as to the bad taste and unnecessary snarling of the criticism.

We are glad to be able before closing to cull from the *Athenæum's* notice one paragraph we can agree with. It is as follows :—

> The folly of touching upon photographs was never more strikingly shown than in Mr. J. E. Mayall's *Portraits* (152), most of which, originally excellent, have been fairly spoilt by handling, that, however careful, is never an improvement to such things, —a fact it requires but a moment's consideration of the nature of a photograph to make palpable to the observer. A bad photograph is not worth keeping, and a good one is infinitely beyond the power of manipulating to improve.

This remark is worth saying, and is well said.

## ON THE CONSTITUTION OF THE DARKENED CHLORIDE OF SILVER.

BY JOHN SPILLER, F.C.S.

In the course of some experiments on the action of phosphorus upon metallic solutions, I was incidentally led to observe a chemical reaction, which appears to throw some light upon the nature of the decomposition effected by the sun's rays on the white chloride of silver. If a current of phosphoretted hydrogen gas be conducted through an aqueous solution of chloride of mercury, there is formed an orange yellow precipitate of somewhat doubtful constitution, but containing the elements phosphorus, chlorine, and mercury, in the proportion required by the formula $PHg_3$, $3\,HgCl$; and described in Gmelin's "Handbook of Chemistry" under the name of "phospho-chloride of mercury." This product having been collected on a filter, and purified by washing, was transferred to a test tube, and acted upon by a neutral solution of nitrate of silver, when the compound immediately became white, and underwent a succession of changes in colour, exactly corresponding to those observed when the white chloride of silver is exposed to sunshine; and by varying the conditions of the experiment—using the silver in larger or smaller amount, and employing a gentle heat—it was possible to control the rapidity of the change, and to produce the slight variations of tint, violet, sometimes tinged with red, at other times with blue, which are constantly noticed in practical photography.

With regard to the chemical changes accompanying this alteration of colour, it is probable that the first action consists merely in the conversion of the chlorine in the yellow mercury compound into white chloride of silver, the mercury at the same time entering into solution; a moment later the reducing action of the phosphorus in the compound begins to be exerted upon the remaining nitrate of silver, the result of which is, that particles of metallic silver are formed, and gradually accumulate within and throughout the entire mass of the white chloride, and to the production of this metallic precipitate is attributed the darkening and general alteration of colour observed during the progress of the experiment. If this explanation of the phenomenon be correct, there is a well sustained analogy in regard to the constitution of the darkened chloride of silver, whether prepared under the reducing action of sunshine, or by the power of reduction originating in the phosphorus contained in the mercury salt employed. In confirmation of this view, it may be stated that the violet substance produced in the manner indicated becomes grey and metallic by treatment with ammonia, hyposulphite of soda, or cyanide of potassium; and with nitric acid and other chemical reagents behaves exactly like the product formerly examined by me, and described in a contribution to the *Philosophical Magazine* for March, 1860.

*Royal Arsenal, Woolwich, October* 28, 1862.

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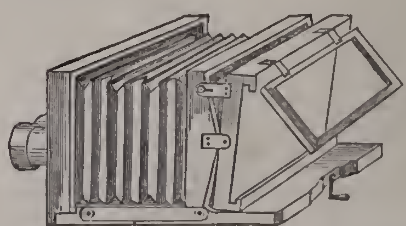
## The International Exhibition.

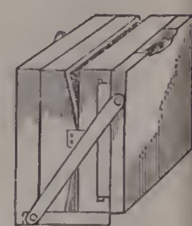
### BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

We find the last days of the Exhibition approaching before the amount of time and space at our disposal has allowed us to complete our notices. We now hasten to proceed with further brief remarks on the apparatus.

Messrs. M'Lean, Melhuish, & Co. (3,120), exhibit some excellent samples of the especial apparatus for which they are known, such as the Metal Camera, giving a maximum of rigidity, lightness, and durability; the Universal Objective, &c., &c. Especially deserving of notice is the "Simultaneous Camera," the conception we believe of Lieutenant-Colonel Shakspear. This is a square trunk camera, fitted with four lenses for card portraits. Its specialty consists, however, in the use of a fifth lens which acts as a finder. By the use of such a lens the sensitive plate may be placed *in situ* with the slide drawn, and all ready for exposure at a moment's notice, the right time being ascertained by the aid of the finder, with which the focussing of moving objects is also effected; the finder having, of course, the same focus as the other lenses, and the camera being so arranged that the focussing of one regulates all. For instantaneous effects, andfor portraits of children, &c., the use of this application will be manifest.

Mr. Meagher, Coppice Row, has a very well arranged display of photographic apparatus, chiefly consisting of cabinetwork. Mr. Meagher received his allotment of space at so late a moment that his name does not even find a place in the Catalogue; his contributions, begun and finished within a few days, were moreover placed immediately beneath the skylight, subjected to a heat which we hope apparatus has rarely to withstand even in the tropics. The perfect condition, however, of every article at the present moment illustrates their suitability for the Indian climate, for which a good deal of the apparatus exhibited is designed. A large trunk camera of Spanish mahogany, is a very handsome piece of cabinet work, and would be an ornament to any operating room. It has all the modern appliances of swing back, endless screw, &c., and having a focal range of from 6 inches to 30 inches, is available as an excellent copying camera. A new binocular stereo camera, manufactured by Mr. Meagher, and designed some time ago by ourselves, is exceedingly complete and convenient, and having now used for some time the first one made, we are well satisfied that it forms one of the most complete equipments possible for the amateur or professional photographer. It is arranged so as to be suitable for stereoscopic pictures, or views 7½ inches by 5 inches, having a moveable central partition and extra front. It extends from 3½ inches to 10 inches, admitting thus of the use of stereo lenses of short focus, and a single lens of longer focus for the larger views. In our own we use a Dallmeyer's, No. 1, triple, and a pair of his stereo lenses, which form a very complete equipment. The camera has a bellows body, and hinged tailboard, which folds up and reduces the camera to the smallest compass. It has also swing back, screw focussing adjustment, &c., stereo inner frames, and card portrait inner frames, &c., and when packed up with three double backs in the leather case provided for it, forms a convenient and very portable parcel for the hand. We subjoin an engraving of the camera extended and packed up.





Brass bound and other Kinnear cameras with modern improvements, a folding binocular stereo camera, which may easily be carried in the pocket, *carte de visite* cameras, revolving cabinet stereoscopes, various ornamental cases for stereoscopic slides, water tight baths, stands, printing frames, and various minor matters, complete a very handsome case of photographic cabinet work.

Messrs. Murray & Heath (3,128), have a fine display of apparatus of the very best quality, and designed with much judgment to meet the various wants of photographers. Prominent in their case is a noble copying and enlarging camera, with double bellows body, and extending several feet. It has a screw adjustment working from either end. A graduated scale is attached which enables perfect focus to be obtained for any degree of enlargement with absolute accuracy, without even looking at the ground glass. This is the arrangement described by Mr. Heath at the Photographic Society some months ago, in his paper on enlargement. The multiplicity and excellence of the contributions, and especially of the various clever contrivances, would require much more space to do them full justice than we can spare; we must, therefore, content ourselves with a brief enumeration of some of them. A modified Kinnear bellows camera possesses a strong and simple mode of giving firmness to the front, and the screws, &c., are packed so as to avoid loose pieces; it is very convenient. A neat binocular stereoscopic camera with dark slides for eight dry plates, forms, when packed complete, a rectangular box measuring outside 11 × 9 inches, and weighs only 7½ lbs. A compact camera especially adapted for stereoscopic, *carte de visite*, or single views, 7¼ × 4½ inches. It extends for focussing, from 3½ to 10 inches; a box front forming a sunshade for the lenses. It also possesses an instantaneous shutter. An ingenious registered stereoscope, convex reflector to properly illuminate the whole picture, with rack and pinion adjustment for length of focus. An improved reflecting stereoscope for large pictures, on the principle of Helmholtz's stereotelescope. The pictures are here seen in their true position, instead of reverse, as in the ordinary reflecting stereoscope. Smartt's admirable dark tent which we have before described, and with which almost all photographers are familiar. A useful and clever instrument for varnishing the edges of dry plates to give a uniform edging of varnish. A tripod stand with legs made of cane, giving the utmost degree of tightness compatible with rigidity. A water-tight travelling bath, with the top fitted so as to stand at the back of bath when in use. A new form of field box containing all the requisites for working 12 × 10 plates wet, and measuring only the same as a 12 × 10 dozen plate box. This is a very complete equipment. There is also another field box with some additional appliances. A bellows camera with double swing back, so contrived as to occupy no more space than an ordinary camera. These, with a variety of minor articles, such as plate drainers, collodion pourers, dropping bottles, improved pneumatic holders, &c., complete a very perfect display of apparatus.

T. Ottewill & Co., (3,133) contribute some cameras and other apparatus, of first-rate material and workmanship. These comprise the various requisites for the studio and the field in most general use. Mr. Ottewill has not aimed at novelty in his contributions, but rather exhibits those articles of such approved form and design, and such excellence in quality, as he is well known for producing. Some of theglass dishes which were used years ago, consisting of plate glass fixing into a frame work of wood, and which for many purposes have not been surpassed, are exhibited in this case.

The following notice of the British Photographic Department appeared recently in the *Times*:—

There is scarcely a class in the Exhibition which does not profess, with more or less of truth, to have its peculiar grievances and hardships. Not one, however, has such just grounds forcomplaint as the contributors to Class 14 (photography), and from none have fewer complaints and remonstrances been received. Not that photographers have been at all indifferent to the slights they have received, or the way in which their once superb collection has been treated. As a body they were among the first of the many whom the Commissioners unfortunately managed to offend, and their association, therefore, early withdrew from co-operating in bringing about an exhibition which they knew was not only to be located in a place where few would see it, but exposed to such influences as would destroy their chances of successful competition with their foreign brethren. We would venture to say that only a very small per centage of the visitors to the building ever found by their catalogues that there was such a thing as a photographic collection in the Exhibition, and of this small number only a smaller number still have been tempted to scale the weary flights of stairs which give access to the room where the photographs are almost hidden away.

For the information of those who may wish to see the little that yet remains worth looking at in this collection, we may state that the room is built above the brick tower of the Cromwell-road entrance—a height very nearly equal to the roof of the nave itself. A worse place than this could not possibly be given to it. The glazed roof, for a long time left unscreened, made the heat here during the summer quite unbearable. The heat peeled the pictures off their mounts, cracked and warped their frames, and the glare of the sun's rays ruined the tints of some of the finest specimens exhibited. Add to this that the whole space given was inadequate to the requirements of the class, and that more than half even of this little had to be shared with the maps and school-books of the education class. It must give foreigners (if any penetrate up here) a curious notion of our ideas on education to find that great dolls and cases full of the commonest kinds of children's toys are thought more worthy of exhibition as educational objects than the artistic and beautiful results of one of the most important scientific and chemical discoveries of the age. It may possibly be due to this state of things that the collection is by no means divided or arranged with proper effect, and that the Catalogue is therefore far from being as good an assistant as the purchaser has a right to expect.

Photography in 1851 had no class of its own, and, in fact, was scarcely represented at all except by a few Daguerreotypes and Talbottypes, which, with their apparatus, were exhibited among philosophical instruments. The collodion process, to which is due the development which has taken place since, was then not known. In the present collection all the photographs, with very few exceptions, are by the collodion process, and include, of course, every variety of specimens of the art—large and small portraits, *cartes de visite*, landscape views, instantaneous and otherwise, towns and buildings, stereoscope, and positive transparent pictures on glass.

Compared to what might have been expected, only a small number of portraits are exhibited, and of these collections only three call for any remark; viz., those by Mayall, Williams, and Watkins. Mayall very wisely makes every spectator a judge of his perfection in his art by exhibiting the likenesses of such personages as Lord Palmerston, Earl Derby, Mr. Gladstone, and others whose features are familiar. The art with which he has transferred the features and expressions of these statesmen is something almost marvellous even for photography. The portraits of the two first named peers might be set before all photographers as models of the excellence which they should aim at in such works. Mr. Williams, among untouched photographs, only shows one very well-known face—that of Mr. Gladstone, of which we cannot say more than that it is as good a likeness as that taken by Mr. Mayall, with all the additional advantage derivable from Mr. Williams's exquisite method of printing. His other portraits are chiefly those of less known individuals, but one has only to look at them to see that the same success has been obtained, especially with the likenesses of ladies. Mr. Watkins shows a fine series of portraits of Ristori in all her chief characters. It may be that these have suffered somewhat from exposure, for their printing is scarcely up to the high standard usual with this photographer. In coloured portraits Claudet and Williams are the chief exhibitors in point of merit. Some of the former's enlarged portraits are really wonderful efforts, as are also Williams's photographic portraits painted in oils of the late Primate and the Earl of Malmesbury. Some very admirable likenesses, which can neither be said to belong to the plain nor coloured series, are exhibited by Mr. Eastham. These are taken upon opal glass by the tannin process. Several of these, from the peculiarly soft and delicate tone given by the glass, are exceedingly effective. Caldesi is, as usual, first in his photographs from paintings and miniatures.

Of views and landscapes there is great variety. The place of honour in this class, whether for the wildest mountain scenery, for towns or buildings, for interiors of grand old minsters, likenesses of quaint old country inns or ivy-covered ruins—in short, for perfection in all that relates to out-door photography in its wildest and highest sense, belongs to Francis Bedford. Many landscape artists show in this collection, each of whom in his own peculiar walk may equal what Bedford does of the same kind in that branch, but he stands alone in being the only one who can equal all, no matter how long they may have practised, or how peculiarly their own they may have made any single department of landscape photography.

Let the visitor look at Ludlow Castle, the Feathers Inn Ludlow, Raglan Castle, Tintern Abbey, and the interior of Wells Cathedral, and then turn to such views as the Cheddar

Cliffs, Pont Aberglaslyn, and the Pass of Llanberis. With the wild, solemn, stony grandeur of the latter, with its pile of overhanging cliffs and rugged crags, he fails, as all photographers have and must do, when they cope with mountains of this class; but the Pont Aberglaslyn is wonderfully rendered in all its endless variety of rocks and pines, and the Cheddar Cliffs are equally good.

Mr. Rouch exhibits near these views a beautiful series of instantaneous pictures of Ventnor and Bonchurch, Isle of Wight. These, especially some of the latter on the beach, are exceedingly good in the minute clearness of their detail, from the first ripple of the inshore wave out to the regularly marked, though distant, undulations of the sea in the background. Of the same kind, and equally praiseworthy, are those shown by Mr. Wilson. Than his small view of Land's End there is nothing better in the collection. The picture of the Cambridge at gun exercise, with the smoke wreathing out of her heavy broadside, is also very commendable, and the result, we presume, either of a wonderful piece of good luck or else very carefully timed preparation. Mr. Stephen Thompson shows some remarkably well-developed cathedral pictures; and in the small but very good display made by the Amateur Photographic Association will be found some of an excellence which well-to-do professionals might envy.

Conspicuous among the amateurs, though not exhibitors under the Association, are the pictures of the Earl of Caithness, Lady Jocelyn, Sir A. Macdonald, &c. The Earl exhibits many very good views indeed, one of the best being a snow-scene, though in this, as is usually the case in the effort to secure detail in the light flaky effects of the new fallen snow, all other objects are rendered of an intense blackness. Lady Jocelyn's pictures are conspicuous for their clear detail, though some appear to have been rather over-printed. Messrs. Sidebotham, Robinson, Mudd, and Piper each send a careful selection of their best effects in landscape and other views, all of which are remarkably good, and some, especially those of Mr. Mudd, are not to be surpassed in their way by any in the gallery. Mr. J. Spode also shows some good views of Stoneleigh Park, which make one wish for more of the same kind. Mr. Vernon Heath exhibits very largely, and what is more, everything he shows is of the best description. There are views in this collection which are equal in clearness, softness, and detail to any shown by Bedford himself, and which are as exquisitely printed as the portraits of Williams.

Sir Henry James, the Director-General of the Ordnance Survey, exhibits a process known now as photozincography, by which photographs can be transferred to a zinc plate, and thus reproduced in common printer's ink to any extent. This process is used by the Government in the production of maps and plans, either enlarged or reduced in the camera, and a great saving is effected by it. Specimens of it, including a modification of the process called photopapyrography as well as photolithography, and showing its adaptation to the reproduction of printed matter, engravings, and, above all, MSS. (whether old or modern), are exhibited. For MSS., or for maps and plans, these zincographs are admirably suited, but the more ambitious effort of copying engravings is far less successful.

Mr. Paul Pretsch calls to the aid of photography the electrotype process, producing thus not only the engraved plate, but blocks for surface printing. The prints, however, especially of portraits, no matter how carefully done, are coarse and thick. The minute detail of a photograph, which an electrotype just as faithfully reproduces, is far too much for the action of such a thick, viscid agent as printer's ink. No doubt this obstacle will be overcome in time, but at present it is still a desideratum.

The London Stereoscopic Company, as usual, carry off the palm for stereoscopes. Negretti and Zambra exhibit a very beautiful series of positive transparent pictures on glass. For a long time this process was exclusively practised in France, and it was believed to be the *forte* of French photographers till Negretti and Zambra entered the field and latterly distanced all competitors. Their series includes some of the stereoscopes taken for them by Frith in Egypt and Nubia, and their book published on the antiquities of Egypt, the first of the kind ever issued with stereoscopic illustrations, and the forerunner, we believe, of many valuable works of the same class.

Mr. Breeze also shows some excellent transparent pictures, among which is one of a statue taken by moonlight. Even now, after all the ill-usage the collection has experienced from atmospheric influences, there is still more than enough left to show how well our photographers have maintained their reputation against all comers. Few, however, have visited it without feeling that they deserved better at the hands of the Exhibition authorities than having their works huddled away in such a remote and almost inaccessible corner of the building.

## Critical Notices.

INSTANTANEOUS VIEWS OF LONDON. Photographed by Valentine Blanchard. London: Eliot, Aldermanbury.

The task of photographing London under any circumstances has been one fraught with much difficulty, and hence it has happened, that a city comprising more photographers amongst its inhabitants than any city in the world, has been less photographed, probably, than any other large town. Not for want of objects of interest, as every one who knows what noble old buildings are almost hidden in it can testify. The difficulty has consisted in the soot-begrimed colour of its edifices, the murky atmosphere, and the crowded streets, interfering with the work. If there were difficulties in the way of ordinary photography, from these causes, what must have been the difficulties of instantaneous photography, in which the busiest thoroughfares, in their busiest moments, are portrayed? Despite all these difficulties, and the superadded trouble of a very unfavourable summer, Mr. Blanchard has succeeded in producing some of the best and most interesting instantaneous slides which have yet been issued; pictures which are brilliant, despite the smoky atmosphere, well-defined, in spite of the constant and rapid motion, and well-detailed and soft, in spite of the poor light and instantaneous exposure.

Here is "Oxford Street, looking east," No. 196, an admirably perfect picture from a most telling point of view, forming a most satisfactory composition. Cabs, omnibuses, and pedestrians, in motion, some right in the foreground, all perfectly defined, the one exception being a Hansom cab crossing the field of view, which is slightly blurred. The pace of a pedestrian, even still more in the foreground, was not, however, sufficient to produce a blur, a man wheeling a barrow across the road being perfectly caught with uplifted foot as he proceeds. Here are several views, from different points, of Trafalgar Square, by far the most effective of any we have seen of this noble site. Several views of the Strand, from different points, give an effective idea of this crowded thoroughfare; one with Temple Bar in the distance is especially excellent as a picture, and perfect in its rendering of moving vehicles which are quite in the foreground, whilst the effect of distance, and London atmosphere, are finely rendered. To describe and characterise faithfully every picture before us, would require many columns, but it is sufficient to say, that various views of Westminster, with Westminster Abbey and the Houses of Parliament, of the International Exhibition with its surrounding crowds of people, of St. Martin's le Grand, of the interior of Covent Garden, of the New Cattle Market on a market day, of Regent Street, &c., &c., are all equally good. The especial excellence of this series depends on a combination of causes, in reference to all of which, the very best conditions have been carefully studied and secured. The most effective views have been chosen irrespective of the difficulty of obtaining them; the best point of view, and the most telling period of the day for each subject have also been selected; and whilst, in each case, the most effective view of the place has been seized, regard has been had, in most cases, to the production of pictorial effect besides. As pictures, they are brilliant and harmonious, and as accurate portrayals and valuable souvenirs of the daily street life of the busiest metropolis of the world, we have seen nothing at all to equal them.

We have amongst the series, a few more of our *premiers amours*—Mr. Blanchard's marine and river scenes, which, with their varying effects of water, and shipping, and cloud, to us, possess a charm, that never palls or wearies. Here is "A study of the Thames, looking to London Bridge, with St. Saviour's Church in the distance," not one of the most effective as regards atmospheric effects, but which we commend to the attention of young students of composition, just for the purpose of pointing out how valuable a small sloop in the left hand corner of the picture becomes in completing the composition and balancing the picture. Again, both as a composition, and as a picture of wondrous poetic beauty, let us commend attention to No. 146, "Evening; the Port of London." The tranquil river illumined with an evening sun; forests of masts in the distance; a brig and various barges in the foreground; and, nearer still, portion of the hull, masts, and cordage of a large vessel looming heavy and black against a sky covered with grand clouds, the edges of which, are gilded by the sun, which is descending behind them. The scene is one which rivets and charms, and is well worth studying.

We have said little about the mechanical qualities of the series, as our attention has been absorbed by higher qualities. But we may remark, that the photography is excellent, and that the results here shown, furnish a recommendation, stronger than any words, of the excellence of the bromo-iodized collodion with which they were taken, and which, from announcements in another column, we see Mr. Blanchard now manufactures for the public, as well as for his own use. The tone and general quality of the prints, is not only uniform, but uniformly good, and, altogether, satisfactory.

## THE PHILOSOPHY OF POSITIVE PRINTING UPON ALBUMENIZED PAPER, IN CONTINUATION OF "ALBUMINATE OF SILVER AND THE ABBE PUJO."

BY GEORGE PRICE.

IN my last communication,* I stated that as the Abbé Pujo's paper entitled "Positive Printing on Albumenized Paper," was always spoken of in terms of commendation: I could not but presume that the statements contained in it were generally accepted as *facts;* now the acceptance of an error as a fact, retards the advancement of truth, and when that error relates to a subject that is but little understood, its acceptance as a fact is the more injurious. Having in that communication, shown the fallacy of the Abbé's assertion respecting the proportions of albuminate and chloride of silver, which will result from a given quantity of dry albumen and salting chloride: I will now resume the subject.

However humiliating the confession may be, I think every candid mind must acknowledge, that very little, if anything, is known respecting *one of the most important branches of the art*, viz., "The Philosophy of Positive Printing upon Albumenized Paper." Notwithstanding this ignorance, it seems to be the universal opinion of photographers, that chloride or nitrate of silver, alone, is *incapable* of producing good results, but that a conjunction of both is necessary; and also that the superior vigour and brilliancy of prints upon albumenized paper, is due, not so much to the *glaze* given by the albumen, as to the addition of the compound it forms with nitrate of silver, and which has been termed the *albuminate* of that metal.

As Nature *invariably* works by fixed laws,—there must be a certain proportion which the chloride, albuminate, and nitrate of silver should bear to each other, in order to produce the best results under the same conditions of light, &c., and above or below which proportions, we have no right to expect anything but deteriorated effects. We must readily concede that our knowledge of the exceedingly delicate and complicated actions and reactions which take place in positive printing, is not sufficiently advanced for us to state as a fact, what these proportions ought to be; and thus, we are necessarily compelled to proceed by guess, from not having, as yet, undertaken a series of well conducted experiments with the view of endeavouring to ascertain them.

* Page 494.

As tending *somewhat* to elucidate the intricate subject of "The Philosophy of Positive Printing upon Albumenized Paper," I have analysed the albumenizing formulæ of various photographers, and will now proceed to show the extremely diversified proportions of chloride, albuminate, and nitrate of silver which they offered. To prevent all misunderstanding, I may as well state, that when I use the word albumen, *without any prefix*, white of egg in its normal state is to be understood.

The tables which I shall append, show the percentage of salt to albumen; the proportion of dry albumen to one of the salting chloride; the quantity of *each* in grains which a sheet of paper will contain, after being albumenized and dried; the amount of chloride of silver, albuminate of silver, and free nitrate of silver produced by its being sensitized upon a 70 grain bath; and the quantity of nitrate of silver required to form the chloride and albuminate of silver. A cursory inspection, even of these tables, will, I fear, show such extraordinary diversity, as to fully warrant the sarcasm, that photographers but too generally work by "rule of thumb."

It will easily be understood, that in albumenizing paper, the *proportion* which the salting chloride bears to the dry albumen in the sheet, is not in any way affected by the *water* which is added for dilution, as it merely serves the purpose of causing the paper, when dried, to be surfaced with a greater or lesser proportion of dried chlorided albumen, according to the greater or lesser quantity of it which may be used.

With respect to the percentage of salting chloride to the albumen in the albumenizing moisture; Maxwell Lyte says,* "The proportion of salt added to albumen must not exceed two per cent." As he does not state *what* salt he means, the naming a percentage is of no use whatever; for the same percentage of different chlorides will yield more than double the amount of chlorine in one, to what it will do in another. In his own formula, he uses 5 grains each of chlorides of ammonium and barium to $\frac{3}{4}$ oz. of albumen. Estimating the two chlorides simply as 10 grains, we have $2\frac{7}{9}$ per cent.; estimating the ammonia as its equivalent of barium, we have these 10 grains equal to $16_{18}$ grains, which is $4\frac{53}{96}$ per cent.; estimating the barium as its equivalent of ammonium, we have these 10 grains equal to $7\frac{8}{41}$ grains, which is $1\frac{737}{738}$ per cent. When we bear in mind, that these varying percentages all yield *the same amount of chloride of silver*, we see the futility of naming a percentage without stating the chloride to be employed; and we have here a fair sample of the indefinite manner in which many photographers write what is intended for information, but which, when analysed, affords none at all.

As chloride of ammonium seems to be at present more generally used than any other salt, I have given Maxwell Lyte's percentage in its equivalent of ammonium; and the same whenever barium is used, but when sodium is employed I have given its own percentage.

In the first column of table No. 1, instead of the symbols of the chlorides, I have given So. for *chloride* of sodium, Am. for *chloride* of ammonium, and Ba. for *chloride* of barium; and when in any formula, barium is used, either alone or in conjunction with another chloride, the percentage is reckoned in the equivalent of that which is placed *within a bracket*; the same also when *any two* chlorides are employed.

I have taken as a basis for my calculations, the *maximum* number of minims which the Abbé Pujo states a sheet of paper will take up, viz., 135. For the quantity of salting chloride which surfaces the paper when dried, I have calculated the number of grains contained in the 135 minims, according to the more or less dilution of the albumenizing

* Vol. v. p. 159.

mixture. For the quantity of dry albumen, I have taken Stockhardt as an authority that white of egg leaves on evaporation only *one-eighth* of solid albumen, the rest being water; this being $12\frac{1}{2}$ per cent, and just midway between the statement of others, that good white of egg should yield on an average from 10 to 15 per cent. of dried albumen, is not likely to be far from the truth; therefore, after estimating the quantity of albumen contained in the 135 minims according to its dilution, I take $\frac{1}{8}$th of it for the quantity of dried albumen surfacing the sheet. The proportion of dried albumen to 1 of chloride, is estimated according to the quantity of it which each ounce of albumenizing *mixture* will produce, and the amount of chloride it contains, but when no more than just sufficient water is employed than will dissolve the salting chloride, I have considered the albumen to be *undiluted*.

With respect to table No. 2, which is headed "after sensitizing;" Mr. Spiller states* that a full sized sheet of albumenized paper ($17\frac{1}{2}$ by $22\frac{1}{2}$) abstracts from 48 to 50 grains of silver from a 70 grain bath; I have, therefore, estimated the quantity of nitrate of silver which the dry albumen and salting chloride in the sheet, require to form albuminate and chloride of silver, this, deducted from 50 grains, gives the quantity of free nitrate in the sheet. For estimating the amount of albuminate of silver, I have taken the atomic weight of pure albumen at 8206, and as the albuminate of silver is said to be a compound arising from a chemical combination of albumen with nitrate of silver, I have considered that they combine as elementary substances. If it be objected that 8206 is the atomic weight of *pure* albumen, whereas the dry albumen on the paper, has all the impurities which existed in the white of egg; I reply that for all practical photographic purposes, dry albumen may be considered as pure albumen; and moreover, those *impurities* as they are called, will, in all probability, but little affect the quantity of albuminate of silver which is formed, but rather tend to increase the quantity of chloride of silver; this, however, will be to such an infinitessimal extent, that it may safely be disregarded.

The parts of a grain are given in simple fractions, instead of decimals, as being generally better understood; besides, fractions give the *exact* fractional part, which decimals *seldom* do. I need scarcely, perhaps, state that the construction of these tables has involved much time and trouble.

The following are the various formulæ which I have analysed, and the sources from whence they have been obtained.

Nos. 1 and 2, "Dictionary of Photography," Photographic News, vol. iv. p. 260. "About half an ounce of water to an ounce of albumen will give a very good surface. To each measured ounce of the mixture, add from ten to fifteen grains of chloride of ammonium or chloride of sodium." I have taken the two extremes, No. 1 is ten grains, and No. 2 fifteen grains.

No. 3. Mr. Sutton, *Photographic Notes*, vol. vi. p. 236. Twelve grains of salt to every ounce of albumen, with only sufficient water to dissolve the salt. This is also the proportion in Mr. Fry's formula, Photographic News, vol. v. p. 411.

No. 4. Mr. J. C. Leake, junr., Photographic News, vol. iv. p. 245. "Albumen 15 ounces, water 5 ounces, chloride of ammonium, 300 grains."

No. 5. Mr. Charles A. Long, "Practical Photography," 4th edition, p. 66. Published by Bland and Co. Albumen 6 ounces, water 12 ounces, chloride of barium 270 grains.

No. 6. Mr. Maxwell Lyte, *British Journal Photographic Almanac*, 1862, p. 59. "Albumen $\frac{3}{4}$ths of an ounce, water $\frac{1}{4}$th of an ounce, chloride of ammonium 5 grains, and chloride of barium 5 grains."

No. 7. M. Alco, Photographic News, vol. iv. p. 101. "To every 100 parts of albumen, add 5 parts of a soluble chloride (that of ammonium is best), first dissolving it in as little water as possible."

* Vol. vi. p. 339.

No. 8. Mr. G. Wharton Simpson, "Photographic Teacher, 7th edition, p. 25: published by Squire and Co. Chloride of ammonium 20 grains, water 1 ounce, albumen 1 ounce. These are also the proportions in the formula of Mr. Hardwich, as given in his *last* edition of "Photographic Chemistry."

No. 9. Mr. Edwin Musgrove, Photographic News, vol. v. p. 532. "To each ounce of albumen, add 10 grains of chloride of ammonium or sodium, dissolved in a quarter of an ounce of water."

No. 10. Mr. Hardwich, "Photographic Chemistry," 2nd edition, p. 197. "Chloride of ammonium or pure chloride of sodium 15 grains, water 1 ounce; mix any number of ounces according to the above formula, and add a third part by measure of the whites of new laid eggs." In the following page, Mr. Hardwich proves himself to be *a very bad arithmetician*, by saying. "The solution made according to the directions will contain exactly *ten grains* of salt to the ounce."

No. 11. Mr. T. Cadby Ponting, "Photographic Difficulties," p. 88, published by Bland & Co. "Albumen 15 ounces, water 5 ounces, chloride of ammonium 120 grains."

The following have been kindly furnished me by Mr. G. Wharton Simpson.

No. 12. as being that of Mr. T. R. Williams, 3 parts albumen to 1 part water, with 10 grains of chloride of barium to each ounce of solution.

No. 13, as that of Mr. Hart, (Bourquin's albumenizer.) 7 grains of chloride of ammonium and 1 grain of chloride of sodium to each ounce of albumen.

No. 14, as that of M. Marion, $3\frac{1}{2}$ grains of chloride of ammonium, and $3\frac{1}{2}$ grains of chloride of sodium, to each ounce of albumen.

Without investigating the subject, most persons would be apt to imagine, that as albumen is a complex organic compound, and its atomic weight, therefore, necessarily high: the albuminate of silver must also be high in proportion to the chloride of silver in a sensitized sheet of paper, because the quantity of albumen largely exceeds that of the salting chloride in the albumenizing mixture; but such is not the fact, for the following reason: Taking 8·206 to be its atomic weight, the dried albumen, by conversion into albuminate of silver, is increased by the exceedingly small fraction $\frac{795}{4103}$, whilst the salting chloride, supposing it to be ammonium, by conversion into chloride of silver, is increased two-thirds more than two-fold.

The proportion in which a substance chemically combines with others, *is in inverse proportion to their atomic weights;* therefore, the atomic weight of pure albumen being 136 times and $\frac{21}{30}$ths *higher* than that of chloride of sodium; 151 times and $\frac{26}{27}$ths *higher* than that of chloride of ammonium; and 66 times and $\frac{88}{123}$rds *higher* than that of chloride of barium; any quantity of dried albumen will require 136 times and $\frac{23}{30}$ths *less* nitrate of silver to form albuminate of silver, than an equal quantity of chloride of sodium would require to form chloride of silver; 151 times and $\frac{26}{27}$ths *less* than an equal quantity of chloride of ammonium; and 66 times and $\frac{88}{123}$rds *less* than an equal quantity of chloride of barium. Thus the quantity of nitrate of silver required to form the albuminate of silver, is exceedingly small in proportion to that which is required to form the chloride of silver.

It must be distinctly understood, that I do not give the foregoing tables as affording *exact* estimates of quantities yielded by the formula I have analysed, as, independent of the uncertainty respecting the atomic weight of pure albumen, the more or less absorbtive power of the paper will affect the results; I merely give them for as near an approximation to the truth as the present state of our knowledge will allow us to obtain. However, it is perfectly immaterial whether the atomic weight I have chosen be correct or not, for, supposing it be very wide of the truth, it will only affect the proportions of each *individual* formula; but the disproportion existing between the *different* formulæ will not be affected in any way, as the same error (if error there be) will equally affect them all.

*Tabulated Statements of Results given by the Albumenizing Formulæ of Various Photographers, &c.*

By GEORGE PRICE.

No. 1.

| Names, &c. | Percentage of Salting Chloride in Albumen. | Proportion of Dry Albumen to one of Salting Chloride in Sheet. | Grains of Salting Chloride in Sheet. | Grains of Dry Albumen in Sheet. |
|---|---|---|---|---|
| No. 1. Dictionary 10 grs. Am. ... | $3\frac{1}{8}$ | 4 | $2\frac{13}{16}$ | $11\frac{1}{4}$ |
| „ 2. Ditto 15 grs. Am. ... | $4\frac{11}{16}$ | $2\frac{2}{3}$ | $4\frac{7}{32}$ | $11\frac{1}{4}$ |
| „ 3. Mr. Sutton, So. ... ... ... | $2\frac{1}{2}$ | 5 | $3\frac{3}{8}$ | $16\frac{7}{8}$ |
| „ 4. Mr. J. C. Leake, Jun., Am. | $4\frac{1}{6}$ | 3 | $4\frac{7}{32}$ | $12\frac{31}{32}$ |
| „ 5. Mr. C. A. Long, Ba. (Am.) | $4\frac{19}{164}$ | $3\frac{1}{27}$ | $1\frac{559}{656}$ | $5\frac{5}{8}$ |
| „ 6. Mr. M. Lyte, Am. Ba. (Am.) | $1\frac{737}{738}$ | $6\frac{15}{59}$ | $2\frac{31}{1312}$ | $12\frac{21}{32}$ |
| „ 7. M. Aleo, Am. ... ... ... | 5 | $2\frac{1}{2}$ | $6\frac{3}{4}$ | $16\frac{7}{8}$ |
| „ 8. Mr. G. W. Simpson, Am. ... | $4\frac{1}{6}$ | 3 | $2\frac{13}{16}$ | $8\frac{7}{16}$ |
| „ 9. Mr. E. Musgrove, Am. ... | $2\frac{1}{12}$ | 6 | $2\frac{1}{4}$ | $13\frac{1}{2}$ |
| „ 10. Mr. Hardwich, 2nd edit., Am. | $9\frac{3}{8}$ | $1\frac{1}{3}$ | $3\frac{21}{128}$ | $4\frac{7}{32}$ |
| „ 11. Mr. T. C. Ponting, Am. ... | $1\frac{2}{3}$ | $7\frac{1}{2}$ | $1\frac{11}{16}$ | $12\frac{21}{32}$ |
| „ 12. Mr. T. R. Williams, Ba. (Am.) | $1\frac{9}{41}$ | $10\frac{1}{4}$ | $1\frac{77}{328}$ | $12\frac{21}{32}$ |
| „ 13. Mr. Hart, Am. So. (Am.) ... | $1\frac{31}{48}$ | $7\frac{17}{79}$ | $2\frac{71}{320}$ | $16\frac{7}{8}$ |
| „ 14. M. Marion, Am. So. (Am.) | $1\frac{37}{96}$ | $9\frac{3}{133}$ | $1\frac{557}{610}$ | $16\frac{7}{8}$ |

No. 2.

After Sensitising.

| Names, &c. | Grains of Chloride of Silver in Sheet. | Grains of Albuminate of Silver in Sheet. | Grains of Free Nitrate of Silver in Sheet. | Grains of Nitrate of Silver required to form the Chloride of Siver in Sheet. | Grains of Nitrate of Silver required to form the Albuminate of Silver in Sheet. | Grains of Nitrate of Silver required to form the Chloride and Albuminate of Silver in Sheet. |
|---|---|---|---|---|---|---|
| No. 1. Dictionary, 10 grs., Am. ... | $7\frac{1}{2}$ | $11\frac{1982}{4103}$ | $40\frac{179765}{196944}$ | $8\frac{41}{48}$ | $0\frac{3825}{16412}$ | $9\frac{17179}{196944}$ |
| „ 2. Ditto, 15 grs., Am. ... | $11\frac{1}{4}$ | $11\frac{1982}{4103}$ | $36\frac{63769}{131296}$ | $13\frac{9}{32}$ | $0\frac{3825}{16412}$ | $13\frac{67527}{131296}$ |
| „ 3. Mr. Sutton, So. ... ... ... | $8\frac{1}{10}$ | $17\frac{1843}{8206}$ | $40\frac{5771}{65618}$ | $9\frac{9}{16}$ | $0\frac{11475}{32824}$ | $9\frac{39877}{65618}$ |
| „ 4. Mr. J. C. Leake, Jun., Am. | $11\frac{1}{4}$ | $12\frac{30147}{32828}$ | $36\frac{7193}{16412}$ | $13\frac{9}{32}$ | $0\frac{34425}{131296}$ | $13\frac{8919}{16412}$ |
| „ 5. Mr. C. A. Long, Ba. (Am.) | $4\frac{77}{82}$ | $5\frac{6085}{8206}$ | $44\frac{141783}{2691568}$ | $5\frac{515}{656}$ | $0\frac{3825}{32824}$ | $5\frac{2549785}{2691568}$ |
| „ 6. Mr. M. Lyte, Am. Ba. (Am.) | $5\frac{65}{164}$ | $12\frac{30147}{32824}$ | $43\frac{741107}{2018676}$ | $6\frac{1459}{3936}$ | $0\frac{34425}{131296}$ | $6\frac{1277569}{2018676}$ |
| „ 7. M. Aleo, Am. ... ... ... | 18 | $17\frac{1843}{8206}$ | $28\frac{13143}{32824}$ | $21\frac{1}{4}$ | $0\frac{11475}{32821}$ | $21\frac{19681}{32821}$ |
| „ 8. Mr. G. W. Simpson, Am. ... | $7\frac{1}{2}$ | $8\frac{10049}{16412}$ | $40\frac{23905}{24618}$ | $8\frac{11}{48}$ | $0\frac{11475}{65648}$ | $9\frac{713}{24618}$ |
| „ 9. Mr. E. Mugsrove, Am. ... | 6 | $13\frac{3199}{4103}$ | $42\frac{31863}{49236}$ | $7\frac{1}{12}$ | $0\frac{2295}{8206}$ | $7\frac{17873}{49236}$ |
| „ 10. Mr. Hardwich, 2nd edit., Am. | $8\frac{7}{16}$ | $4\frac{10049}{32824}$ | $39\frac{499799}{525181}$ | $9\frac{123}{128}$ | $0\frac{11475}{131296}$ | $10\frac{25385}{525184}$ |
| „ 11. Mr. T. C. Ponting, Am. ... | $4\frac{1}{2}$ | $12\frac{30147}{32824}$ | $44\frac{55811}{131296}$ | $5\frac{5}{16}$ | $0\frac{34425}{131296}$ | $5\frac{75455}{131296}$ |
| „ 12. Mr. T. R. Williams, Ba. (Am.) | $3\frac{12}{41}$ | $12\frac{30117}{32821}$ | $45\frac{123661609}{145311672}$ | $3\frac{7855}{8856}$ | $0\frac{34425}{131296}$ | $4\frac{21680063}{115311672}$ |
| „ 13. Mr. Hart, Am. So. (Am.) ... | $5\frac{37}{40}$ | $17\frac{1843}{8256}$ | $42\frac{766479}{912776}$ | $6\frac{191}{192}$ | $0\frac{11475}{32824}$ | $7\frac{146297}{912776}$ |
| „ 14. M. Marion, Am. So. (Am.) | $4\frac{79}{80}$ | $17\frac{1843}{8206}$ | $43\frac{1201181}{1575552}$ | $5\frac{311}{381}$ | $0\frac{11475}{32824}$ | $6\frac{374371}{1575552}$ |

Dr. Löwig says,—"With the proteine substances, it is as yet clearly impossible to determine even an empirical formula with but an approximation to exactness, not alone from the difficulty of obtaining them in a pure form, but also on account of the want of positive compounds of the same, and because of the ease with which they decompose.

From the analytical results presented, the most different formulæ may be calculated with equal probability. In the present state of our knowledge in respect to these bodies, we must abandon every formula by which their atomic constitution is said to be expressed."

If this be true (which I have not the least doubt of), the quantity of albuminate of silver, which is formed by using any particular albumenizing mixture, can only be ascertained by delicate and careful experiment as to the combining power of dried albumen and nitrate of silver.

As an inspection of the tables I have given suggests many important questions, I must defer their consideration to a future time.

## NEW METHOD OF PRINTING.

BY H. COOPER, JUNR.*

Though I hope the time is not far distant when resinized paper will take the place of albumenized, yet there is a good deal to be done in the former process before it can accomplish the wished-for result. I have the honour to lay before you this evening a few specimens of my progress; and if you will kindly listen for a few minutes, I should like to make a few remarks on the different methods I have employed, and on the disadvantages and drawbacks at present existing in the process, as I think that it is a better way to remove them, than to forget the faults, and point out the beauties. A good many faults arise, not exactly from careless manipulation, but from a want of knowledge of the peculiar requirements of the process. For after having gained a little skill in the processes we employ, we are apt to wonder why we cannot succeed all at once with a new one; forgetting, for the moment, all the difficulties and disappointments we met with in that which now appears so easy. For instance, after I had printed some dozens upon resinized paper, I lost numbers by not printing deeply enough. And what is more vexing, after a hard day's printing, and that to all appearances successful, than to see all the batch becoming gradually faint in the toning bath, without a hope of preventing it? The prints should be left in the printing frame till a good part is quite green with bronzing; and even if the lights become faintly tinted, it will be of no consequence, as they will become quite white again in the toning. Many will say, "But that is a great disadvantage; look at the time a print takes to get bronzed like that, why I shall only be able to print one half the number from the same negative!" But you must not forget that the resinized paper is very sensitive to light, and that as many prints may be produced upon it in the day, as upon albumenized paper. I have received many enquiries whether the bath should be acid, neutral, or alkaline. I recommend a strong bath very slightly acid with nitric acid, hardly sufficient to be detected by litmus paper. My reason for this is, that a very unstable salt is formed in the paper, which causes it to decompose very quickly, and the more alkaline the bath, the sooner the paper becomes spoilt. In very warm weather, the paper should be sensitized and fixed within twelve hours; but if it be very cold, twenty-four hours may elapse. I have also received complaints from several, that they have not been able to get warm tones. Sensitizing on an alkaline bath is very apt to render the prints cold, as well as to decompose the paper. The use of a new toning bath is also conducive to blueness. I find that a bath prepared as I recommended in the first instance—acetate of soda and chloride of gold made at least twenty-four hours before using—is the best to obtain rich warm tints. The prints prepared with chloride of cadmium seem much poorer than those prepared with a more soluble chloride such as calcium or magnesium. On this account, 10 grains is about the quantity of chloride of cadmium soluble in alcohol of 8·35°; this is equal to a much less quantity of chloride of sodium, as the chloride of cadmium has a much higher equivalent of its base than sodium. Being moreover locked up in a resin it does not, in my opinion, form as much chloride of silver as it would if it were employed in albumenized paper; by increasing the quantity of chloride of silver in the paper, the prints become much more vigorous. To effect this, I have employed the chloride of calcium and magnesium, which, as I have just remarked, are more soluble in alcohol. There is another advantage over cadmium in the two mentioned chlorides, they are very soluble in water, so that any that remains in the paper undecomposed is easily removed. The prints before you marked calcium and magnesium, contain 15 grains to the ounce. Some of the specimens, as you will see, are salted only on one side. I thought of this method when I was endeavouring to get more vigorous prints; but since using chloride of calcium I have discarded it, as it is much more trouble than the formula I gave at first; but as you may like to know the details, I will shortly run over them. The paper, to begin with, is immersed in a solution of frankincense and mastic, made according to directions given in The Photographic News for October 3rd. with the exception of the chloride, which must be omitted. When the paper is quite dry, float for two minutes or more upon a 15-grain solution of chloride of sodium. Float on the nitrate bath for three to five minutes. After the prints are finished they should be immersed, before mounting, in the resin solution that was used in the first preparation, to thoroughly encase all the particles forming the image. I would recommend that all prints on resinized paper should be immersed in a weak alcoholic solution of mastic. This does not give the prints a varnished appearance; but they will glaze much finer in the rolling. I have found an application of enamel to the prints, after they are mounted and rolled, is very efficacious in giving depth and transparency to the shadows; but it has also a disadvantage of causing the prints to assume a highly glossy appearance, which is highly inartistic and very like albumenized paper; it also slightly injures the whites. The want of transparency and brilliancy is one of the points I would call your attention to in the resinized paper. Another is the peculiar granular appearance of the prints after rolling, particularly *papier Saxe*. The cause of this is obvious—the uneven thickness of the paper. The resin is, as it were, in little hills, and when the paper is passed between the rollers, the tops of them get crushed down and polished, leaving the valleys untouched. With a thin sample of *papier Rive*, that I had some little time back, it was hardly perceptible. From the pieces of prepared paper now before you, you will perceive that *papier Saxe* possesses the granular appearance in the first instance; this also is caused by the uneven texture of the paper. The flat appearance of some of the specimens is owing to the want of depth in the shadows to which I have called your attention. To better show the failings of the process, I have brought a few prints on albumenized paper from the same negatives. As regards printing by development, about which I was very sanguine at first, I have not been able to get on at all well, the proofs being very motley. I have not had much time to devote to this branch of the process, but I hope, during the next few weeks, to resume my experiments in this direction. One fact with regard to it worth mentioning is, that the paper when prepared with a chloride, and a small quantity of a neutral citrate, receives the actinic impression very rapidly, so that it has to be exposed a much less time, than is usually requisite for this method of printing. Only the faintest trace of an image should be visible. I bring two proofs which have been the most successful at present. After removal from the pressure frame they were soaked for one hour in distilled water, and then developed in the following. Saturated solution of gallic acid one ounce, distilled water half ounce, acetic acid 5 drops, and 10 drops of a 30-grain solution of nitrate of silver. They were then toned and fixed in the usual baths. You will not be astonished at the stains on the back, when you hear that upon

* Read at a meeting of the North London Photographic Association, on October 22nd.

removal from the hypo-bath they were placed in a dish of water, separate from the other prints, and, being forgotten, left there for five days. All the specimens are *absolutely untouched*, with the exception of one which is marked. As I could not well understand from writing, how Mr. Harmer produced his prints, I have brought some of the masks used in printing the fancy ones now before you.

I have now only one or two cautions to add. 1. Let the solution of resin for the first preparation of the paper be perfectly clear and bright before using. 2. Whilst preparing the paper, be careful that there are no particles of dust or other matter flying about in the room. 3. Use a strong nitrate bath, and after having sensitized one piece of paper, agitate it before placing another upon it. If this be omitted, the bath will become turbid, for the reasons mentioned by Mr. Lyte. The nitrate of the base of the chloride in the paper will remain upon the surface of the bath, and dissolve out the chloride before it is decomposed. 4. Dry the paper by artificial heat as quickly as possible to prevent the free nitrate, which is so essential to the production of brilliant prints, sinking into the paper. Of course a quarter of an hour or so must elapse before placing it in the printing frame. 5. After printing wash very rapidly, and then soak before toning. 6. Only use the hypo bath for one day, as a curious compound appears to be formed in it, which rapidly eliminates the sulphur. Although I only use my hyposulphite once, I do not waste it; as it is used, I throw it into a large jar, and when sufficient quantity is obtained, I evaporate it down to saturation. I then add a little acetic acid, allow it to stand for twenty-four hours, filter it and employ it for my negatives; I dare say this will appear a great deal of trouble, but I do not find it so in practice. My last caution is, wash the proofs after fixing quickly; the whites will be kept much purer by it. I do not think I have anything else to mention, and I hope that in what I have said I have not proved tedious. But should any questions occur to you, I shall be very happy to give you any information in my power.

## NEW METHOD OF PREPARING IODIDE OF CADMIUM.

BY DR. MONKHOVEN.

Iodide of cadmium is usually prepared by putting into a glass retort, placed on a sand bath, a mixture of water, iodine, and metallic cadmium, at a temperature of 122° Fah. When the liquid becomes colourless, it is a solution of iodide of cadmium, which is next evaporated to crystallization.

The purity of the metal cadmium varies with the source from which it is taken; It is frequently contaminated with copper, zinc, and lead. Frequently iodine is also impure; it often contains chlorine, but in so small a quantity, that the iodide shows scarcely any traces of it. If the iodine be obtained by precipitation, it contains iodides, bromides, and chlorides of potassium, sodium, and magnesium. Iodine is much purer when sublimed, still it always contains a little iron which communicates a light yellow tint to the iodide of cadmium. We know that there are two methods of preparing iodine; the one consists in precipitating it from iodide of potassium by means of chlorine: the other consists in preparing it by sublimation on heating a mixture of iodide of potassium, peroxide of manganese and sulphuric acid.

In commerce, *iodide of potassium is cheaper than the iodine it contains*. It is upon this fact, and upon the ordinary impurities of cadmium, that we have been led to consider another method of preparing this iodide, which possesses the advantage of yielding a very pure iodide of cadmium at a lower price than now obtainable. The method to be followed, is as follows, carefully adopting the proportions given :—

Into a large porcelain retort placed on a sand bath, put 5 parts of water and 1 of sulphuric acid, then throw in the granulated cadmium.

The granulated metal is obtained by heating to a dull red heat a clay crucible, into which one or more ingots of cadmium are placed: care must be taken not to carry the heat too high, else the cadmium will be burned. The crucible is removed with tongs from the fire, and the melted metal poured from a height into a vessel of water: it is thus divided into grains which offer an extended surface to the action of acids. The action of the acid upon the cadmium is very feeble, but if heated, the cadmium is rapidly dissolved. When no more hydrogen gas is disengaged, the liquid is left in contact with the metal several days: the metals less oxidisable than the cadmium, especially the copper, are precipitated. Copper is often found with cadmium: it gives a reddish colour to the iodide, but only when it is completely dry.

Crystals are frequently deposited as the liquid cools; but of these we need take no notice.

If the cadmium be pure, or at least if the solution be colourless, and not bluish, the liquid is filtered while warm, and evaporated in a porcelain capsule.

Upon cooling, white crystals of sulphate of cadmium are formed, whose formula is $CdO, SO^3, 4 HO$. They are put into a funnel, well drained, and dried upon a porous stone covered with a sheet of bibulous paper. To the mother-liquor we add one fourth of its weight, or one seventh of its volume of fresh sulphuric acid, and proceed as before.

On the other hand, we may buy iodide of potassium from the large manufacturers of iodine. This iodide is sufficiently pure; it only contains a little chloride; in 1000 parts of iodide of potassium, about 5 parts of chloride, and 10 of iodide of sodium and of magnesium. These products do not materially alter the purity of the iodide obtained by our new method, and are in so small a quantity, that the iodide of cadmium obtained is as pure, or more so, than that prepared by the old method.

The atomic weight of the two substances is, iodide of potassium, 166·20. Sulphate of cadmium, 116.

$$\begin{array}{rcl} K & = & 39{\cdot}20 \\ I & = & 127{\cdot}00 \\ \hline & & 166{\cdot}20 \end{array} \qquad\qquad \begin{array}{rcl} Cd & = & 56 \\ O^3 & = & 40 \\ S & = & 16 \\ 4\,HO & = & 4 \\ \hline & & 166 \end{array}$$

The relation between 166 and 116, or more simply 83 and 58, enables us to recognise the quantities to be employed in preparing iodide of cadmium.

To this end take 116 parts of dry sulphate of cadmium, and dissolve it in as little boiling water as possible. Then dissolve 116 parts of iodide of potassium in their weight of warm water, and mix the liquids together. A *crystalline* precipitate of sulphate of potassa is immediately formed. (If cold solutions are employed, this precipitate will be pulverulent, and much more difficult to wash.) The mixture is left standing one night; abundant crystal of sulphate of potassa will be found attached to the sides of the vessel. In collecting the liquid, reverse the vessel, allow it to drain, and wash the crystals with a little cold water, to remove the last traces of iodide.

It may be perceived that the reaction is based upon the great solubility of iodide of cadmium, and the insolubility of sulphate of potassa. We have, however, in the liquid, a small quantity of sulphate of potassa, which must be removed; not that this salt can injure the collodion in the least degree, *for it is completely insoluble*, but we must render the product saleable.

To this end the liquid is evaporated to dryness in a flat capsule placed in a stove; the white substance is scraped up with a plate of glass, removed, and placed in a glass receiver. Upon 100 parts of this substance dried, pour 300 parts of ordinary alcohol, boiling; and after shaking it a few minutes to facilitate solution, filter it. Upon cooling, the iodide of cadmium is deposited pure in a crystalline state.

The alcohol is decanted and heated, and will serve for new preparations upon the addition of a little fresh alcohol. In a word, persons familiar with chemistry, will see that the operation is continuous, and that it may be practised, economically, on a large scale.

From 166 parts of iodide of potassium employed we obtain :

$$\begin{aligned} Cd &= 56 \\ I &= 127 \\ \hline &183 \text{ parts of iodide of cadmium.} \end{aligned}$$

We recommend those persons who make this preparation for their own use, to make use of the liquid dried in the stove, but not treated with alcohol. The quantity of sulphate of potassa which is thus mixed with the iodide of cadmium is so small, that it may be neglected in formulæ; and, moreover, the sulphate of potassa is completely insoluble in the liquid of which collodion consists.

The purest cadmium is that of the Vielle Montagne (Belgium). That from Silesia frequently contains copper. The price, in quantities, is 3s. to 4s. per pound; by retail that price is doubled. The price of iodide of potassium varies from 8s. to 9s. per pound. The price of cadmium is about 8s. or 9s. per pound. These prices are much higher when sublimed iodide is employed. When iodide of cadmium is prepared with precipitated iodine, it is always yellow, and contains many impurities.

Bromide of cadmium may be prepared in the same manner; but the old method is preferable, because bromine separates much more readily. We must, however, not omit to observe that bromine as now prepared, almost always, contains much chloride, in the shape of chloride of bromine, a substance which so much resembles bromine, that a chemical analysis is required to detect it. In such case the bromide of cadmium necessarily contains much chloride; but this chloride, somewhat less soluble in alcohol and ether than the bromide, separates at the expiration of a few days.—*Le Moniteur de la Photographie.*

## Proceedings of Societies.

### North London Photographic Association.

The usual monthly meeting of this Association was held on the evening of Wednesday, the 22nd, inst. at Myddelton Hall, Islington, Mr. G. Shadbolt in the chair.

After the usual routine proceedings, the following gentlemen were elected members of the society: Messrs Paigetor, Fisk, Layte, and Whiting.

Mr. G. Dawson then read a paper on the causes of fading in photographs. The chief cause he held to be the action of sulphur, and recommended the very careful washing of prints, and final immersion in salt and water, before toning and fixing, so as to eliminate every trace of free nitrate, because either that salt, or carbonate, or acetate of silver, would decompose the hyposulphite and set up sulphur action. He also endorsed the announcement which recently appeared in our pages, to the effect that silver was to be found in the whites of all albumenized prints, no matter how they had been treated, but expressed a conviction that the compound existing was insensitive to light, and that as yet it was not proved to exercise any detrimental influence on the permanency of the picture.

A conversational discussion followed in reference to the prints which had faded in the International Exhibition; the haste with which many of them had necessarily been prepared being alleged as one of the causes of fading, while such a cause was entirely disallowed by other members.

Mr. Hill said he had been troubled lately with a brown stain frequently occurring at the back of his prints for which he could not assign a cause.

Various suggestions were offered as to the probable cause, such as the use of dirty clips, the action of bits of bibulous paper when placed to assist in drying the excited sheet, touching with fingers which had come in contact with hypo. Mr. Hill did not think that any of the suggestions met his case.

Mr. Seeley asked if maintaining the hypo fixing bath in a decidedly alkaline condition, would not prevent the generation of acid from free nitrate, &c.

Mr. Dawson said that if nitrate, acetate, or carbonate of silver were introduced into the hypo bath, no matter whether it were alkaline or not, decomposition would ensue, and sulphur be liberated. He recommended that all free silver should be at once converted into chloride before toning. It was not important how much salt were used, if care were taken to have plenty.

After some further conversation on the subject, in which the Chairman, Mr, Dawson, Mr. Simpson, Mr. Hill, and Mr. Seeley took part,

The Chairman referred to the allusion made by Mr. Dawson to Mr. Spiller's recent statement in our columns, to the effect that the whites of fixed albumenized prints contained silver, and stated that he (the Chairman) had since corroborated, by experiment, the statement.

Mr. G. Wharton Simpson said, in reference to Mr. Dawson's statement, that the compound of silver and albumen thus left in fixed prints, was not acted upon by light, that he thought the non-sensitiveness was not satisfactorily ascertained. He had recently had an opportunity of examining a number of vignetted albumenized prints, which presented a large surface of white. That part of the whites which had been submitted to the action of strong light, was slightly discoloured, having something of a yellow or creamy tint, without, however, any signs of fading. The portions of the same prints which had been protected by a mount or passe-partout, remained perfectly white. He thought it was probable that this change of colour was, probably, due to the action of light on the trace of a silver compound left in the print.

Mr. Dawson said it was possible that the continued action of a strong light might affect the compound. He had only tried it in a test tube, and with a short exposure.

The Chairman referred to the fact that in some thick plain papers, especially when sized with animal size, he had, on applying the hydrosulphate of ammonia test, found traces of silver.

After some further conversation on the subject,

Mr. H. Cooper, jun., read a communication on "Resinized Paper" (see p. 524). At the conclusion of the paper he exhibited a number of very fine prints, the results of different experiments. Some of these were fine specimens of the effect to be obtained by double printing, and Mr. Cooper gave some explanations of his method of proceeding to produce the various effects. (A paper on the subject, by Mr. Cooper, will appear in our next.)

Mr. Dawson asked if the use of resin gave a better tone than Iceland moss, or Irish moss. Some of the finest tones he had ever seen were produced by these additions to the salting bath.

Mr. Cooper said the resin gave a better tone, and one which he preferred, and it gave more vigour. The prints now exhibited were, many of them, experimental prints, and by no means examples of the best possible results.

The Chairman thought there was not sufficient brilliancy to render it likely that albumenized paper would be superseded.

Mr. Cooper thought that for large prints it might be.

Mr. Hill thought for some subjects the effect was better.

A discussion then followed on the tendency of resins to become yellow.

The Chairman believed that all resins had this tendency.

Mr. Cooper said the specimen of frankincense he had used was perfectly white, and it had been five years in the hands of the retailer. How much longer it had been in wholesale hands he could not say.

Mr. Martin believed that all resins on exposure oxidized and turned yellow.

In answer to a question

Mr. Ross stated that Canada balsam, exposed in a bottle to the sun bleached and became whiter.

Mr. Martin said that, in that case, it was protected from oxidation.

Mr. Dawson said he was afraid that oxidation was a convenient term often applied to effects of the real nature of which we knew nothing.

After some further conversation on the subject,

Mr. Seeley said that he had recently been informed that in the photographic department of the South Kensington Museum they were only using a 30-grain silver bath for printing, and using, at the same time, a paper less freely salted.

Mr. Simpson said the plan had often been proposed and often tried, and, under some circumstances, and with some negatives, it doubtless answered; but as the general experience of photographers it had been found desirable to adhere to the use of stronger baths.

The Chairman said he did not put much faith in anything coming from South Kensington.

Some prints by Messrs. Hill, Fenn, Seeley, and others, and a copy of Col. James's new work on "Photozincography," by Mr. Simpson were then exhibited, and after votes of thanks to Mr. Dawson and Mr. Seeley, the proceedings terminated.

A paper on "Washed Collodion," by Mr. Hislop, was promised for next meeting.

## Correspondence.

### PHOTOLITHOGRAPHY IN VICTORIA.

Sir,—In your journal of Friday last I find an anonymous communication casting a doubt on my originality as inventor of the photolithographic process which bears my name. Had this letter been published in Melbourne, it would be quite unnecessary for me to reply, but under present circumstances I may venture to make a few short statements which will serve to show that your correspondent is in error, and but very partially acquainted with the facts about which he writes.

The only statement of importance contained in "Melbourne's" letter, is one to the effect that I obtained the first idea of my process from M. Asser of Amsterdam. If this were so it would matter very little, for both Col. Sir H. James's method and mine differ quite sufficiently from M. Asser's to entitle them to be regarded as distinct and new. Such, however, was not the case. M. Asser's process was not published in England until some time in December 1859, that is, more than three months after mine had been in active operation at the Survey Office, Melbourne. The notice of it to which reference is made by "Melbourne," appeared in your journal in May 1859, and consisted of the bare statement that M. Asser exhibited certain positives transported to stone in lithographic ink, adding, at the same time, that the specimens were far from perfect. This notice, such as it is, might have come to Melbourne about the period when I began photolithography, but not only did I neither see nor hear of it then, but I have never seen it yet, every exertion of mine while in Melbourne to obtain that copy of the "News" having proved unsuccessful.

At the time I speak of, the "News" was a journal but little known in Melbourne, and I never heard of any person possessing the number in question but Mr. Perry, from whose printed evidence alone I obtained the first knowledge of this early notice of M. Asser's experiments.

The fact is Asser's process was not known or talked of in Melbourne for months after mine had been introduced, and it was assumed by those who thought it right to oppose me, that I had imitated M. Poitevin of Paris, Mr. Perry himself supplying the information which he imagined would be conclusive for that purpose. It was about six months after the date of my patent that the December number of the "News" reached Melbourne, and it was then that attention was directed towards it for the first time.

Be that as it may, the paragraph in question was laid before the Photolithographic Board appointed by Government, as well as before another tribunal to which I shall presently refer, and supported by all the arguments which a strong feeling of opposition to me could suggest, notwithstanding which the Report was distinct in pronouncing my originality.

"Melbourne" informs you that Mr. Perry called a public meeting of photographers and others. He founded the Photographic Society of Victoria; became its president; set forth, in a lengthy statement, the evil I had done, and received power at that meeting to act for them, and to resist and expose, as he might think fit, my claims as an inventor. This was actually the fact (and I am sorry to say, that it is almost the only statement in "Melbourne's" letter, respecting which he and I do not differ); but what subsequently took place he has not told, and this information it is incumbent on me to supply.

Before I joined the society, notice was given, and a motion carried at the next meeting, in virtue of which a committee of seven members, elected by *ballot*, was appointed to enquire into my claims to originality, the utility of my process, &c. Pending the enquiry undertaken by these gentlemen, a motion, of which notice had been duly given, was carried at an ordinary meeting, to the effect that Mr. Perry's address, referred to by "Melbourne," as having been delivered at the formation of the society, should be cancelled and expunged from the minutes (upon which it had been entered verbatim), as unbecoming and personal.

Finally, after about six months' work, the committee brought up their report, having examined every witness who had, or thought he had, any information calculated to throw light upon the subject of their labours. Their *unanimous* decision was, that my process was *perfectly original, and superior to any other then known.* At a very full meeting of the society, this report was adopted without a dissentient voice, the president, who was in the chair, having the good sense to remain silent on that occasion, and a copy of it was ordered to be sent to the leading journals, in which it appeared, more or less fully, on the following morning (4th of June, 1861).

I shall abstain from disproving other erroneous insinuations to be found in "Melbourne's" letter, not from want of the material or the power to do so, but because I believe that enough has been said, and that to go into the subject at greater length would involve explanations of a nature hardly interesting to the readers of your Journal.—I am, Sir, yours obediently,

J. W. Osborne.

28, *Lorrimore Square, Kennington Park, S.*, 27 *Oct.*, 1862.

[We shall have a few observations on this subject in our next.—Ed.]

## Photographic Notes and Queries.

### Clouds in Landscapes.

Dear Sir,—Can you inform me of a good illustrated work on clouds? Artistic photographers have, we know, been long dissatisfied with universally white skies in landscapes. Now, their desire to increase artistic effect, has produced an *attempt* at something better than a mere shaded sky, and though the results are, with few exceptions, any thing but satisfactory, they indicate a growing ambition for something better, which should be encouraged. Our exhibitions show how imperfect and unsatisfactory are the various mechanical dodges for putting in skies. Good effects may be obtained where the sky in the negative is transparent enough to print through, which is now the rule instead of the exception, by printing clouds upon it.

But to render such effects truthfully, and in harmony with the rest of the picture, the eye and hand of the painter are required, and even that is insufficient unless the painter be also a photographer, or at least accustomed to study negatives with a view to their printing capacities.

My impression, is that it would be a great inducement to amateurs to practise their hands at putting in these aërial touches, if they had some good examples of clouds to study from, drawn, or what would be better, photographed from nature.

I imagine a series of sky and cloud studies, taken during the photographic hours, showing their characteristic forms, more common combinations, with the disposition of light and shade upon them, as seen by the eye of the camera, though too often obliterated on the plate, could be obtained of a moderate size, say with Dallmeyer's small triplet, by many of our photographers, those living by the sea-side having the advantage as regards site, in the course of twelve months.

I am persuaded, moreover, that there are some amongst us who could make such a work of very general interest, by adding valuable information, artistic and meteorological, to the illustrations; and even render it remunerative in a commercial point of view, if that were a consideration.

In hopes that these, not altogether disinterested suggestions, may be supported by others feeling the same want, I beg the favour of your publishing this letter, and remain, yours truly,

G. S. Penny.

*Cheltenham, October 25th*, 1862.

[We do not at this moment remember any work solely devoted to clouds. There are some excellent hints on the subject, with illustrations, in a little work on marine painting, by Carmichael, published by Winsor and Newton, a little work which will well repay perusal. We should strongly recommend, however, photographers to make their own cloud studies.

There are many occasions when magnificent studies of clouds might be obtained by almost every operator, even when nothing else could be secured. A good work on clouds, well illustrated with photographs, would be one of the most interesting and valuable which could be produced.—Ed.]

### Carbonate of Soda in the Toning Bath.

Dear Sir,—Not long ago you stated that having admired the productions of a certain gentleman, whose name I have forgotten, you solicited his formula, which he complied with; the toning bath was carbonate of soda. I had never tried this, but then made up one, and to my taste the result was far preferable to acetate. Judge then to my surprise on reading the account of the South London Society's meeting the following sentence of Mr. Leake's: "As to the use of carbonate of soda in the toning bath, he believed it to be the worst thing which could be used."

I have enclosed a few cartes toned by carbonate; what is your opinion of them? if the colour is not good, I will leave it off; but it is what my connection prefer; if, therefore, it is injurious, I should feel glad if you will state in what particular, that I may be on my guard. There are numbers of photographers who have gone back to carbonate, and who are no doubt surprised at Mr. Leake's opinion. I am not aware if the latter gentleman is an amateur or a professional photographer; but it is to the former the latter are indebted for very valuable information; to the professional photographer, whose business requires the aid of several assistants, certain formulæ are absolutely necessary; and when he has one he likes and pleases others also, how vexatious to hear others whom he relies upon, so conflicting in their opinions! I should, therefore, feel obliged if any of your numerous readers will state, whether they have found carbonate decidedly injurious in the toning bath.

Hoping you will excuse the liberty of requesting space for this, I am, dear sir, yours truly, E. T. Brooks.

*Newbury, October* 18th, 1862.

[Nothing could be better or more brilliant than the tone of the prints received.—Ed.]

### Photogenic Properties of Walnut Rind.

Sir,—Having discovered that the extract of the outside, or green shell, of walnuts has some of the properties of nitrate of silver, and having no convenience of testing it further, I now leave it to your numerous readers to bring it into some use in photography. If you think this communication worth your notice, you will oblige yours truly, J. W. H., *Herbalist*.

*Canterbury, October* 11, 1862.

P.S. If a piece of plain paper is placed in the extracts, in the dark room, it will not change its appearance until exposed to the light, when it will turn the paper quite as dark as the nitrate of silver solution.

[That the juices of walnuts and various other fruits and vegetables are darkened by light is well known; but this property has not been utilized hitherto.—Ed.]

## Talk in the Studio.

Silvery White Positives.—The following solution for developing positives, was given by Mr. Dawson at a recent North London meeting, with the statement that it gave glass positives of exquisite silvery whiteness. Three ounces of protosulphate of iron dissolved in one pint of water; to this was added three ounces of a saturated solution of gallic acid, and then nitric acid was added drop by drop until the solution was clear. It might be placed in a dipping bath and used over and over again.

Photographic Society.—The first meeting of the London Photographic Society for the winter session. will be held at King's College on Tuesday evening next at 8 o'clock.

Coloured Portraiture.—The rage for card portraiture, which at one time threatened to drive all other phases of photography out of the market, has not quite ruined the colourists, the majority of whom, are, we believe very busy. We had recently submitted to our notice some very good colouring in oil, by Messrs. Sawyer and Co. of Newcastle-on-Tyne, in which the photography and painting were alike excellent.

## To Correspondents.

*** Agents or subscribers having copies of the following numbers of the present volume, which they can spare, will confer a favour by forwarding them to the office, where they will be exchanged or bought at full price: Nos. 174, 187, and 196 to 203.

W. D.—The sample of resin received is jalap resin, but, not *purified* jalap resin. By passing an alcoholic solution of the resin sent through animal charcoal, you will deprive it of its colouring matter, consisting of one-tenth of its weight. The purified resin of jalap, or the jalapine of the pharmacopœia, is nearly colourless, very hard; but slightly hygrometric; that is, when powdered the (common form in which it is kept) it absorbs damp, and sticks together in clots, a circumstance which would appear to militate somewhat against its suitability for a negative varnish. The testimony of an able photographer and good chemist like Maxwell Lyte, to the effect that it is good, renders it well worthy of a trial. We fear that it will be too expensive for common use. Jalap is at the present time worth six shillings a pound, and it only contains one-seventh of resin, and this loses in one-tenth in purifying, so that the purified resin will cost six or seven shillings an ounce. This price need not, however, be a barrier to its use for negatives, should it prove really valuable for the purpose, as one ounce of the resin will probably serve for ten or twelve ounces of varnish.

A New Subscriber.—The best distinct work on the Talbotype process was that of Mr. Sutton, which is now out of print. Some of the best articles on the subject to which we can refer you, will be found in our first volume, especially on pp. 38 and 51, in Nos. 4 and 5; an excellent article on the subject by Dr. Diamond, who is a most skilful calotypist, appears in the first volume of the *Photographic Journal*. Turner's paper is generally preferred. Either floating or spreading with a glass rod may be used; the latter is preferred by many. Some spread the solutions with a Buckle's brush.

R. H.—We believe you will have reason to be satisfied with the action of a battery of 60 double plates of carbonized iron and zinc, arranged in three or more troughs in the same manner as the Cruikshank's battery of copper and zinc. The plates may be about 5 by 8 inches, those of zinc being about twice the thickness of the iron plates, and soldered to the latter. The existing fluid is a saturated solution of salt with one-third of sulphuric acid. The distance between the compound plates is about half-an-inch. It is preferable to amalgamate with mercury the zinc side of the compound plate, to reduce the consumption of metal.

R. F., Kennington.—Many of the matts and preservers used for photographs are imported from America. Those of English make are manufactured in Birmingham.

J. C. J.—It is probable that the clearing up process used by Mr. Osborne will not be so applicable to dry plates as to wet ones, but you may easily try on a plate of small importance. If your negatives are already intensified, but not sufficiently so, you may obtain a great accession of density by applying a solution of iodine and iodide of potassium, and then, after washing, apply pyro and silver; or by simply applying a solution of bichloride of mercury, followed by hydro-sulphate of ammonia. The latter is the method used in the Ordnance Map Office at Southampton, and it is always applied after the plates have been dried.

J. C. Wilson.—One thickness of yellow calico will not be sufficient to keep out actinic rays. The colourless sheet glass has rarely a surface sufficiently perfect to enable good collodion positives to be taken thereon.

James Ramage.—It is unnecessary to discuss the differences, or identity, between photolithography and photozincography; the inventors of the respective processes known by these names regard them as similar, but not the same; but anyone is, of course, at liberty to regard them as the same. Mr. Fox Talbot at one time tried to prove that the collodion process and calotype process were the same. They both consist of a film made from vegetable fibre, as a vehicle for iodide of silver, which receives a latent image from the action of light, and is developed by a reducing agent. But the nature of the film is slightly different, and the results widely different. Your statement on the coagulation of dry albumen by heat is perfectly correct. The fact has been more than once pointed out in our pages, that dried albumen cannot be so coagulated. But we go further than you, and affirm that it cannot be coagulated by alcohol, ether, &c. &c., as generally supposed. One of our correspondents, Mr. Price, pointed out, twelve months ago, that heat would coagulate dry albumen. Since then we have carried the experiments further, and have, at the present time, an article and another communication on the subject waiting for insertion, when we can find space. In reference to Mr. Osborne's experience, there would appear, at first sight, a discrepancy; but his explanation, in answer to a query on the subject, in a recent conversation we had with him was to this effect: the dry albumen is not coagulated by heat; it is not until the albumen has again become softened and moistened by absorbing water, that the heat coagulates it as he describes. That it is coagulated then, he says, is a simple fact.

Seaside.—It will be a very simple plan for each reader desiring his Almanac bound, to get it done for himself. Or it would be found a good plan to have made a reading case of the right size, which might be used for each year's issue. However, your suggestion shall be submitted to the publisher.

L. F.—It is frequently expedient, before proceeding to intensify a negative after it is dry, to varnish the edges. This materially lessens the chance of losing the film. Some collodions require this treatment, as there is great danger otherwise of losing the negative by the splitting of the film. Experience alone can teach you when to make the application, and when to neglect it.

Farringdon Lane.—We will examine the glass, and report thereon.

A large number of communications, in type, are compelled to stand over until our next, amongst which are articles on the following subjects:—"Double or Fancy Printing," by H. Cooper, jun.; "The Theory of Alkaline Gold Toning;" "A New Photolithographic Process;" "The Influence of Chlorides and Bromides in Collodion;" Report of the Marseilles Photographic Society," "Photographic Chemicals," "Ammonia as a Developing Agent," and several others.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to 32, Paternoster-Row.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 218.—*November* 7, 1862.

## HALF TONE IN PHOTOLITHOGRAPHS.

The great desideratum in photolithography has hitherto been, *half-tone*, or gradation of tint, without lines or points, hatching or stippling. This has not been satisfactorily produced by any of the known processes. Col. Sir Henry James has just announced it as an accomplished fact. The following letter appeared in the *Times* of Tuesday last.—

"PHOTOZINCOGRAPHY.

"Sir,—I shall be glad to be allowed to announce, through the columns of the *Times*, that we have accidently made the important discovery that the paper prepared with bichromate of potash and gum only, as described in the work on Photozincography lately published by Messrs. Longman and Co., will, if only kept for a week or ten days in the dark, yield half tones, and consequently give us lithographic or zincographic prints from any photograph.

"I enclose two copies of a print produced in this manner, which, although not so perfect as we can undoubtedly make them, will prove that the object so long sought after has now been attained.—I am, Sir, your obedient servant,

"Henry James, Colonel Royal Engineers.

"*Ordnance Survey Office, Southampton, November* 3.

Mr. Pouncey in a letter, an extract from which we give in another column,* announces similar progress, and challenges examination at the meeting of the Photographic Society. On Tuesday night he was present at the meeting, and produced several specimens, some of which were photographs, and others impressions in printers' ink, produced direct from the negative. They were not received very favourably by the meeting, a spirit of distrust on the one hand, and of antagonism on the other, seemed to prevail, and a general dissent from Mr. Pouncey's assumption, that they were equal to silver prints, was expressed.

For our own part, we feel some difficulty in expressing an opinion on the subject. We have every disposition to do Mr. Pouncey full justice, and we feel the difficulty of doing so without having silver prints from the same negatives, with which to compare his specimens. They were certainly not good pictures, and appeared to be from somewhat hard negatives; but they certainly possessed some gradation. His proposition to take any negative submitted to him, and produce from it a photolithograph, or an image in any printer's ink, which might be brought for the purpose, as perfect in half tone as any silver print from the same negative, certainly appears a fair one, and should, we think, be met. On the other hand, we would suggest to Mr. Pouncey, and we do it with every wish to avoid offence, since he holds the conviction that he has been ill-used by photographic societies and the photographic press, that, however unintentionally, he seemed to approach the meeting in a spirit of antagonism, and that begets antagonism. That, moreover, he contravened the custom of the society in wishing it to deal with a secret, or, at least, an unrevealed process. And that, further, he had, on former occasions—with the best of motives it might be—issued prints as the result of one process, which were produced by another; and this circumstance might explain some distrust. We believe, however, from what we saw of his results, on Tuesday night, that they are worthy of further attention, and shall be glad to see more of them. And, personally, we may add that we shall have pleasure in allowing him to select a portrait negative, from which to produce a photolithograph for comparison with a silver print.

In an interview with Mr. Maxwell Lyte, just before his return to France, he entrusted us with a verbal description of a method, by which he suggests that half tone might be produced in photolithographs. It was his wish that we should have described it to the meeting on Tuesday night; but the protracted character of the meeting, and a severe hoarseness under which we were labouring, induced us to publish it in this form.

Mr. Lyte proposes to obtain half tone in photolithographs, by taking advantage of the method adopted by M. Fargier, for obtaining half tone in carbon prints. M. Fargier, believing that the difficulty in obtaining half tone in carbon prints arose from the fact, that the action of light upon a film of gelatine, bichromate of potash, and carbon, failed to penetrate in the half tones much further than the surface, and that thus, when the sheet of paper on which it was spread was immersed in water, the unaltered gelatine underneath the half tones being readily washed away, carries off at the same time, the slightly altered portions which really constitute the half tones. The deep shadows being more perfectly acted upon by light, are, of course, less soluble, and remain. The result is a black and white picture, without proper gradation. The same fact will obtain in photolithography from the same causes.

M. Fargier overcomes the difficulty, by applying the film of gelatine, carbon, and bichromate of potash to glass, and after exposure, coating the surface with collodion. The film is then removed from the glass, and the unaltered gelatine, &c., dissolved. By this mode of manipulating, the delicate half tones are preserved, and remain attached to the collodion, instead of being, as in the other method, washed away.

Mr. Lyte proposes to apply this method to photolithography, with this difference to suit the case: instead of carbon in combination with gelatine and bichromate of potash, he proposes to use powdered bitumen, and after treating the plate after M. Fargier's method, he would transfer the image so obtained, to a lithographic stone, by the aid of heat. The half tone which is produced by this treatment, in a carbon print, would, he conceives, be thus secured on the lithographic stone.

So far as the production of a properly graduated image on the stone is concerned, this method appears very promising. How far prints with half tone would be obtained, remains to be tried. The experiment is certainly well worthy of attention.

## ON THE PERCEPTION OF RELIEF.

BY PROFESSOR EDWIN EMERSON, OF TROY UNIVERSITY.

[We have been favoured by the courtesy of Professor Emerson, and the prompt and courteous attention of Professor Silliman to his request, for early proofs of the following interesting contribution, which appears in *Silliman's American Journal* for November. We especially commend attention to it as a lucid explanation, of the not generally understood difference between two distinct phenomena, relief and perspective.—Ed. Photo. News.]

"Professor Cima of Turin, has sent us the description (says the editor of the *Cosmos*) of a stereoscopic experiment which is not without interest. He takes the picture of a front view of a human head, executed either in crayon or lithograph or copper plate, and which is three or four centimetres in height; this he cuts into two parts along a line which coincides with the vertical axis of the nose; he takes one of these halves in each

* An article in type, on "Photozincography, Photolithography, and Photoengraving, and their Inventors," is compelled to stand over until the next week.

hand, and holding them in the same perpendicular plane, he brings them before the eyes, at a distance which is less than that of distinct vision; he then allows the optic axes to converge, and thus causes the drawings to approach or recede until he is able to see two pictures of each half, and until the two middle ones overlap, so that they make the impression of an entire countenance. When one makes this experiment for the first time, says Professor Cima, he will see with astonishment that the full face which is produced by the overlapping of the two halves makes, in a high degree, the impression of a solid body; the half tones melt and mix together as in a modelled figure; the nose rises well from the face; the eyebrows, lips and chin stand out very well; and the entire figure raises itself from the ground upon which it is drawn, and assumes, in a remarkable degree, a living expression. The necessary distance of the two half-pictures from each other and also the proper distance from the eyes of the observer for the production of the greatest effect, can only be ascertained by trial. The more steadily one gazes at the pictures, the more the sensation of relief is strengthened."*

The foregoing extract from The *Cosmos* has been reproduced in *Pogg. Annalen*, bd. cii. p. 319; in *Il Nuovo Cimento*, vi, 185; in *Die Theorie de. Schens und räsmlichhen Vorstellen*, bei Dr. Cornelius Halle, 1861; and in *Monographie du Stereoscope*, par Blanchére, Paris, 1862. Seemingly endorsed by such a high authority as Moigno, the alleged fact passes through scientific treatises unquestioned, and is now apparently regarded as established. We consider it, therefore, important to refute the conclusions involved in the experiment as described by Professor Cima, and at the same time point out some analogous mistakes as to the perception of relief.

When the experiment of Professor Cima is carefully performed and analyzed, it will be found that the right eye sees the right half of the middle picture, and the left eye the left half, now as these two dissimilar masses are not superposed upon each other, as in the case with the dissimilar complementary figures in ordinary vision, but are merely joined together at the line passing through the centre of the resultant picture, it is evident that if such an effect is realized as that "the nose rises well from the face," or that there is any "sensation of relief," we have here an experiment which refutes the established theory of binocular vision, and leaves the effects of the stereoscope without any adequate explanation.

The fact is, however, that in Professor Cima's experiment there is no real perception of relief. All that is really seen is the perspective, which is mistaken for relief or solidity. To prove this—let the observer, while looking at the two half-pictures in the mode alleged to produce the effect of solidity, close one eye, the right for instance, the right half of the picture dissappears, but the left retains exactly the same appearance it had before; it loses no appearance of solidity, simply because it had none. Or, let the observer join the two halves together, and closely and continuously observe them with one eye, the effect will be the same as in Professor Cima's experiment. Or, to vary the test, take a *single* photographic picture, for instance, the right-hand side of a stereograph, cut it in two by a vertical line through the centre, and place the halves the proper distance apart in a stereoscope, so as to unite them readily into a whole, the same effect, claimed by Professor Cima to be a sensation of relief, will be observed: that it is not relief will be most manifest by comparing it with a stereograph of the same scene.

But the reader will very naturally inquire—"How did Professor Cima, and those who have unquestioningly quoted his experiment, fall into this error with regard to the presence of relief?" This reasonable question we will endeavour now to answer.

The ability to perceive relief, or solidity, is a natural one. To those who have the proper use of their eyes, and can walk, it is an intuitive faculty, we cannot help seeing solidity, where it exists, if we try, no more than we can help hearing sounds or seeing colours. The common idea that this faculty is the *result* of experience, and is, therefore, acquired, is opposed by the whole analogy of our being. The infant does not learn to hear; it hears, intuitively, if it is a perfect child, but learns as it grows to know what it hears: it feels a blow, but may be too young and feeble to know what that blow is; so it has but to open its eyes and the scene enters, it is painted properly and instantaneously upon the retina, but it may require a long education before the child will have an intelligent idea of what it sees; indeed, it may go through life and never be able to give more than *one* name to a great variety of very different colors, such as red, vermilion, scarlet, orange and crimson. It is unphilosophical to confound a faculty with its use. We have the natural faculty of seeing solidity; but the acuteness with which it is employed, depends greatly upon the intelligent attention with which it is exercised.

It is no answer to this to say that we can analyse the optical conditions upon which the perception of relief depends. This has been splendidly done by Wheatstone, Dove, and others, and is beautifully illustrated by the stereoscope; but this has no necessary connection with the question before us. When I say—we hear intuitively—it is nothing, in the way of refutation, to explain to me the acoustic conditions upon which hearing depends, or to assert that Mozart had no intuitive perception of melody and harmony, because the laws are fixed by which a melody ought to proceed, and harmony, to be such, must be according to the formula of Thorough Bass, whereas the child Mozart could not know all this. So with the matter in question; all men see solidity who have the proper use of their eyes; very few, indeed, know how it is effected, or are able to distinguish acutely between the perception of binocular relief and the perception of mere perspective, or the appearance of distance without relief.

The perception of *relief* depends upon the angle formed by the rays which proceed from any object of sight to the right and left eyes respectively; the larger this angle the more relief is apparent, provided the eyes can unite the dissimilar images; but when, by reason of distance, this angle becomes nothing, practically, and the rays are parallel as they enter the eyes, relief vanishes.

The perception of the *perspective* depends upon very different conditions, such as the direction of the lines that compose a view, the light and shade, the apparent size, the tint, &c.

When we consider the matter, it is not surprising that these two modes of perception should often be confounded. True relief diminishes so gradually, and melts so gently away, leaving perspective entirely master of the field, that the essential difference between them is likely to be lost sight of. That this is the case may be shown by the following examples:—

It requires a series of very careful experiments to determine how far, under ordinary conditions, we can perceive relief. Experiments of my own lead me to believe that the distance is under three hundred yards. The only reason a good painting, whose foreground is represented as it appears at the distance of two or three hundred yards, is not a complete illusion when seen under favourable conditions, is, that we can change our point of view; and motion to one side or the other will impart the idea of relief in nature, but as there is no relief, properly so called, in a painting, as soon as we shift the point of view, we detect this, and the illusion is at an end. Hence, paintings ought to be observed by one eye and from one point of view, to obtain the maximum effect. Hence, also, stereographs of scenes which lie at a distance of over three hundred yards from the observer, will give no stereoscopic effect, will not *give the impression* we are able to get with our eyes, assisted by our capacity to move from one point of view to another; they ought, therefore, to be photographed from stations more or less distant from each other, but always exceeding considerably the distance between the eyes.

Persons *not accustomed* to experimenting with the stereoscope cannot distinguish readily between stereoscopic and pseudoscopic effect; they are also constantly imposed upon by views which have no stereoscopic effect whatever; I have repeatedly mounted two identical or right-eye views of the same scene, side by side, as though they were right and left eye views, and have never failed to get the verdict that they exhibited stereoscopic effect; which was impossible of course. Not only are ordinary observers thus mistaken, but they constantly manifest an opposite peculiarity, being unable to see the greatest relief when it is exhibited in an unusual manner. In *Das Stereoscop*, C. G. Ruete, Leipsig, 1860, Dove's illustration of this point is republished in such a way as to destroy the object in view, showing that this commentator had not a fine perception of relief.

A remarkable instance of the uncertainty attending the perception or non-perception of stereoscopic relief, even in cases where we might suppose there could be no want of knowledge, is shown by the controversy now going on in Europe over the *Chimenti Pictures*. Sir David Brewster thinks he has in these

* *Cosmos*, vol. ii, pp. 353.

pictures a specimen of real stereoscopic drawings, produced about the middle of the 17th century: and this opinion is endorsed by Professor Tait, Professor M'Donald, and others, in decided terms. I have made a careful examination of the photographs of these pictures, and the truth is, that the trifling stereoscopic and pseudoscopic qualities about them are evidently accidental. To prove this let any one execute a pen-and-ink sketch; and then let him make as perfect a copy of it as he can without careful measurements; now place these two drawings in the stereoscope, and you get the same kind of effect seen in the Chimenti drawings, and for the same reason; the drawings will vary more or less from each other; all that is necessary then to impose upon ordinary eyes, is to find out which way the sum of the variations preponderates; mount the drawings accordingly, and, *mirabile dictu!* you have produced a stereoscopic picture (the pseudoscopic portion being overlooked) drawn by hand; you have done that very thing that Sir David Brewster has repeatedly declared was quite beyond human skill! If Professor Wheatstone gets no heavier blow than this, his fame as a discoverer is secure.

As a further confirmation of our views, we may point to the fact that but few persons can properly locate the optical position of reflections from curved surfaces, and, in particular, the images from concave surfaces.

During the last year or two large assemblages have been drawn together in our principal cities, to see with delight the effects produced by what is called *the Stereopticon*, which is merely another name for a Magic-lantern of good quality, with *one* side of a glass stereograph for a slide. Nearly all in these large assemblages have agreed in believing that they saw, what they were told they saw, excellent stereoscopic effect in the single picture which alone is exhibited. The truth is, they made the popular mistake; they saw nothing but perspective.

Stereoscopic effect on a large scale may be obtained by exhibiting the right and left pictures of a glass view side by side, by the magic-lantern, and then uniting the magnified pictures by means of prisms. This I have recently demonstrated by experiment. The idea was also suggested some years ago, by Dr. Wolcott Gibbs, to Mr. Pike, of New York, but not put to the test.

We conclude, then, from the foregoing—

1. That Professor Cima's experiment is only another instance showing how easily we can mistake one thing for another, and induce others to do the same.

2. That intuitive perception of relief may be indefinitely increased in degree by exercise; showing that this sense follows the same law under which we employ our other faculties.

## PHOTOGRAPHIC CHEMICALS:

### THEIR MANUFACTURE, ADULTERATION AND ANALYSIS.

*Lime Salts* (continued).—Caustic lime, both in the anhydrous and slaked condition, is in constant requisition in the photographic and chemical laboratory. Slaked lime is invaluable for neutralizing acids, which may have been accidentally spilt on the floor. Where these corrosive liquids are much in use it is scarcely possible to avoid such occurrences; sometimes in these cases the very worst thing that the operator can do is to mop it up with a cloth, and in many cases throwing cold water upon it will also do more harm than good. A handful of slaked lime should be sprinkled over the spot; this will immediately unite with the acid and convert it into a harmless non-corrosive compound. Now will be the time to add water, when the whole may be mopped up without the slightest danger to the operator or his clothes. The acid neutralizing properties of lime are likewise valuable in other directions, owing to this, its powers as a disinfectant are very great. Sulphuretted hydrogen and other deleterious gases are rapidly absorbed by it, and hence the value of slaked lime in sewers, drains, &c., where foul smells are generated. The dark room in which most of the photographic manipulations are conducted should always have the walls lime whitened; the layer of carbonate of lime which in this manner is exposed over such a large surface to the atmosphere of the room, tends very greatly to purify it from acid vapours, and keep it in some measure free from close and disagreeable odours. The coating should be renewed at least once a year.

In its unslaked caustic state, lime is likewise of great value. In the hydrated state lime is of value on account of its property of absorbing and neutralizing acids; in the anhydrous state it is chiefly of use on account of the great affinity which it possesses for water. A most ingenious and valuable application of this property has been made by Mr. Spiller; he uses it to dry the atmosphere in which sensitive photographic papers or plates are kept; their preservative properties being in this manner increased tenfold. The apparatus is very simple, and may easily be constructed out of an old box. The only requisites are that the lid should fit tight upon it, so as practically to exclude air. The box may be of any size, but the most convenient dimensions are such that a full sized sheet of paper may be laid in it without folding. A tray about six inches deep is placed at the bottom of the box, and a sheet of perforated zinc placed on the top of the tray; the latter is now half filled with lumps of good well burnt quick-lime, and the perforated zinc is covered with one or two sheets of white blotting paper. Upon closing the box the lime will rapidly absorb all the aqueous vapour, carbonic acid, sulphuretted hydrogen, and other impurities which might have been present in the atmosphere, and will protect any photographic paper or plates which may be put in the upper part of the box from contact with anything likely to be injurious. With a well fitting lid this drying box may form part of the furniture of the dark-room, and foggy dark days on which no other work can be done, may be conveniently employed in replenishing it with paper. If a box of this sort is to be made by a carpenter, a few alterations, as originally proposed by Mr. Spiller, will be advisable, although for general purposes, where little expense is desired, the above arrangement answers very well. Thus the portion containing the lime may be constructed as a drawer, which may be removed from the outside so as to avoid the possibility of lime dust getting into the upper part where the paper is held. It would also be a convenience if that part which is to hold the paper were likewise constructed drawer fashion, proper communication being effected between the lime and the paper by means of holes in the sides and bottom.

Lime water is sometimes of value as a cheap and convenient substitute for potash or soda in neutralizing acid liquids. The hypo-bath may thus be neutralized with it when old and acid, and it has this advantage over potash and soda, that the sulphate of lime formed is practically insoluble in water, and may be removed by filtration. Moreover, in neutralizing acid liquids with lime water, a slight excess of lime may be added without danger, as upon exposure to the air the surplus lime absorbs carbonic acid, and becomes precipitated as an insoluble carbonate; these two properties render lime water a very valuable substitute in many cases for the alkalies proper. Lime water is also usefully applicable to another purpose which may be of interest to the photographer. Formed into an emulsion with oil, it is one of the best materials for cleaning polished brass, &c. About half fill a corked bottle with lime water, and then add a little less than the same quantity of olive oil; shake them violently together, and the mixture will instantly assume the consistency of thick cream, it will keep any length of time, and merely requires to be well rubbed on to the metal with a woollen cloth, and afterwards polished with a leather. We may also mention in passing, that this same mixture of olive oil and lime water is the very best application for a severe scald or burn; it is to be thickly spread on a piece of cotton wadding, and laid on the injured part, when it removes the pain at once, and causes the part to heal very rapidly.

When caustic lime is exposed to the air in the hydrated condition, it quickly absorbs carbonic acid, and becomes converted into *carbonate of lime.* This compound is too well known for us to give its physical properties; the native compound occurs in several different forms, as chalk, marble, calc-spar, arragonite, &c. These are all identical, chemically with one another, although they differ greatly in their physical characteristics. Marble is constantly employed in the laboratory as a source of carbonic acid, and chalk is also frequently used for neutralizing acids. In this respect it may be used in the same manner, and for the same purposes as caustic lime, but it has the objection not possessed by this latter, of liberating an immense volume of carbonic acid during the operation. *Prepared chalk* is an artificial variety of carbonate of lime formed by precipitating a solution of chloride of calcium with carbonate of soda, and well washing the product; it is a fine white amorphous powder, the uses of which are too well known to require further allusion. Carbonate of lime, although insoluble in water by itself, becomes soluble when an additional quantity of carbonic acid is present. For instance, if lime water be placed in a glass, and a current of carbonic acid be passed through it, the first effect will be to precipitate carbonate of lime. As the gas continues to pass the precipitated carbonate gradually redissolves, and ultimately a clear solution is obtained of what is commonly, but erroneously, termed bi-carbonate of lime. The lime in this liquid is held in solution by the additional quantity of carbonic acid, and if the latter is removed in any way will be immediately precipitated. Hard water, especially in chalky districts, is a solution of this kind. By boiling, the extra equivalent of carbonic acid is driven off, and the carbonate of lime is precipitated. This occasions a deposit in culinary and other vessels in which such hard water is heated, and as the deposition takes place somewhat gradually, the carbonate of lime, especially if a little sulphate is present at the same time, is precipitated in the form of a hard stoney mass, which sometimes accumulates an inch or more in thickness. Many have been the plans proposed for remedying this inconvenience, but none of them are sufficiently effectual or practicable on the small scale to be of any use.

## The International Exhibition.

### BRITISH PHOTOGRAPHIC DEPARTMENT.—APPARATUS.

Mr. T. Ross (3149), displays a large collection of excellent apparatus and lenses, prominent amongst which, are several complete panoramic equipments for pictures of different sizes, together with some fine specimens illustrating the angle which can be obtained. We have so frequently described the panoramic lens and its products, that it is unnecessary to refer further to the subject here, except to remark, that no attention is spared in obtaining perfect results, every fresh set we see exhibiting some improvement in the mechanical appliances, curved porcelain baths instead of gutta percha, being the latest addition we have noticed.

There is a large collection of lenses of almost every kind, for every purpose. Portrait lenses, with two different back combinations, the object being to secure, when required, the utmost perfection of definition, with its accompanying curvature of field; or a flatter field with slight sacrifice of definition. There are also a variety of lenses for *cartes de visite* of different focal lengths, so as to suit glass rooms of various sizes. Portrait lenses of various sizes, of large aperture in relation to focus, suitable for instantaneous effects, of various kinds. Orthographic, triplet, single, stereographic, and other lenses for portraits and views, complete this part of the display. Mr. Ross also adopts the plan to which we have before referred, of illustrating the qualities of his lenses, by a number of very fine specimens produced by their aid, thus affording practical evidence of their excellance.

In addition to lenses, Mr. Ross exhibits some excellent cameras for different purposes and other apparatus. Amongst these, is a convenient bi-lens camera for stereoscopic views, or two card portraits, and, on removing a central partition, for views 8 inches by 4½ inches. This camera extends from 3½ inches to 11 inches, having a double means of extension, consisting of sliding body and bellows body. It has also a simple swing back movement, and instantaneous shutter. Some other good apparatus, and ingenious contrivances, complete the contributions in this case.

Mr. W. W. Rouch (3150), exhibits a handsome case of apparatus, and chemicals. Attracting first attention amongst these, is the Registered Model Tent of Mr. Ernest Edwards. This is one of the most complete and conveniently contrived tents, which we have yet seen. As conveying a better idea than a long description, we subjoin an engraving of a section, so drawn as to show the interior, with the operator at work.


It will be seen that a great convenience is gained, in giving as much space as possible over the head of the operator, so as to avoid the sense of suffocation so common in tents. Another convenience consists in the use of a small water-tank placed outside, and having a flexible tube and spring tap inside, the water being carried off by another pipe. The general arrangement secures the greatest convenience within the least space. Altogether, we believe that it would be impossible to get greater convenience combined with more portability.

The "Model" Carte de Visite Camera, may be used for stereoscopic as well as for card portraits, and has a moveable partition, so as to allow of its use with one lens of larger focus, for views, the full size of the plate. In this camera, the part to which the lenses are attached, is that which travels, it is worked by a rack and pinion, giving the utmost accuracy, and is altogether an excellent camera. There is also the "Universal," and other cameras, a clever instantaneous shutter, in which as one lid opens another closes by a simultaneous movement, and a variety of other good apparatus and convenient contrivances. The excellent chemicals we have before noticed.

Mr. H. Simpson (3154), exhibits a Photographic Cabinet, forming a complete operating room, which is thus described in the Catalogue:—

"The Photographic Cabinet, when extended, forms a complete operating room, when closed, it has the appearance of an ordinary closet or wardrobe, and will contain all chemicals, cameras, portable tent, and other apparatus, thus avoiding all photographic litter. It can be extended in one minute, and will then form a dark chamber, about four feet square, fitted with sink, drawers, &c., and will shift, so that light can be admitted at pleasure. There is no combustion inside the chamber, and abundant ventilation without draught. No dust can arise from curtains, as they are entirely superseded by india-rubber springs.

For convenience of carriage, it may be constructed in parts, and fitted with screws, carefully marked, so that with the printed directions, any intelligent youth may put it together. It may be painted or unpainted, so that it may be coloured the same as staircase or furniture.

It will be seen from the description, that the contrivance will frequently be useful to the amateur without a spare room at his command. We should prefer a little more space than the one exhibited possesses, but this and other matters of detail are easily modified.

Mr. J. Solomon (3158), has a very attractive case of apparatus, which is distinguished by the convenience and ingenuity of many of the contrivances for facilitating the labours of the photographer, as well as by the novelty and excellence of the articles. Some of these have been already noticed in our pages, amongst which we may mention a cutting table, and guides for trimming and shaping photographs, consisting of a plate of glass, on which to cut, fixed in a revolving frame, to enable the print to be trimmed on all sides without moving, the table revolving, instead of shifting the print. Developing holders, giving a firm hold of the plate in such a position as permits its progress to be examined during development, whilst there is no need whatever to soil the fingers with the solution. Chanter's collodion pourer affording more complete immunity from the possibility of any kind of floating matter or sediment in the collodion falling on the plate, than any other bottle we have seen. Chanter's syphon, another useful contrivance, consisting of a flexible tube of india-rubber, with an india-rubber ball attached, of sufficient capacity to exhaust the air entirely from the tube, and thus afford a simple efficient method of setting it in action, without the trouble which generally attends the use of a syphon. There is an excellent portable tent; some very efficient rolling presses; a very solid iron camera stand, admirable for the dark room, and, moreover, we understand, very cheap; a clever little microscopic camera, for producing minute photographs for subsequent enlargement in the microscope, or by means of a lens attached and mounted, as in M. Dagron's photo-bijouterie; a variety of other apparatus, and frames and albums for card portraits.

Mr. Spencer (3161), exhibits albumenized and other prepared photographic papers. The examples look well, but it is, of course, impossible to speak of quality, simply from appearance. From the catalogue we learn the interesting fact, that upwards of 200,000 eggs have been used in six months, to furnish albumen for the paper prepared in Mr. Spencer's establishment.

Dr. H. G. Wright (3187), exhibits a very cleverly contrived portable apparatus, consisting of a light and useful tent, with camera, bath, and equipment complete, each part belonging to a convenient whole. Some excellent pictures by Dr. Wright, who is an able amateur, illustrate what may be done in his tent.

We have now briefly noticed the whole of the apparatus in the British Photographic Department which as struck us as worthy of attention. We shall next have a few brief words on foreign apparatus.

## Critical Notices.

STEREOSCOPIC VIEWS OF THE INTERIOR OF THE INTERNATIONAL EXHIBITION. London: The STEREOSCOPIC AND PHOTOGRAPHIC COMPANY, Cheapside and Regent Street, London; and Broadway, New York.

ALL persons interested in the credit of photography, as well as the Commissioners of the International Exhibition, and the public at large, have reason to be well satisfied that the contract for photographing the interior of the building and the art treasures it contained fell into the hands of the London Stereoscopic Company. Without in any way depreciating the ability of other firms, we question whether one house in a thousand would have brought to bear so much enterprize, ability, and capital upon the work, or have executed it in a style at all comparable with that in which the photographs already issued have been produced. The firm to which we have referred took a large view of the project and made a bold offer; in addition to the fifteen hundred guineas paid down, and the prospective royalty on sales, a further sum of about £500 had to be paid for various advantages, in the shape of space for erections of various kinds, &c. A still further outlay was speedily made, when it was discovered that Dallmeyer's lenses executed the work better than the equipment of first-rate lenses already in use; these were all laid aside, and a complete outfit of new lenses ordered of Mr. Dallmeyer, costing, we believe, about £300 more. We have always pleasure in recognizing the debt which art owes to enterprize and capital, because it is a debt often ignored and by some utterly denied. We have known some short-sighted and feeble-minded operators in our own art, as in others, regard the interposition of capital—without which, in such a case, nothing could be done—with a grudging jealousy.* We are glad to believe that, bold as was the speculation, there is every reason to regard it as a successful one. The sales have been, we understand, enormous. Mr. England, who was entrusted with the production of the stereoscopic negatives and prints, has alone executed an average of little less than one hundred and fifty gross weekly. Of some of the most popular subjects the negatives have required continually repeating to secure facilities for rapid production. The number of stereoscopic subjects already photographed, is between two and three hundred, and the number of negatives between two and three thousand. Of the larger prints, of which there are several sizes, we have not any definite statistics, but we apprehend that the demand for these will have been in like proportion.

As to the quality of the photographs produced, the public verdict has been given in the demand for the prints. They comprise a treasury of the choicest gems which the world of art and science could produce, photographed with an amount of skill which could not, we believe, be surpassed. Some of the slides before us are choice gems of photography, as well as exquisite delineations of gems of art. Nothing can exceed the beauty of many of the general views of the nave, transept, and various courts. In the representations of ornamental glass and ceramic wares, the exquisitely delicate rendering of texture is something marvellous, the perfect detail and softness giving an effect of reality to these substances in the stereoscope, which we have hitherto regarded as only possible in stereoscopic transparencies on glass. The grouping of various art products, in some of the slides, has been managed with much judgment, taste, and skill.

The specimens of sculpture here presented, are truly magnificent, and present to the student such a collection as, it is probable it would be impossible to meet with elsewhere. We have rarely felt the stereoscope so valuable, as in its wondrous power of reproducing before our eyes, in the quiet retirement of the study, those exquisite embodiments of beauty. The glorious "Reading Girl" of Magni, which shows how a soul can be enthroned on a marble face; and features, which move not, be instinct with intellect and feeling. The exquisite grace and loveliness of Monti's Sleep of Sorrow, and Dream of Joy. The sensuous beauty of Marshall Wood's Daphné, the indescribable and mystic power of Story's Sybil

* It would be an interesting task to trace the ramifications of employment created by the spirited management of enterprizes of this kind. A staff of not less than fifty extra persons, not photographers at all, have been engaged in the commercial department of the business, as clerks, messengers, young ladies in charge of stalls, &c. To these, in addition to salaries, a commission has been paid on sales beyond an estimated amount. It would be easy to trace the matter further, and point out, how in all cases, the judicious interposition of capital, gives an immense impetus to art and commerce, and opens new fields for the employment of labour. Since the above remarks were in type, we have had a striking illustration of the need for diffusing sound and common sense views on such subjects, in the publication of an article in a contemporary, which is astounding in its singular ignorance of, or antagonism to, the first principles of political economy.—ED.

and Cleopatra, and the varying charms of scores more. We can wonder also on what was based the factitious reputation of the Tinted Venus, which excited so much expectation, and which turns out to be such a commonplace undressed young woman; and we can wonder as we examine the poor, meagre, hard figure which Hiram Power designates California, whether the sculptor has fallen off, or the Greek Slave was less beautiful than we, in common with the rest of the world, believed it to be eleven years ago. In short, we can revisit the Exhibition, and enjoy its beauties without fatigue, and with unalloyed delight. If in no other respect, the Exhibition of 1862 possesses an immense advantage in this respect, over that of 1851, and if every other department of the Exhibition has been characterised by mismanagement, this at least has been free from it. Almost all the subjects we have seen, have been pleasing as pictures, and perfect as photographs.

RAMBLES ABOUT CHESHIRE. By John H. Underwood.

This is a series of very charming stereoscopic slides, consisting of rustic scenery, farm yards, sylvan nooks, shady avenues, cool meadows, and quiet streams, of a most seductive character. The negatives are, we believe, by the collodio-albumen process, and fully maintain the reputation of that safe and excellent process. The pictures are rich and brilliant, without any hardness, being at the same time harmonious and full of tone.

"BRINGING HOME THE MAY." Photographed from Nature, and Printed from several Negatives. By H. P. Robinson, Leamington.

We have before us a production which we confidently aver to be the finest composition photograph which has ever been issued, and in reference to which, we should not feel much hesitation in stating our conviction, that it is the finest *picture* which has ever been obtained by the art of photography; and we speak very deliberately and advisedly when we express this conviction. Having said this much, we feel somewhat at a loss to proceed, because we feel it to be utterly impossible to convey, by criticism or description, anything like a perfect idea, either of the picture itself, or of the impression it produced upon us on seeing it. When sciolists in art have attacked the art qualities of photographs, and denied the power of photography, we have often, even with some secret misgiving that the attacks were not always unmerited, felt pleasure in doing battle for the art and its products. To all cavillers, in future, we should like to show this picture; and to their scornful enquiry, "Can any good thing come out of Nazareth?" we should gladly reply, "Come and see."

The picture before us is forty inches long by fifteen inches deep, having the general form of a panoramic picture, and is printed from nine negatives. We commence by these mechanical facts in our description, simply because such facts aid a photographer's preliminary estimate of a photograph; but these are the last thoughts that enter the mind on seeing this picture. There is, on the contrary, such a completeness and symmetry in the section of nature presented, and, moreover, such a sensation of vastness and space, that it scarcely enters the mind to consider whether the canvas containing it extend inches, feet, or yards; it is enough to feel that it constitutes one harmonious whole, neither a fragment, nor the various scattered portions of a picture. Here, at least, there is no "patchwork."

The subject consists of various groups of figures and landscape. These groups are connected in the composition so as to form one company, all girls, embracing young children and blooming maidenhood, all engaged in bringing home May blossoms, the fragrant wealth of English hedgerows in the advanced spring season. An admirable extract from Spencer, which is appended, will at once initiate the reader into the spirit of the picture:—

"When all is cladde
With pleasaunce; the ground with grasse, the woods
With greene leaves, the bushes with bloosming buds,
The younge folks, now flocken in every where,
To gather May-buskets and smelling brere;
And home they hasten, the postes to dight,
And all the kirk-pillours care daylight
With hawthorne buds"

Nearly in the centre of the picture is a group of four girls, each laden with hawthorne blossom, the central figure of the group bearing a large burden of the branches upon her head. This is the principal group in the picture, and upon it the eye instinctively rests first, in examining the composition; it is nearest and most prominent, most brilliantly lighted, and best made out. The figures are in full sunshine, and the breadth of light, free from chalkiness, and the broad masses of shadow perfectly transparent and free from blackness, have a charmingly sunny effect. The pose of all the figures is easy, natural, and perfectly harmonious with the general action; but the position of the central figure, to which we have referred, is perfect in its simplicity and gracefulness, and might be employed, without altering a line, as a Caryatis in a Grecian temple. To the left of this group is another of two girls, who are tardily bringing up the rear, one of them pausing whilst she shakes from her dress one of those long straggling parasitic plants which cling with such tenacity, and are familiarly known, in some parts of the country as "followers." To the right of the central group are other two figures, one of whom is stooping and gathering together a large heap of the newly cut hawthorne branches, the other waiting to assist in carrying them. Still further to the right is another group of two little children, who are toddling home in advance of the party.

The background and landscape generally, is, for the most part, thickly wooded; but, through the trees, the eye travels far away over meadows into a charming distance. In the middle distance, immediately behind the groups, a fine tract of open country shelves away, leading the eye into the forest path, divided by rustic railings and a stile from the open. The arrangement of the picture does not leave need for much foreground; but this consists chiefly of some well chosen and well made out wild plants.

It is a May morning and every figure is beautifully tipped with the sunlight, which pervades the picture. But it is early on a May morning, and the atmosphere is filled with the delicate misty vapour which clothes the distant foliage with that delicate and fairy robe of atmosphere, which gives a charm to English landscape scenery, rarely met with elsewhere. If the picture before us be filled with sunlight, it is not less filled with atmosphere. The thick, leafy, spring-like foliage of the background is thus thrown back from the sun-lit figures, which tell the story of the picture.

The first impression which strikes the mind on examining the picture is a conviction of the admirable composition and chiaroscura, which at once satisfy the eye as masses without distinct reference to forms. The arrangement of lines, and the general contour of the picture is especially pleasing, whilst the effect of light and shadow, the arrangement of light and dark objects, the perfection of gradation, and general breadth of effect is altogether satisfactory. The next impression produced is of the complete harmony and subordination; every thing takes its place admirably, and nothing obtrudes. It is harmonious in sentiment; the landscape is an unquestionable spring landscape; the children and damsels—there is too much of life about them to be perpetually called "figures"—are in the spring of life; the whole picture is pervaded by the feeling of spring-time. There is harmony in the action, purpose, occupation, and pose of each figure, which perfectly connects them as a whole, although divided into separate groups; and there is a feeling of gladness and freshness expressed in every part of the picture. It is harmonious as a composition, harmonious in gradation of tones; there is perfect gradation in the sun-lit and well pronounced foreground objects, and gradation in the distant hazy woods. There are no crude chalky lights, or black heavy shadows, no patch of white sky killing all the other lights in the picture. The masses of May blossom in the bright sunlight are soft and well made out, not mere masses of snow and the sky has a pleasant atmospheric tint which suggests the season.

There is that harmony which renders it difficult to remember that this is a "composition" picture, in the photographers' technical sense of the word. It is difficult to believe in it as the product of several negatives, each part so thoroughly belongs to the whole and so perfectly accords with the whole. Ruskin, speaking of the test of the true artist, says that his work, or the "imaginative work," as he calls it, "looks always as if it had been gathered straight from nature; whereas the unimaginative shows its joints and knots, and is visibly composition." The test is an admirable one and admirably put, and may, with augmented force, be applied to the "composition," or rather let us call it, as referring to the mechanism, the "combined" pictures of the photographer. It is when this test is applied that the picture before us claims its true position as an imaginative work. We do not see the "knots and joints," we do not mean the joints in printing, but in working out the conception and composition. Let us add, for the benefit of young photographers who may be tempted to tread in Mr. Robinson's steps, that a work of this kind cannot be produced from a crude conception. Months before this picture was commenced, we received from the artist a well-drawn sketch, in which the design and composition of the intended picture were fully indicated, these being specifically settled before a negative was taken.

The mechanical portion of the picture is, notwithstanding the difficulties, admirably managed. The printing of nine negatives on a sheet of paper, forty inches long, and requiring, from the commencement to the conclusion, about eight days, is not a light task. But it is admirably executed in all respects, and the general quality and tone of the print are admirable. Of Mr. Robinson's former compositions, especially the "Holiday," and "Lady of Shalott," we spoke freely, and whilst we admired their beauties, we pointed out what we thought to be their faults. We will not be so hardy as to say that this has no faults; but we are bound to say that, at present, we have not seen any. We are conscious that we have given but a very faint idea of our impression of the great beauty and excellence of this picture; but as it will be sent to the next exhibition of the Photographic Society, to be held in January, photographers will be able to supply for themselves what we have failed to convey.

## DOUBLE OR FANCY PRINTING.

BY H. COOPER, JUNR.

As I find that Mr. Harmer's communication, which appeared in the pages of the News a short time back, has excited considerable interest, and as a few specimens printed by some of the methods there mentioned have been much admired, I think I may be pardoned for going somewhat fuller into the subject than Mr. Harmer has done. I am afraid that several are in the same dilemma as your correspondent, G. G., with regard to it. I was myself, but having adopted some of the dodges beforehand, I was able, after some trouble in thinking over the subject, to make out the way to use the masks, &c., mentioned. I will, therefore, ask the reader to give me his careful attention, while I detail, as clearly and concisely as possible, the "ways and means." But I must first remind him that it is no easy task, as it is difficult to know how to say enough without becoming too prolix. But to the point.

A vignette generally softens off on to white paper, so that there is a mass of white all round, which in some instances seriously deteriorates the high lights of the pictures. Now, I dare say, it will occur to many, but why not make this mass of white of a middle tint, so that it will relieve and throw up, instead of detracting from the portrait or view, as the case may be. I will first explain how this effect can be gained. Many might think of a vignette glass, such as is used for vignetting positives on glass. But this would not do at all well, on account of the vignette being an oval. The following is the best. Print the vignette as usual. Let it be as "soft in the softening" as possible. When it is printed the required depth remove it from the pressure frame. Now procure a piece of very thin glass, free from air bubbles, specks, &c., and having made it perfectly clean, lay the print, face downwards, on it; then place a piece of black velvet over the back of the print, and over that another sheet of glass. The whole may be held together by American wooden clips. Then turn it over, and with a small brush filled with a solution of gum arabic, go over *carefully* that part of the front glass that covers the features, shirt-front, &c., supposing it to be a portrait. Lay on a lump of fine cotton wool, taking care that the centre part be opaque enough to prevent any light finding its way through. Now pull out the edges till it softens off just the same as the vignette. Expose it in the shade till all the uncovered part is exactly the tint of the shade behind the head. If the flat tint be required only of this depth, the operation is finished, but should it be wished to make it darker, collect all the wool up into a nob, so that it shall protect the parts sheltered by the gum, and no other. Now moving it about, to prevent a halo being formed, print to the required depth. I have explained this "dodge," first, as the effect is more simple, although more difficult, to produce than some I shall touch upon presently. If properly managed, the effect of the above is very fine, the photograph, particularly if it be large, giving the idea of a drawing on India paper, having the high lights put in with white. I would advise that all fancy prints be mounted neatly on a mount, having the centre of an India tint, so that when the photograph is placed upon it, there is a tinted margin between it and the white. For all the following "dodges," masks are required.

Procure some good black or deep yellow paper, which will bear inspection when held up to the light, being free from pinholes or other defects. Take a sheet of it the required size, and with a shape and a sharp pen-knife, cut an oval, round, square, or any other form, from the centre. So you will have a shape of paper, and a sheet with an aperture in it. These masks, as I shall call them, must be very evenly cut, the edges being perfectly free from jags. The next style to the one explained above, is a picture, vignetted on an Indian tint, with a white margin. The production of this is very similar to the preceding. Place one of the masks with an aperture in it, between the print and the sheet of thin glass, taking care that the vignette is in the centre. Proceed as before.

The third style is a vignette, softened on to white paper, with a tinted margin. After the vignette is printed, remove it and the negative from the printing frame, or better still, a separate frame may be used. Take one of the masks, or shapes, and place it on the print, carefully centring the picture. Put the print and mask in the frame, and expose to light till the required tint is gained. These three methods I call the single ones, all others are compounded of them. A very pretty picture may be produced in the following manner:

Having proceeded as in the last instance, using an oval mask, so as to allow the paper to be white for half an inch or so round the vignette, take the frame into the dark room, and remove the print and mask from it, then place in front of the print, an oblong mask, with the corners rounded off, of such a shape that the oval first printed may be equidistant from its four sides, and having replaced it in the pressure frame, expose to light, for half as long as it was exposed to gain the first tint. I do not think it necessary to describe any other styles, as, by the judicious use of different shaped masks, hundreds may be produced, and after the operator has become conversant with the ones detailed, numbers are sure to occur to him. To cut the masks, the mats used in mounting photographs on glass may be employed. By printing the different tints at different times, allowing an hour or two to elapse between each, several tones on the same picture will be produced, which may be often used with advantage. In conclusion, I would remind the reader that the end of all fancy printing is to improve the print so that any designs used, must be kept quiet and subservient. The flat tints should never be made very dark, as it would give a heavy effect to the whole.

## PHOTOGRAPHIC PRINTING ON WHITE SILK.

BY HENRY COOPER, JUN.

Since the publication of my last communication, I have printed some photographs on *silk*, by the aid of the resins used for preparing the paper for the new method of printing; and as the results have been much admired, and have excited considerable interest, I do not think a short account of the method used would be uninteresting to your readers; and I should be obliged if you could find space for these remarks in your valuable journal. I have tried several formulæ, and although Iceland moss gave very nice results, I prefer to use a small quantity of a resin to give a surface to the silk, to prevent the image sinking too much into its substance. A great deal depends upon the silk, so that the first point is to procure a suitable kind. It must be rather stout and opaque, and very perfect in the thread. The best French glacé answers very well, if it be of really first-rate quality; but I should think *gros de Naples* would do better.

Ascertain which is the right side, and mark it. As the silk will require to be ironed once or twice during the preparation, some fine flannel must be obtained, and three or four thicknesses laid on a board; this is to form the material to iron upon. If there are any creases in the silk, lay it face downwards, and over the back place a sheet of fine filtering paper, and then iron it until they disappear. Then prepare the following solution:—

| | |
|---|---|
| Pure frankincense ... ... ... | 4 grs. |
| Mastic ... ... ... ... | 2 grs. or 3 grs. |
| Chloride calcium ... ... ... | 15 grs. |
| Spirit... ... ... ... ... | 1 oz. |

Filter before use. Immerse the silk in the same manner as I directed for paper; but pin it up by two corners. To sensitize it, *immerse* in the silver bath, which should be 60 grains to the ounce, and faintly acid. Several pieces of silk may be immersed at the same time, so long as they are put in separately. This will save time, as they must remain in the bath at least a quarter of an hour. Turn the batch over, and remove the pieces singly, and again pin up by two corners. When the silk is quite dry, it is to be ironed, before exposure in the printing frame, in the same manner as I have described above. If this be neglected, the silk is very apt to cockle, rendering the prints misty in parts. The covering the back with clean filtering paper, both in the ironing and in the pressure frame, must on no account be omitted.

Print deeply; wash quickly; and tone in a bath of acetate of soda and chloride of gold, rather strong. Tone to the required depth; *wash well;* and fix in new hypo; this should be also rather strong. Wash very carefully and thoroughly; taking care that no impurities come near the prints, as the silk is easily soiled whilst wet. If the prints be small and are intended for book-markers, or things of that description, they may be simply dried and ironed; but should they be large, for screens, &c., they must be stretched, whilst wet, over a frame, and left to dry in a state of tension. Although the manipulations are rather tiresome, the photographer will be amply repaid by the results. The fruits are brilliant in the extreme; the shadows are particularly deep and transparent, and every detail in the negative is perfectly rendered on the silk. The uses to which this style of printing may be put, are almost numberless, and I would recommend it to the attention of all photographers; hoping that all who try it may succeed.

Note on Resinized Paper.—I have recently made some improvements in the formula for resinized paper. By the new method, the paper will keep after sensitizing as long as albumenized paper; the prints possess greater transparency in the shadows; and are free from the granular appearance to which I called attention in my last remarks. Immerse thin *Rive* (I used a negative paper) in a sufficient quantity of the following solution, which may be filtered through paper:

| | |
|---|---|
| Pure Frankincense ... ... ... | 10 grs. |
| Mastic ... ... ... ... ... | 8 grs. |
| Chloride of Calcium ... ... ... | 15 grs. |
| Spirit ... ... ... ... ... | 1 oz. |

The proofs are easily toned, and any tint may be obtained. The fact that the tone becomes bluer when the print is dry, must not be lost sight of. A slight application of Clausel's encaustic paste is a wonderful improvement in some cases. By a judicious use of it, some parts of the picture may be brought out more prominently than others. But I would not advise its use except as a last resource. H. C.

## THEORY OF ALKALINE GOLD TONING.

BY FRANCIS G. ELIOT.

Dear Sir,—Perceiving that you have been for some time endeavouring to work out the faults of the alkaline toning bath, and that a correspondent under the title of "Photographer's Assistant," has been writing some able articles on this subject, and has lastly advanced a theory on its supposed nature, I beg to inform you, that having for some time been working in the same direction, I have at length hit upon what I believe will be found to be the correct solution of the difficulty, and if so, will greatly improve our knowledge of this hitherto troublesome part of our manipulation.

Your correspondent has very nearly got upon the right track, when he says he believes a decomposition of the gold takes place, but I think he has a little missed the mark in his explanation; to go at once to the point then, I believe the gold solutions to exist in four states, and taking the chloride of gold as a simple terchloride, according to the English school of hydrogen being 1, not the Berzelius scale of 0·5, as your correspondent has it, we have, first, $Au\ Cl_3$, plus free acid, the state in which the gold is usually sent out, and the state in which it was used by Le Gray and others, for toning. Secondly, $Au\ Cl_3$, minus free acid, the state in which it exists in a bath in which any quantity, no matter how much, carbonate of soda is thrown in, and in this state a first batch of prints being *immediately* immersed: its action is as follows: the prints are very much reduced, a false colouring is given, which dissolves off in the hypo. If the prints are kept long in, to get full toned, a nasty slaty colour is produced, and general mealiness is the result; it is not until the gold is nearly exhausted, that the prints begin to tone properly.

Thirdly, $Au\ Cl_2$, this is the state in which No. 2 becomes after a number of prints have been toned in it: it also comes by keeping the bath for some time, and also by heating, but it is best produced by adding one equivalent of soda carb. only, to No. 2, and allowing decomposition to proceed as far as it will go. Here we are met with a difficulty, the varying amount of free acid in different samples of chloride of gold. The atomic weight of chloride of gold is 303, and of crystallized carbonate of soda, 144, and the dry, as sold for effervescing draughts, containing 40 per cent. of alkali, about one-third less, so that if my theory is correct, one-third grain to every grain of gold would be enough. That the quantity generally used is more than necessary, is proved by the fact, that Mr. Thomas, the celebrated collodion maker, exhibited at at a meeting of the society, some separate toned prints, with only three-fourths of a grain of carbonate of soda to each grain of gold; probably with any other gold but his own that would completely fail. I believe, however, that the chief failures are to be attributed to a *perfect decomposition*, as far as the soda will allow, not having taken place. I shall presently indicate a method of doing this quickly, and with certainty.

Fourthly, and lastly, there is Au Cl. This is the state in which Nos. 2 and 3 will become if a larger quantity of soda is added than is enough to destroy the free acid, and one equivalent more. It also is produced under the same circumstances when the prints are *boiled* in the bath, to try and make them tone quicker. Many operators are surprised to find the bath suddenly stop, when they know there ought to be plenty of gold in it, the solution when in this state; becomes quite colourless, and is so inert that it may almost be said to be devoid of toning properties altogether.

Now for some practical conclusions from the above: the first thing would be to find the amount of free acid in the gold; but the only method I know of to do this, is a very uncertain one in the hands of inexperienced persons: it is to add soda carb. to the gold, until test-paper is no longer strongly reddened, but the difficulty of seeing the difference between the acid of the hydrochloric, and the reddening of the free carbonic, will lead some to add a much larger amount than will be correct. I can therefore only recommend the following: lay in a stock of gold so as to save trying often, keep it in solution, say 8 or 10 grains to the ounce, for use; then take four or five beaker glasses—clean jam pots will do as well—put into each, say ½ ounce of gold solution, and into the first ½ grain of soda per grain of gold; second, 1 grain; third, 2 grains; fourth, 4 grains; fifth, 6 grains; pour on each 4 or 5 ounces *of boiling water*, which will, in ten minutes or so, bring on a perfect decomposition of the gold. Then dilute to the proper extent with water, and immerse a few prints in each, the results will probably be as follows: No. 1, prints reduced, bad colour, horridly mealy; No. 2, little better; No. 3, intense black and white, rather increased than reduced in strength, toned rapidly, and do not change in the hypo. This solution will tone from two to three sheets to the grain of gold before it is exhausted, and will not require to be heated to tone quick enough in any state of weather up to this date, end of October.

No. 4, the solution has become first, colourless, then slightly opaque, a greenish deposit on the side of the glass, and when prints are immersed, hardly any toned action at all. I do not say that these preparations will act exactly with all gold in the order indicated, but they can be produced most certainly with every sample of gold that may be obtained.* I can only say in conclusion, let every one work it out for himself, and if I have advanced anything that may aid the thoughtful printer in his endeavours, I shall be only too gratified, and would wish him every success.

## Photographic Tourist.

### A PHOTOGRAPHIC TRIP TO THE PITCH LAKE, TRINIDAD.†

BY W. TUCKER.

Next morning we returned by the same road, and found everything as we had left them the day before, safe and dry, although it had rained considerably during the night. Hills close up this side of the lake, and on the one over which we passed a very pretty view of the lake and its islands is obtained through a vista of trees. The depth of the pitch is probably less on this than on the northern or La Brea side. Patches of high grass, and islands covered with trees, occur frequently, and considerably relieves the monotonous appearance. After a refreshing bath in one of the larger fissures, we made our way to the centre of the lake, where the greatest uninterrupted mass of pitch is collected. The natives call it pitch-pot on account of its round form, resembling a giant iron cooking-pot, and from the bubbling noise in the soft pitch in several parts. To me it resembled an immense black pie-crust. The Pitch Lake is highest on this spot, and the rain water finds its level in the crevices of the lower sides. All attempts to ascertain the depth of the lake have been unsuccessful; a hole that had been cut out by Mr. Stollmeyer, large enough to allow of twelve men working inside, closed up in a couple of days, and before all the material cut out with wooden axes, could be carted away. The surrounding layers or waves of pitch press towards any disturbance of its equilibrium, and no practical purposes could be served by digging lower under increasing difficulties. The experiment, however, is sufficient to prove that millions of tons of asphalt are here attainable. Near the pitch-pot is found in several places the soft or semi-liquid pitch of the consistence of stiff dough, oozing up from beneath—the actual oozing is not observable, but in several places near the edge there is a bubbling of muddy water and gas—giving forth a disagreeable odour. The negroes said that several cattle had disappeared in the soft pitch, and some time after again reappeared floating in the gulf. The water oozing up is strongly impregnated with salt, and mixed with grey mud; and certainly from its taste, and the colour of the mud, strongly leads to the belief of its connection with the sea. The semi-fluid pitch, when cut, resembles fermented dough; and water can easily be squeezed from it by pressure from the hand. It is not at all adhesive, and will bear passing over it at a quick pace in the wet season. In no part is it deeper than the fissures, which, too, sufficiently proves the absurdity of the idea of any large animal disappearing in it. In fissures formed near the pitch-pot, the soft pitch generally replaces the rain water, which it forces out from the bottom, and retains the base of hard pitch. This soft pitch requires a long exposure to the sun, in order to evaporate the large portion of water with which it is mixed, before it will solidify and combine with the hard pitch of the lake; until then it lies on the surface as a flake, in the form of the fissure, and may be removed near the edges, curled up and rolled without much soiling the fingers. Near were several of the filled fissures, in which the pitch was quite hard. In several parts of the lake, but particularly near this spot, several parts of logs and branches of trees were above the surface. I examined several, and found them in different stages of transformation; some were merely saturated with petroleum, others were of the same bituminous consistency as the pitch, but more brittle, and retaining all the fibrous appearance of wood. Others were traceable on the surface of the lake only from the fibrous appearance of the log, having, as it were, become fused into the main body of the lake.

As the morning was showery I did not attempt to photograph. At mid-day, however, the sun shone out with a true tropical glow, and soon dispelled the icy appearance given to the surface by the rain, and resumed its usual dull black. Having taken off my boots a little time before, I was glad enough now to seek their protection from the heated surface, which rendered the manipulation of the next two views a matter of great difficulty, from the intense heat in the tent, combined with what I cannot better describe than as hot bricks under my feet. I was glad to lean on the edge of my tent and relieve the burning sensation by lifting both my feet at times during the process, which caused the tent so to sink on this side as to require a fresh removal and re-levelling (for this reason, that I made use of the top in place of a tripod stand). By perseverance, however, I obtained three views. In the meantime, the surface of the lake had become so hot, that standing in one position for twenty seconds caused a burning, blistering sensation in the soles of the feet. We now, and to my relief, moved over to the southern side, which is, perhaps, the most interesting portion of the lake, being bounded by beautiful Moriche palms, which are reflected in the rain-water between the pitch deposits in as clear and sharply defined a manner as in a mirror. Nowhere in Trinidad is the Moriche palm found in such numbers, and in such perfection as in this particular place, where they grow wild. No visitor to the Pitch Lake should omit seeing this jewel of Nature; but

* I would also add, that the gold in the state of Au Cl is much more permanent than is usually imagined. I have kept it undiluted for a week, and no doubt it would keep much longer; it is excess of alkali that causes it to go on decomposing, and then to precipitate the gold.

† Continued from p. 513.

from the difficulty of reaching this spot it is seldom seen. I had some trouble in obtaining a sharp negative of these trees, owing to the constant movement of the long pendulous leaves. In the woods behind these Mr. Stollmeyer had the fortune, a few years ago, to discover an independent nugget of exceedingly fine glacé pitch, which when shipped to England, realized a good price; unfortunately, it was only a few tons. None of the same kind has since been found. The southern half of the lake is dotted with small islands, composed of small trees, amongst which grows the Moriche. It is supposed that these islands are formed on the apex of the earth's uudulations, which run under the pitch, and at these spots approach the surface. Clouds, which had been gathering eastward, now covered the lake, greatly increasing its gloomy appearance; a cool wind blew in puffs; birds in hundreds flew over the lake westward; Nature seemed suddenly hushed; noise, like the falling of small pebbles over the forest, was now heard, and the burst of a regular tropical storm, which, in less than sixty seconds completely saturated every part of our clothing, and continued falling over a quarter of an hour, defying umbrellas and cloaks, and gave to the surface an appearance of a lake of rough ice, caused by the strong reflecting power of the water when covering the pitch. I obtained a view of the appearance just before the storm, and one immediately after. As I had seen everything interesting, and taken, in all, fourteen views, we now left the lake for the last time, and returned to Point Rouge. On the Saturday following we returned to La Brea, and at 4 p.m. embarked on board the return steamer for the capital, where we arrived at 10 o'clock. Observation has proved that the whole material of the lake is in a slow, but constant movement. During my conversation with Mr. Stollmeyer, I was led to inquire from him the probable origin of this wonderful work of Nature. It has not yet been clearly determined whether this asphaltum is a mineral or vegetable substance, Mr. S. takes it to be a link between the two; it appears to him to be the result of a distillation of vegetable fibre mixed with earthy matter under high pressure; but a circumstance which brought together such an enormous quantity of woody fibre to this particular spot, which, in its decomposition, produced millions of tons of asphalt must ever remain a secret. It is, however, not improbable that before the separation of Trinidad from the mainland of South America, viz., before the Brocas' and Serpent's Mouth were formed by the waters of the Atlantic, the Gulf of Paria was a lake receiving the waters of the Orinoco and the Gurapiche rivers, quantities of timber, brought down by them, may have drifted to that spot, until successive layers reached above the level of the water, which must have been then much higher than the present level of the Gulf, if, as it is supposed, the fertile valley of the Naparimas, which abounds in fresh-water shells, formed the bed of the river that delivered the water of the lake iuto the Atlantic Ocean. Whether the above hypothesis be correct or not, the existence of the Pitch Lake is a reality, and it is fairly to be supposed that at some future time it will become an important element in the prosperity of Trinidad. Upwards of 3000 tons were exported in the years 1860-61. Whenever enterprise and science take a firm footing in Trinidad, La Brea will become the Newcastle and Birmingham of the West Indies; and this black diamond of Trinidad will furnish the means of giving employment to thousands of industrious people, and wealth to many enterprising men.

The whole of the land circumjacent to the Lake, with Point La Brea, is the property of the Earl of Dundonald, who also leases from the Colonial Government twenty acres of the lake. Various specimens of raw asphalt, and a few of the purposes for which it may be used, have been forwarded to the International Exhibition.

## Proceedings of Societies.

### London Photographic Society.

The first meeting of the Photographic Society for the session was held on Tuesday evening, at King's College. Mr. Francis Bedford in the Chair.

The meeting was a full and interesting one, and the table was liberally bestrewn with many excellent specimens for exhibition and for presentation to the society. Amongst these were some fine large pictures by M. Debedts, and a series by Mr. Clifford, illustrating a work entitled "Scrambles in Spain;" both sets being forwarded by Mr. T. Ross. Mr. Martin exhibited a print and some negatives, intended to illustrate the excellent qualities of the bromo-iodized collodion—Messrs. Horne and Thornthwaite's—with which they were taken; and he also called attention to Mr. Harmer's two albums, containing specimens of double printing and chromo-photographs, to which we have before called attention. Mr. Hughes exhibited some charming *cartes de visite*. Mr. Dallmeyer exhibited some very beautiful examples of the work of his card lenses. The Stereoscopic Company sent a number of choice specimens of their photographs of the interior of the International Exhibition, by Mr. England and others. Mr. Warner exhibited a handsome album, made to hold a dozen card portraits on one page; the album was filled with specimens of views, &c., the introduction of which, in card size, Mr. Warner claimed. Mr. H. Cooper, jun., exhibited a fine collection of prints on resinized paper, and some very fine photographic prints on white silk. The whole of these specimens, with some others, were examined with much pleasure and interest.

The minutes having been read, the following gentlemen were elected members of the society: Messrs. J. W. Osborne; Hale, of Eastbourne; Reeves, of Falmouth; Mayland, of Cambridge; Heisch, of Piccadilly; and Clark, of Nuneaton.

Mr. J. W. Osborne then read a paper on "Some of the Difficulties of Photolithography." Presuming that members were familiar with his paper read at Cambridge, he called attention to points not before treated, and gave a brief description of the processes of other inventors. We shall give his paper in our next. At the conclusion of his paper he exhibited a series of interesting specimens, illustrating his own process, and also specimens of photolithographs, photo-engravings, carbon prints, &c, by Poitevin, Talbot, Cutting and Bradford, Pouncy, Pretsch, Ramage, and others, and by the process of photozincography, which he stated, though not identical with his own, was very similar.

After a few words from the Chairman,

Mr. Pouncy said he had listened with much interest to Mr. Osborne's paper, but had hoped to have heard some detailed account of the experiments by which he had arrived at his invention. If either Mr. Osborne or Col. James were the real inventors of the processes they claimed, they must have made many progressive experiments, the results of which would have been very interesting to see. However, Mr. Osborne had stated that he could not produce half tone, and that he did not know any one who could. Now he (Mr. Pouncy), could produce half tone, and was prepared to produce half tone on the face of a fine-grained stone, equal to that of a silver print. As he did not wish to challenge an opinion on his products by surprise, he was willing to attend the meeting that day month, and bring with him the stones, on which he would place the image from any negative with which any gentleman would supply him, and he would produce impressions in printers' ink of the same, equal in half tone to silver prints of the same negative. He was there to assert that the prints he now produced were *bona fide* impressions direct from the negative, in *bona fide* printers' ink, and he would produce impressions by the ink supplied by any printer in London with half tone equal to that of silver prints. Other prints he now produced were from the stone. Referring to the letter of Col. James in the *Times*, announcing the discovery of half tone, Mr. Pouncy said he doubted the truth of that statement. He did not believe that any one could produce half tone by the method described. Various persons had boasted of having invented the carbon process, and among others his own apprentice. If they had, they could produce results, and this he challenged them to do. His object now was to have the matter settled, and was prepared to have his claims tested. He wished it to be proved he was wrong, or admitted that he was right. If his offer were accepted, and a decision given, the matter would be settled; if not, the question might be re-opened twelve months hence. He wished first for the decision as to whether he had or had not obtained half tone; the method and its details would be a question for after consideration. If it were denied that he had obtained half tone then there would need no communication; but if it were admitted that he had obtained it, it would then be time to communicate how.

Mr. Jabez Hughes rose to a point of order. Were they now discussing Mr. Osborne's paper, or a distinct communication from Mr. Pouncy, of a character somewhat unusual to the Society? It was, he believed, not the custom to discuss any process, the details of which were not explained.

Mr. Pouncy said, he simply came forward, because Mr. Osborne said that half tone could not be produced, in order to show that it could.

Mr. Vernon Heath asked if the specimens handed round, were intended as illustrations of half tone. If they were, he had not another word to say, except that he did not see any.

Mr. Portbury said that he had been Mr. Pouncy's apprentice, and since he had alluded to him, he (Mr Portbury) distinctly said, that the carbon process, claimed by Mr Pouncy, was not invented by him, but by himself (Mr. Portbury), and that produced the very specimens Mr. Pouncy brought to a former meeting, some years ago, to illustrate his inventions. He produced the first carbon print, and Mr. Pouncy happened to come in whilst he was engaged upon it.

The Chairman deprecated further entering into personalities.

Mr. Pouncy said this person was not worthy of his notice.

Mr. Heath protested against such language.

Mr. Sebastian Davis, having had some experience in connection with lithographic printing, confessed that he had not much hope of securing half tones in photolithographs. There was no true half tone in lithographs at all; the only approximation consisted in the gradation formed by having greater or less space between the lines and spots of which the tint was formed, thus giving a certain granulation. The half tone in a photograph consisted of gradation of tint, and nothing approximating to that could be obtained from printing ink, which was one uniform colour.

Mr. Malone thought that this view seemed philosophical and true, but it was not absolutely so. He had reasoned in a similar manner to Mr. Davis, and, at one time, held the same view. He argued that the gradation in a silver print arose from variation in the depth of deposit of a more or less transparent substance, and that this was a condition, which could not be imitated in carbon, which was a uniformly black material. The carbon prints exhibited on a former occasion had not the half tone he claimed for them. These to-night had more, but, still, not so much as silver prints. There was still blackness in the shadows. As, however, they had neither the negative nor a silver print for comparison, much could not be said about the matter. Still, he thought it dangerous to state that half-tone could not be produced. He had recently seen some of Fargier's specimens in the International Exhibition. There were also some silver prints from the same negative. When he saw them apart, the carbon prints were so good that he thought them equal to the silver prints, and it was only when they were placed together that he saw that the silver prints really were superior in transparency and gradation. Carbon had, however, already accomplished more than had been anticipated, although not so much as silver prints.

Mr. Osborne was sorry that the discussion had not been confined to his paper, as its peculiarities might then have been considered. Regarding Mr. Pouncy, he had taken a somewhat incongruous position, in asking Colonel James and himself to detail their experiments, and thus tell him everything, whilst he told them nothing. He had made another error in saying, that he (Mr. Osborne) confessed he could not get half tones. He could get it, and did get it often when he did not want it. He got it whenever he had a dirty map to copy. The question was, as to getting perfect half tone, and as to the number of impressions which could be taken, and still preserving it as half tone. He was quite willing to admit, however, that he had not got any so good as that exhibited by Mr. Pouncy, as, indeed, in the work in which he had been chiefly engaged, they required just the contrary effect. Regarding Mr. Pouncy's claims, he did not quite see what he complained of. He surely did not claim the origin of the carbon process, or photolithography. These were due to M. Poitevin, who discovered them as early as 1855, long before Mr. Pouncy did anything. Photolithography by another process was executed as early as 1853, by M. Lemercier. Col. James or himself did not claim the invention of photozincography or photolithography, but of a certain simple method in which a transfer was used. Regarding the remarks of Mr. Davis, they were, in many respects, true, but it was dangerous to speak of such a thing as impossible, especially when they looked at the progress of photography. He believed that half tone would be obtained. Not, perhaps, as good as that in silver prints, but as good as that usually obtained in lithographs. It was possible that it might never be quite applicable to negatives from nature; but he thought that it might be obtained so as to admit of perfect reproductions of an artist's drawing, which, as a commercial question, might be of still greater importance.

After the usual votes of thanks the proceedings terminated.

## Correspondence.

### PRINTING DIFFICULTIES.

Sir,—Passing over the numerous arguments which tend to support the theory of toning, advanced in my last letter; we shall now briefly consider the nature of carbonic acid as a toning adjunct, so far as toning or surface clearing is concerned, the presence of this agent is unnecessary, for the binary compound NaO (plain soda,) will effect all this but the retarding influence carbonic acid exercises, on the process of decomposition produced by the chloride of gold in contact with soda, renders it a valuable agent, whose duty is to economize the consumption of $Au_2 Cl_3$ for its combination with soda must be destroyed before a connection can be formed with the chlorine, hence the greater the volume of the acid present with the soda, the more slowly will decomposition be effected. Again, its presence as an acid tends to neutralize, to a considerable extent, the causticity of the soda with which it is connected, and as it unites in various proportions with that substance, the printer has at his command a selection to meet the requirements of his paper; but for general purposes, the carbonate, in my opinion, is decidedly the best, the toning powers of the bath become exhausted sooner than when bi-carbonate is employed, but if toning is commenced soon after the bath is mixed, the gold will go as far with the former as with the latter substance, although a bath made slightly alkaline with the bi-carbonate, will retain its powers many hours after mixing, whilst the simple carbonate solution decomposes in an hour or two. The acetate of soda bath, owes its, not altogether deserved popularity, to the retarding influence exercised by its four equivalents of carbon, but although the process of decomposition is somewhat more complicated, its direct toning action is precisely the same as with the soda carb.; so also with Le Grey's chloride of lime bath, which is but a round-about way of bringing about the same action and results. The chloride of sodium takes the place of carbonic acid to stay the rapidity of decomposition, in fact, any base of a caustic nature, possessing an affinity for chlorine, would answer the purpose of a clearing agent, the important object is to introduce a substance, which, whilst it retards, does not altogether arrest the progress of decomposition, these properties we have to a remarkable degree, combined in the carbonate of soda bath, which is at once the cheapest, the most simple, and excuse me for saying, the most scientific toning compound in use; for I repeat, the numerous agents which have been brought forward to supersede the soda carb. are but complicated methods for producing the same process of decomposition, and so far as my experience goes, I have never found that they effect a greater saving of time or gold. A volume would be required to enter fully into details, but any one who will take the trouble to study the subject, will, I am sure, come to the conclusion that carbonate of soda is all we require in our present system of toning, and if Mr. This and Mr. That One, produce exquisitely toned prints, with this or that toning solution, it is because the negatives employed are as exquisite as the prints produced, and if fine tones are given by the acetate of soda bath, tones equally as good may be secured by adopting the carbonate solution; depend upon it the secret of fine tones is not in the toning bath, but in the negative! and to my mind there is nothing more absurdly unjust, than for a photographer to expect brilliantly toned prints produced from negatives without an unveiled shadow; by comparing, a veiled with a perfect negative, the contrast is as striking as a comparison of the prints produced from the same two negatives. In my next and last letter on printing difficulties, I shall endeavour to show that the process of toning may be reduced to a system.—Yours, &c., A Photo's Assistant.

## AMMONIA AS A DEVELOPING AGENT.

Sir,—In some experiments in the tannin and honey process, in which I tried fuming with ammonia as an accelerator, I remarked that, when the plate was washed after the fuming, the image came out very distinctly; it struck me that the ammoniacal vapour might have become, in some measure, fixed on the plate, and that, on the application of the washing water, it dissolved and acted as a developer. Following up this idea, I gave a plate a very short exposure in the camera, and *immersed* it in a very weak solution of ammonia; almost immediately the picture began to appear, and continued to come out until nearly all the details were visible. I then washed it well and applied the pyrogallic acid and silver, which rapidly completed the development of the picture, without the least sign of fogging or stain of any kind.

This development of the latent image could not have resulted from any free nitrate being left in the film, as I not only wash it thoroughly after sensitizing, but also pour a 3-grain solution of chloride of sodium two or three times over it, when I again wash and pour on the tannin and honey solution. The use of the ammonia in the liquid form, I think, has one great advantage over the fuming, it acts equally, and the picture being washed before applying the pyrogallic acid and silver, no deposit (such as sometimes occurs when the *fuming* is carried to any extent) can take place.—Your obedient servant, T. M. Leahy.

*Dublin, 23rd October*, 1862.

## Talk in the Studio.

Col. James's New Work on Photozincography.—We have received the new work on photozincography by Col. James and Capt. Scott. It contains some interesting historical matter, as well as a description of the process; and is illustrated with several fine specimens of the process. We shall shortly review it at length.

Medal for Card Portraits.—In our article last week on "Photography and the Contemporary Press," we remarked that Mr. Robinson received the only medal for card portraits. Mr. Mullins, of Jersey, has just called our attention to the fact that we are here guilty of an inadvertent error; as he exhibited little other than card portraits, and still received a medal. In making the remark, we were thinking of the British Department, and thus those of Mr. Mullins escaped our memory. We have pleasure, however, in correcting the error, and expressing our admiration of the very charming specimens for which Mr. Mullins obtained a medal.

Photographic Piracies of Engravings.—Mr. Gambart has recently commenced the prosecution of some photographers who have pirated his copyright engravings. Details of the cases, and some remarks on the subject stand over for want of space until our next.

Photography and Forgery.—Our article on this subject has been quoted into various commercial and scientific journals, foreign and English. We are informed that some of the Bank authorities have recently had their attention called to the subject, and that the question has received grave consideration. Hitherto, the system of check between number and date, together with Bank private marks, have been a safeguard to prevent payment of forged notes by the Bank. Now the question arises, although there is not much danger of the Bank authorities paying the representative of the same note twice, whether they might not possibly pay the counterfeit first. Moreover, however safe the Bank may be, it is important that the public should be made safe also.

*** Agents or subscribers having copies of the following numbers of the present volume, which they can spare, will confer a favour by forwarding them to the office, where they will be exchanged or bought at full price: Nos. 174 187, and 196 to 203.

Col. Sir H. James's Photozincographs with Half Tone.—We have been favoured by Col. Sir Henry James, with a couple of examples of his method of obtaining half tone by means of photozincography, and some further information on the process. So far as we can judge, by a hasty examination of the specimens by gas-light—they arrived at the moment of our going to press—there is every reason to hope, that a very wide step is at once made, and that photozincography, instead of being confined to reproduction, may be used for printing the images obtained by photography from nature.

## To Correspondents.

Amateur.—Negatives produced by the method of intensifying by means of bichloride of mercury, and iodide of potassium, as practised by the late Mr. Lacy, and described in our columns, are not likely to fade; but there is one drawback to their usefulness which has recently been brought under our attention, which becomes serious in pictures intended for publication, and where many prints are required. They become more intense with printing. The deposit seems to become more nonactinic by contined exposure to sunlight; and negatives originally soft, will sometimes become quite chalky by the time a few hundred prints have been produced.

W. May.—The recent Fine Art Copyright Act only refers to pictures not sold before the 29th of July last, as you will perceive on reading the first clause of the Act, giving copyright to all paintings, drawings or photographs "which shall not have been sold or diposed of before the commencement of this Act." 2. The answer depends entirely on the circumstances. If A be the owner of the copyright of the picture painted for B, you cannot copy it for B without the permission of A. If, however, no agreement exist, A will not possess any copyright, as, according to our reading of this obscurely worded clause in the Act, an agreement in writing is necessary to secure the copyright to either vendor or vendee in all cases where the work is a commission. If neither A nor B possess a copyright, there can be no impropriety in your making a copy for B.

Charles.—Your communication was duly received, and merely waits a convenient season for insertion. There has been a great pressure on our columns recently.

A Subscriber.—Glass is the best substance upon which to cut out photographs; it allows a clean cut free from ragged edges, and does not turn the edge of the knife as might be expected. 2. A good plan in cutting out stereo views is to go through them first and mark on each one a point to which a certain part of the guide must be placed. 3. The right hand view should possess a little (not more than the eighth of an inch) more of the right side of the picture; and the left hand view a little more of the left side; that is, the inside of each view should have a trifle more cut off than the outside.

B. K.—You will find instructions for erecting a glass-room in No. 59, p. 73 of our third volume. You may have six feet opaque over head, and the same space opaque at the side at the background end. For the remainder of the north side it will be better to have all glass down to the ground if you can manage it.

H. Steed.—The pink or ruby tint in your prints arises from a peculiar action of the gold bath, probably induced by the action of light on tho solution. In certain conditions, not always easy to define, the gold becomes reduced to a ruby condition, and is in such fine subdivision that it remains in a state of suspension resembling solution, and in this state it has a tendency to stain the paper. If prints are toned in the light this staining action is sometimes brought about.

F. G.—The development of bromo-iodized collodion proceeds more slowly than that of simply iodized collodion, and may be carried further without fogging. If you have been accustomed to simply iodized collodion, you may be easily deceived, and be in danger of under-development.

Argus.—Thank you for the clipping. We saw the paragraph to which you refer from the *Cornhill* chopped and twisted a little, and then inserted without acknowledgment. The journal in question has a strong *penchant* for this kind of appropriation, and hence its readiness to suspect others. As we have stated before, however, it is not a matter worth notice.

Francis S. Beatty, referring to the recent correspondence on photolithography, &c., in our columns, states that the claims made are for processes similar to those patented by himself, and states his intention to support his claims by legal proceedings. He rightly conjectures that the columns of the News will always be open in support of justice; but it must have escaped his attention that the discussion in our columns has reference to processes discovered and published in 1859, whilst the dato of his patent is 1860.

L. F. C.—The chief fault in your card picture arises from placing the camera too high. It is thus difficult to get the feet in focus; and an unnatural slope is given to the floor, which looks as if it were an inclined plane, upon which it would be impossible to stand. The accessories are also too obtrusive. The tone and printing, generally, are pretty good; but the printing might have been a little deeper. The mounting is, also, a little slovenly.

M.—You had better clean the plates with your old, decomposed collodion. An old red collodion which, instead of giving intensity, is slow, but gives a thin grey image, is useless, either for taking negatives alone or mixed with other samples. 2. With a freely-bromized collodion, sufficient exposure is necessary to obtain density. With a simply-iodized collodion, short exposure will often give intensity, but, lack of half-tone; this is not the case with a bromo-iodized collodion. 3. Tho method of intensifying with pyro and silver, after the iron, and before fixing, is generally safe and satisfactory. 4. Fix with hypo, in preference to cyanide of potassium, but be careful to wash very thoroughly.

Young Man from the Country.—The usual exhibition of the Photographic Society will be held this winter. The exact time and place are not yet fixed we believe.

Several articles, letters, and answers to correspondents are compelled to stand over until our next.

# THE PHOTOGRAPHIC NEWS.

VOL. VI. No. 219.—*November* 14, 1862.



## COPYRIGHT IN ENGRAVINGS.

In another page we give in detail the proceedings recently taken by Mr. Gambart, the well-known publisher of engravings, against certain dealers in photographic prints, who were selling photographic piracies of his copyright engravings. In the recent Fine-art Copyright Act, although engravings were not generally included under its provisions, being already protected by more than one Act, there is a clause inserted with the evident purpose of simplifying the mode of securing redress in case of piracy. The remedy given to owners of copyright by former Acts, was to be obtained through the operation of the superior courts of law; always a tedious, and generally an expensive mode of securing redress. By the eighth section of the recent Act it is enacted that the penalties incurred by an infringement of copyright granted by former Acts, shall now be recoverable by summary proceedings before two justices of the peace. Mr. Gambart, having been a considerable sufferer from piracy, sought a remedy from the sitting magistrates at Bow-street. It is not necessary here to recapitulate the details of the case, which appear in another page; suffice it to say, that on some technical grounds, Mr. Corrie dismissed the summons, stating, however, that a wrong had undoubtedly been done; but that the remedy must be sought in a civil court.

We cannot presume, of course, to measure legal opinions with Mr. Corrie, in such a matter; we must confess, moreover, we do not clearly understand the nature of his objection to exercise jurisdiction in the case, his judgment as reported in the *Times*, not being altogether so clear or intelligible as might be desired. From our own reading of the Acts passed in the 8th of George II, and the 17th of George III, with the 8th section of the Act passed last session, we should have had no hesitation in saying, that in the case tried, the Act had been contravened, penalties incurred, and that the penalties were recoverable by summary process before two justices of the peace. We should think it very improbable that Mr. Gambart will let the matter rest on such a decision, which makes the recent enactment practically inoperative.

Apart, however, from all considerations as to the legal boundaries set to this wrong, and the difficulty or ease with which a legal remedy may be obtained, it is clear a monstrous wrong is perpetrated. It is not a question of casuistry upon which conscientious men may honestly hold different views. Here is the broad fact that Mr. Gambart gave upwards of two thousand four hundred pounds for a painting, chiefly with a view to the profit to be obtained by multiplying and selling copies of it. Those who copy his engravings simply rob him. They seek to make a profit out of the investment of his capital. We know that some plead the uncertainty of the law, as an excuse. They say, let the law be clearly defined and we will obey it. But if the law of England, even, were somewhat inexplicit on this subject, there can surely be no uncertainty as to the morality of the matter. Every shilling made by these piracies is profit on another man's capital, who suffers loss, probably in geometrical ratio to the gain of the pirate. We earnestly call upon all photographers having interest in the respectability and legitimate use of the art, to discountenance, by every means in their power, this dishonest application of it.

On the other hand, publishers of engravings have, we regret to say, largely opened facilities for these piracies, and tended to complicate the popular view of the question by neglect of certain precautions. The original Copyright Act for engravings states it as a condition by which protection is to be secured, that each print must have upon it the date of publication and the name of the proprietor of the copyright. In many instances artist's proofs have been issued, we believe, without any such precaution having been taken. A photographic piracy of such a copy may be made with impunity. The fact becoming known that some copyright engravings may be copied without coming within the pale of the law, the ignorant or unscrupulous readily jump to the conclusion that it is a complicated question, and that there is no certain illegality in any case, and readily regard piracy as vulgar minds regard poaching or smuggling, as at least venial, if not praiseworthy.

The suppression of piracy does not in any way lessen the legitimate value of photography for reproduction. A wide field is open for the skilful and enterprising, in the reproduction of old, rare, and valuable engravings, which are not copyright, and the skilful multiplication of which, on moderate terms, would be a decided boon to all lovers of art. Let those who practise reproduction devote themselves to these legitimate fields, and avoid degrading the art by practices which are injurious to individuals, repressive of enterprize, and antagonistic to the sister arts.

## PHOTOZINCOGRAPHY, PHOTOLITHOGRAPHY, AND PHOTO-ENGRAVING—WHO ARE THE DISCOVERERS?

What is a discovery? What is an invention? The perpetual recurrence of claims for discovery or invention, in connection with photography, and the amount of discussion which such claims often involve, render it very desirable that the application of these terms should be strictly defined. Yet, in no art are the boundaries which divide modification or recombination from invention so slight, or the distinctions so subtle as in photography. As a broad definition, we may state, according to lexicographers and common understanding, that discovery is the first perception of bringing to light of any fact, either as to any substance or any property of any substance not previously known, but which, nevertheless, did exist; but that invention is the production of something which did not previously exist. The substances may exist, and their properties may be known; but a new combination, or new application, producing new results, is, nevertheless, an invention.

The various methods of producing impressions of photographs in printers' ink, such as photozincography, photolithography, and photo-engraving, have occupied an unusual share of public attention recently, and in all instances involve, more or less, of the question of invention. Papers have been read at scientific societies, discussions have appeared in the daily papers, books have been published, letters have appeared in photographic journals, &c., giving these subjects a prominence altogether unprecedented, although, by no means exceeding their importance. In attempting to decide where invention begins, and modification ends, here we are struck with the fact, that in no photographic process have the steps been so gradual as those by which photolithography and the kindred process have been brought to their present state.

The principle upon which all photolithographic or carbon-printing processes of any importance are based, was discovered by Mr. Morgo Ponton, in 1838, or 1839—we see both dates quoted, and we have not the original communication in the *Edinburgh New Philosophical Journal* at hand to verify. Mr. Ponton then pointed out the peculiar action of light on bichromate of potash, fixing it in the paper, and rendering it insoluble. The next step is that of Mr. Fox Talbot, who discovers that it is the combination of organic matter and bichromate which becomes soluble under the action of light, and he takes advantage of this property to invent a method of engraving photographic images upon steel, which was coated with bichromate of potash and gelatine, which, being rendered insoluble by the action of light, protected the required parts of the plate from an etching fluid. Mr. Ponton discovered the fact of insolubility being produced, but speaks of the chromic salt as being insoluble; whilst Mr. Talbot advances a step and finds that it is the organic matter with which that salt is in combination, which becomes insoluble. The next step is an important one, and is taken by M. Poitevin, who applies this principle to the production of carbon prints, and to obtaining a photographic image on a lithographic stone, capable of being worked at a lithographic press. The great disadvantage of his process, and which appeared to prevent its coming into commercial use, was the fact that the image on the stone, consisting of a film of organic matter rendered insoluble, was liable to wear off and deteriorate before many impressions were taken. To render a process of photolithography of any practical value as a branch of economics, it was important that the image should be, as in the usual lithographic process, formed in greasy ink on the stone, without any intervening layer of organic matter. This it was sought to effect in various ways, but with only partial success. Messrs. Cutting and Bradford effected it in America by a troublesome process, which they patented; but it was never, so far as we know, turned to much account. Mr. Pouncy produced the effect by a method not described, and with what success we have no evidence upon which to form an opinion. The principle upon which photolithography has been made a practicable working process, now rapidly coming into valuable commercial use, is based on the use of a *transfer*. Instead of coating the stone with bichromate and organic matter in any form, the process is performed upon paper, and a photographic image in lithographic transfer ink is produced upon it. This is easily transferred to the stone, which is then in the same condition as a lithographic stone produced in the usual way, without reference to photography. The substitution of a plate of prepared zinc, and a slight modification in manipulation, produces zincography, the principle being the same. The simplicity of the process, and the excellence of the results, at once bring this method into practical operation, and it is adopted by the Government in Melbourne, by Mr. Osborne's plan, and in this country by that of Colonel James.

There are other photolithographic processes, but we are now referring to a specific class, which is likely to possess the greatest economic importance.

In reference to the claims of Mr. Osborne to the invention of the process worked in the Government office, at Melbourne, and regarding which some correspondence has recently appeared in our columns, we think very few words are necessary. Mr. Osborne claims the production of an image on a lithographic stone, by means of a transfer from a photographic impression, in greasy ink, on paper. Some novel points of detail and manipulation are included in his claim, but the production and use of a transfer constitute the *differentia* in his process. But it is said that the idea of the transfer existed prior to Mr. Osborne's patent, and the attempt to work it had been made. Neither the existence of the idea or the attempt to carry it out, constitute an invention, unless the result be produced. We conceive this to be an important point. Credit is doubtless due to him who conceives a worthy idea; but the credit of invention is due only to him, who works an idea from its crude form into practical results. It is stated that the original idea of the use of a transfer was due to M. Asser, of Amsterdam. Probably it might be, but we cannot say. The first notice of M. Asser's process occurred in the Photographic News, of May 20th, 1859, in a letter from our Paris Correspondent, describing the French Photographic Exhibition. The passage is as follows:—

"We must mention, *en passant*, some lithographic stones exhibited by M. Asser, of Amsterdam. They are engraved photographically, and M. Asser calls them 'positifs à l'encre d'imprimerie (positives in printing ink),' and 'transfere autographique sur pierre pur sur cliché positif sur papier à l'encre lithographique,' or the transportation of a positive proof in lithographic ink on to stone. We are not acquainted with M. Asser's process. The specimens exhibited are far from perfect."

This was published on the 20th of May, in this country. Mr. Osborne's first use of the transfer, was on the 19th of the succeeding August. Admitting a good passage for the Australian Mail, and Mr. Osborne's eager examination of the News immediately on its arrival, he might possibly have seen this notice by the 19th of August; but we can scarcely conceive it probable that a process thus meagrely described, and disparagingly noticed, could have instructed him and enabled him to invent a process so perfect in its details, and bring it into use in the Government office on the 3rd of September in the same year. The next notice of M. Asser's process, appears in the Photographic News of December 10th, 1859, when more detailed particulars are published; and we then find that the two processes are widely dissimilar, and that so far as we can judge, Mr. Osborne's is vastly superior. We have Mr. Osborne's word, which there is no reason whatever to doubt, that he saw no notice whatever of M. Asser's process until the February of 1860, when his own had been months in active operation. M. Asser patented his process in this country, in the year 1860, but we have not heard that it has ever been brought into extensive practical use. Granting, however, for a moment, that Mr. Osborne saw the meagre notice which we have quoted, of M. Asser's process, his own is so materially different in details, and so superior, as to give it, in our estimation, an unchallengeable originality. The circumstance that Colonel James in this country, Mr. Osborne in Melbourne, and M. Asser in Amsterdam, should each, at the same time, have been working in parallel directions, is one of those odd coincidences of which the history of photography presents several striking examples. We may mention that the idea of a transfer as a means of getting an image on the lithographic stone was suggested by Mr. Sutton in 1858, but without any practical suggestion as to the means of effecting it. Our correspondent "Melbourne," invited our attention to a report of the evidence given before the committee appointed to examine Mr. Osborne's claims, and at whose instance his process was adopted and rewarded. We have gone through the dreary task, as in duty bound, and regret to state that we never met with more ignorance, self contradiction, recklessness, and manifest *malus animus*, than we find in the evidence of the witnesses opposing these claims. We have also seen another report, that of a meeting of the Melbourne Photographic Society, at which the committee appointed by the opponents of Mr. Osborne's claims, rendered their verdict. These gentlemen, notwithstanding the purpose with which they set out, report, after examination, that Mr. Osborne's invention was prior to, and superior to, the process it was said to imitate.

Mr. Pouncy has furnished us with a copy of a letter addressed to the *Times*, but not inserted by that journal, in which he claims priority in the use of a transfer. The following extract from his letter, embraces his claims:

1. That in January, 1859, ere either of the gentlemen mentioned above had come before the public with the promulgation of a process, I exhibited stones with transferred pictures upon them, at a meeting of the Photographic Society of London.

2. That in December of the same year a print, taken from one of these stones, was published in the *Photographic Notes*, not because I considered it a fair specimen of what I hoped

to be able to effect, but from circumstances having arisen which led the Editor to call on me for some available result of my process as it then was.

But (3) as I have recently attained the object of protracted labours, and reached a point which neither Sir H. James nor Mr. Osborne will claim to have been yet touched, namely, *the production on stone of photographs taken direct from nature*, while my previous process (identical in principle with that of both disputants) referred only to copies.

On reference to Mr. Pouncy's description of the stones exhibited in January, 1859, we do not find any mention of the word transfer, nor any allusion which indicates that they were so produced; and on reference to the *Photographic Notes*, we find the prints referred to described as carbon prints. It is quite possible that the stones were produced by means of a transfer, but they were not so described: and it is quite possible the prints issued in the *Notes*, were from stones produced by the aid of a transfer; but the term "carbon print," as technically understood by photographers, does not convey the idea of a print from a stone at all. In reference to the question of half tone, we shall have a few words in another article.

Colonel Sir Henry James in stating his own independent discovery, in no way challenges those of other people, but willingly recognizes their labours. We shall refer to his history of photozincography shortly, in reviewing his work on that subject. A letter from Mr. Ryder in the present number, by implication, claims a share in the invention, but is scarcely sufficiently definite.

Mr. Paul Pretsch writes to the *Times*, to protest against the injustice of awarding him a prize medal in the International Exhibition, for improved methods of photographic printing, whilst his real claim is for methods of photographic engraving, or producing, by the combined aid of photography and the electrotype plates, either in intaglio or relief, for printing at the copper-plate or typographic presses. We give his letter in another page. Mr. Lovell Reeve writes to the same journal, denying that Mr. Pretsch's processes are yet in a state for useful application. He says:

> On looking at some stereoscopic pictures prepared by his process, I found it to be an utter failure as regards its application to stereography. The pictures showed that the plate had been so much etched by hand, to mend the shortcomings of the etching by the action of light, that they would not combine in the stereoscope, to say nothing of a coarseness quite intolerable when viewed through the stereoscopic lenses. Compared with a photo-print from a negative, the picture was as the printed etching of a bee's wing seen through the microscope, when compared with the wing itself.

We may suggest, that to examine a picture in the stereoscope, is of all tests, that the least favourable to Mr. Pretsch's process, and that its unfitness for stereoscopic pictures, does not, necessarily, militate against its value for other purposes.

We feel it necessary to apologize to our readers for the amount of our space taken up by these subjects, in this and other numbers, at the present moment. But the great importance which attaches to every method of rapid production, and of securing permanent prints, renders a perfect record of progress of the utmost importance, both to photographers and their art.

## THE LONDON PHOTOGRAPHIC SOCIETY.

We have pleasure in recording a circumstance, which indicates the warm interest, which Her Majesty the Queen takes in photography, and in the Photographic Society of London as the recognized and representative guild of photographers. The Council of the Society, have recently deliberated on the subject, of presenting to each member a copy of a photograph, which, besides possessing excellence as a specimen of the art, should have an especial value, from the fact, that, it would be issued exclusively to members of the Society. At a recent meeting of the Council, it was suggested that the very fine portrait of His Royal Highness the late Prince Consort, taken by Mr. Vernon Heath, and never published, would be a most suitable picture for presentation to the members of a society, of which the late Prince had been the patron. Mr. Heath at once consented to place the negative at the disposal of the Society, subject to the sanction of Her Majesty. Accordingly, Dr. Diamond, the secretary, wrote to ask the permission of the Queen for such a use of the negative, which has been graciously accorded without hesitation. The following is the letter received from Buckingham Palace by Dr. Diamond:—

*Buckingham Palace, November*, 1862.

Sir,—I have had the honour to submit your letter, of the 5th inst., to the Queen.

I am commanded to inform you that Her Majesty willingly sanctions the presentation, to each member of the Photographic Society, of a photograph, from the negative of Mr. Vernon Heath, of the Prince Consort, who was the patron of your Society.—I have the honour to be, sir, your most obedient servant, C. B. Phipps.

Dr. Diamond.

Our readers will be glad to notice, that in according this permission, it is not only done graciously, but that direct recognition is made of the relation subsisting between the late Prince and the Society. His deep interest in, and active patronage of, all that concerned the art, will give an especial value to the portrait, and her Majesty's willing sanction to the gift, from her own negative, confers an interest which could not have attached to any other presentation print. As a photograph, and as a portrait, nothing better could be desired. We may mention that we believe, although without absolute certainty, that members now joining the Society will be permitted to share in the privilege of the presentation.

We may mention another circumstance in connection with the Society. We are glad to state that the Council have just decided on giving prize medals at the next Exhibition of the Society. Just at a moment when considerable discussion has arisen on the propriety of such awards, we are glad that the Council have had the wisdom to discriminate between the real value of such distinctions as incentives to progress, and the evils which attend their mismanagement, especially as there is a tendency to condemn the use of medals, because of their abuse. The exact details have not, at the time we write, been decided, but we believe there will be three or four silver medals, for which a very fine design from an antique medallion has been chosen. There will probably be one for the best portrait, one for the best landscape, and one for the best picture, and possibly, one for discovery, or for excellence of manipulation. We believe we violate no confidence in stating that the carrying out of the project of medals, is largely due to a liberal offer on the part of Lieut.-Col. Stuart Wortley. The Exhibition will be held in Suffolk Street, the Pall Mall Gallery being unattainable on this occasion. We trust that photographers will make an especial effort to secure a good Exhibition, and erase from the public mind as early as possible some of the impressions left by the half stripped and fading effect recently presented by the display in the attic at South Kensington.

## Scientific Gossip.

### The Proposed Change in the Grain Weight.—Examination of Glass in the Spectroscope.

No one knows, or ought to know, better than a photographer, the lamentable state of confusion our national weights and measures are in. It has been estimated that there are no less than ten different systems in use in this country, most of which are established by law. Thus there is:—1, The grain, computed decimally, for scientific purposes; 2, Troy weight; 3, Troy ounce, with decimal multiples and divisions, called bullion weight; 4, Bankers' weights for sovereigns; 5, Apothecaries' weight; 6, Diamond and pearl weights, including the carat; 7, Avoirdupois weight; 8, Weights for hay and straw; 9, Wool weight, using, as factors, 2, 3, 7, 13, and their multiples; 10, Coal weights, decimal numbers, 1, ·5, ·2, ·1, ·05, ·025. Besides these may be added the weights of the French metrical system, the gramme, &c., which is constantly used in this country by scientific men. Weights of the same denomination, moreover, vary in different localities. Thus there are about ten different stones: a stone of wool at Darlington is 18 lb.; a stone of flax at Downpatrick is 24 lb.; whilst a stone of flax at Belfast is both $16\frac{3}{4}$ lb. and $24\frac{1}{2}$ lb., having in one place two values. The hundredweight may mean 100 lb., 112 lb., or 120 lb.; and if we buy a pound of anything, we must enquire how many ounces go to the pound, and if it belongs to Dutch, Troy, or Avoirdupois weight.

All these discrepancies, and numerous others which are of only local importance, might be borne; indeed, the very annoyance to which they gave rise amongst persons engaged in scientific pursuits, analytical chemists, photographers, and others, was gradually introducing a system of recording weights and calculating proportions in grains only, according to the first system noticed in our above list. Thus the chemist has his set of weights from 1000 grains down to the smallest fraction decimally divided, and never dreams of stating quantities in ounces and drachms, but gives the number of grains only, when the gramme system is not employed. The grain being always the same in every system, and invariably constant in the midst of such confusion, has been a sort of harbour of refuge to fly to, when drachms and scruples, pennyweights and ounces, became too complicated; and it has always been our endeavour, seeing the numerous evils arising from the employment of two drachms (one the sixteenth part of $437\frac{1}{2}$ grains, and the other the eighth part of 480 grains) and two ounces in the ordinary requirements of every day life, to induce photographers to write, calculate, and give formulæ in grains only. Our readers will, therefore, be as gratified as we ourselves are, to hear that the fierce onslaught which the General Medical Council has recently made upon the existing grain has been withdrawn, owing, in great measure, to the opposition which the proposed innovation excited amongst scientific men. Our readers are, no doubt, aware of the nature of the attack just made upon the old established grain weight. A New Pharmacopœia for the entire Kingdom is at present under preparation by the General Medical Council; and this body, in order to suit some views which they had of simplifying the mental labours of apothecaries' assistants, proposed to upset the last trace of order and safety in our weights and measures, and introduce a most inconsiderate, inconvenient, and even dangerous change. Their proposition was to substitute the Avoirdupois for the Troy pound, to retain the Avoirdupois ounce, and to divide this ounce into 480 parts, each to be called a grain, in order to preserve the numerical values of the subdivisions of the ounce into drachms and scruples. Now, the Avoirdupois ounce containing only 437·5 *standard grains*, its division into 480 new grains would make that weight just about $\frac{1}{11}$th less than the standard grain, and the same, of course, with the scruple and drachm. The attention of the College of Physicians having been formally called to this proposed innovation, that learned and influential body immediately passed a resolution, to the effect that, however desirable it might be to substitute the Avoirdupois pound for the Troy pound, it was *not* desirable to introduce a new grain differing from the standard grain which has been so long in use, and is established by Act of Parliament. We feel sure that all our readers will gladly endorse this resolution. The advantages to be derived from the change are comparatively small and doubtful; about the confusion and the danger which would ensue from it there can be no doubt. Some advocates, more as apology than defence, have urged that, after all, the subtraction of $\frac{1}{11}$th from the weight of the grain is a matter of small importance in pharmacy; that supposing a medical man of the present generation to take the change into consideration when writing a prescription—a rather extravagant supposition—and the dispenser afterwards to compound the medicine by the old weights, the addition to the dose, even if one ingredient were strychnine, would be attended with no risk to the patient; and with stronger reason it might be considered, that a difference of $\frac{1}{11}$th in the various formulæ used in photography could cause no serious harm. We do not admit this; but if it were true, it would by no means justify the alteration. If the old weights could be at once discarded all over the country, the case might be different; but, as a matter of course, all recipes written or printed before the introduction of the proposed innovation would have to be made according to the old weights, and for that reason, the manipulator must retain these weights in use along with the old ones, when endless confusion would be sure to ensue; or he would have to constantly occupy his mind with arithmetical problems which would never lead to a perfectly accurate result. But it would not be merely in reading or writing recipes that confusion would be created. The unfortunate photographer would be beset with perplexities on every side. At present, when a scruple of anything is named, he is in doubt as to whether 20 grains or 18·229166 grains is meant; but hitherto, when expressed in grains, he has felt safe. Were there, however, to be two grains in the field, he would never know which was meant. A formula for any solution would vary in strength according to the grain the writer meant, or the druggist used to compound it; and in reading any physiological work, he would always be in doubt which grain was meant. These and other objections have been urged so forcibly upon the Medical Council, and the absurdity of introducing three grave difficulties for the purpose of removing one trifling inconvenience, have been so strongly laid before them, that at the last moment they have succumbed to common sense, and resolved not to interfere with the grain weight. They have determined, however, to retain the Avoirdupois pound, as proposed, against which no objection can be made, and also the Avoirdupois ounce, but discontinue the use of the drachm and scruple. As the values of these latter weights are not affected, they will, of course, be used as heretofore, but now as merely denominational weights. This is, perhaps, the most sensible resolution the Council could come to; and with this arrangement, no practical difficulties need occur.

A specimen of glass has been forwarded to us from Farringdon Lane, for examination in the spectroscope. To an ordinary observer, this seems of very excellent quality, being of a full deep brown; and when compared side by side with a piece of good adiactinic orange glass, it still seems as if it might be trusted. It is darker than the orange glass, and of a browner tone. In the spectroscope, however, it is seen to be inferior. Rays, which the silver coloured orange glass would stop back, are freely transmitted by it; and it is apparent that a photographic laboratory lighted through glass of this quality would be inapplicable for delicate photographic purposes.

## ON DEVELOPING ROOMS.

BY SAMUEL FRY.

Why developing rooms should be called dark rooms seems difficult to decide, if we examine carefully into the characteristics desirable for the convenient and facile development of pictures. That in nine cases out of ten they *are* dark rooms, none can deny, being generally miserable dark cells, in which the unaccustomed eye can perceive nothing but a faint dismal glimmer of yellow, until some minutes have elapsed. The primary cause of this wretchedness has been the iterated and reiterated counsel of certain photographic pundits. For example, Mr. Thomas says:—"Use as little light as possible in the dark room;" and in going through the back numbers of the Photographic News, the same advice is to be found in different words. Why use as little light as possible? Is it the quantity or the quality of the light admitted that affects the issue? Surely, the quality. Given, then, a certain thoroughly non-actinic light, you may admit any quantity, and the more you have, the better you can see to do your work. I write thus confidently, because, about twelve months since, having to build a glass room and developing chamber adjoining, I determined to step out of the beaten track, and have a large window immediately facing the developing sink. This window, of 4 feet each way, is filled with yellow flashed glass, of the lightest lemon colour; so that the room is sufficiently illuminated by this window, and another rather smaller at the other end, to read the smallest print.

During summer, the sun has frequently shone through this window on to the plate during developing, without the slightest appearance of injury, although the chemicals I use are invariably in a state of the highest possible sensibility.

Before this glass was put into the window, it was carefully examined in Mr. Crookes's spectroscope, and was found to cut off the whole of the blue, and to leave the smallest possible trace of green.

During last summer, I performed the following experiment, at least six times, in order to discover the presence of white, or actinic, light in the room. On leaving off work on Saturday night, a dry plate, prepared by the Fothergill process, was placed in a slide under a negative, having one half covered over, and by the side was placed another dry plate, both these were placed opposite the full glare of light, until Monday, when a developer of great strength was applied, but every means known to photographers failed to show that the slightest amount of actinic light had reached these plates. I, therefore, urge upon photographers the desirability of emerging from their wretched holes and corners, and putting into their *dark* rooms three or four 12-inch squares of yellow glass. The "Answers to Correspondents" of this journal almost every week will show, that, by sending samples of the glass to be used to the Editor the fullest information may be obtained as to its suitability for the purpose. These remarks apply in at least as great an extent, to the rooms for sensitizing paper, as to the developing room. What a wretched thing for people to be carrying on delicate artistic operations in a room so dark that the very furniture in the place can scarcely be perceived for some minutes after entering. How much more comfortable, and agreeable to the feelings, to work in a well-lighted room? and I do sincerely trust that this paper may have its effect in leading photographers to work with more yellow glass in their rooms, and by all means avoid the use of yellow calico, or paper; any such material must, of necessity, soon fade, unperceived, on the outside, and thus fog may gradually set in, unsuspected, and cause unheard of trouble.

In conclusion, I may just add, that I used at the sea-side, recently, a box for development, having a square of lemon-yellow glass to admit light, this box offered great advantages from the full stream of light admitted of perfect non-actinic quality; this glass resisted successfully the noontide rays of midsummer, in France, and also at a number of seaside places in the south of England. I do, therefore, beg of photographers to inquire for themselves into the question, as regards their own developing rooms, believing that their comforts will be materially enhanced. No deductions could possibly be more erroneous than those that have been drawn as to the effect of true yellow light on the sensitized plate.

## NEW PHOTOLITHOGRAPHIC PROCESS.

The German correspondent of the *Daily Telegraph* gives the following account of a "new" lithographic process recently "discovered." It is exceedingly amusing to observe how all former steps in this direction are ignored: and not a little singular, that an engineer on the central staff of the Prussian Army, should have been two years experimenting in this direction, and then making the discovery, when it is a fact, that about two years ago Mr. Osborne's pamphlet, describing his whole process, was sent to the Prussian Government. So far as the description goes, it does not appear that anything additional had been discovered.—

Immediately after the invention of photography the problem was started, instead of multiplying the negative plate by chemical processes and the effect of light, to procure copies from the same in a purely mechanical way, as in lithography and the kindred arts. Numerous experiments were eagerly made, and all possible materials, such as copper, steel, zinc, stone, wood, and the like, employed for the solution of attendant difficulties. After many abortive attempts, a gentleman at Southampton succeeded in producing multiplied copies on zinc; but the print was so defective in all the niceties of light and shade, as to confine the application of the process to autographs. One step farther in advance, as regards execution at least, of this creditable yet rudimentary beginning, was subsequently made in the Imperial printing office at Vienna, which, however, did not get beyond the sphere upon which it improved. A method has at length been discovered, which is likely to cause an entire revolution in this particular branch—a revolution hardly less sweeping, and perhaps even more important in its effects, than the starting of lithography by Sennefelder, or the rise of the photographic art under the hands of Mr. Talbot. For this progress we are indebted to Herr Burchard, a working engineer on the central staff of the Prussian army, and who, from the multiplication of geographical photographs, was led to extend his researches to the more difficult field of drawings and pictorial designs. After two years of incessant trial, his endeavours have been crowned with success. There is being exhibited a collection of maps and artistic plates, multiplied by his process, and which would seem to deserve unqualified commendation for the beauty as well as the cheapness of the article. The process, so far as it regards the transference of the photographic negative to the stone, and the preparation of the latter for print, is the secret of the inventor. Herr Burchard calls his new method photolithography. Once prepared for print, the stone, which is taken from the well known Solenhofen quarries, looks exactly like the common lithographs, but in so far differs from the inferior products of the simple art, that it admits of an almost unlimited number of copies being taken, 3,000 at least being struck off, before any diminution in their distinctness and general appearance becomes apparent. All these copies are perfect fac-similes of the original negatives, and, what adds considerably to their value, being produced by lithography, they are not subject to the changes of tone and sharpness of outline which go so far to deteriorate the artistic worth of photographs after a short lapse of time.

As yet Herr Burchard has devoted his chief attention to Albrecht Durer and Schinkel, two German masters separated by many generations, but linked together by an equal loftiness of artistic spirit. Of Albrecht Durer, he has produced in the size of the originals, the Lesser Passion, in 37 sheets; two woodcuts—the Trinity, and the Holy Virgin with Child; and the so-called iron engraving of the Germans, representing Christ on the Mount of Olives: all these copies being such successful repetitions of the original, as to have deceived the critical acumen of even the most distinguished connoisseurs. The works of Schinkel, the architect of the Berlin museum, comprehend a number of landscapes and architectural designs. Of the landscapes, that representing the waterfall of Gastein, 27½ inches by 20½, is the most prominent, by rendering the most delicate shades with a perfection not to be excelled. The perspective of the cascade, too, has been greatly admired, and is an effect not to be outrivalled in any kind of mechanical printing. All these works are taken from line engravings, or from drawings in the same style of art—a limitation of the powers of the new process, not yet entirely overcome by the inventor. It is, however, only fair to Herr Burchard to mention that his latest experiments, and the considerable progress he has already achieved in the multiplication of oil paintings, make it a matter of the highest probability that the new process will be shortly extended with equal excellence to the reproduction of every variety of existing photographs.

It may be expected with certainty, that the new invention will have an incalculable influence upon all branches of human activity, as well in the ideal realm of art, as in the business avocations of ordinary life. One instance will suffice to give an idea of this latest progress towards the subjection of matter to mind. On a variety of drawings being lately exhibited for a new town hall in one of the German capitals, a certain design of Herren Schmidt and Stauch attracted considerable attention among the art-loving public of the Fatherland, but as it happened to become a subject of jobbery, and was not to be accepted in consequence, would have been hardly accessible to larger circles of connoisseurs, without the invention of the new art. Availing themselves of Herr Burchard's process, the architects have now issued an edition of their designs for £3 10s., which they would not otherwise have been able to offer under ten times the price. It may be mentioned as another striking advantage, that they were enabled to get the copies struck off in a few days; while by the old process of lithography, and the necessary reduction of the original drawings to a smaller standard, a year would have been consumed, if not more.

Mr. Osborne has addressed a letter to the same journal, in which, after referring to the fact that his process has been in successful operation by the Victoria Government for upwards of three years, adds the following significant facts:—"A description of my process was communicated, with my permission, by Dr. Hochstetter, of the Novara expedition, who left Melbourne in November, 1859, to the Imperial Printing-office in Vienna; and in the early part of the year, 1861, nearly two years ago, I forwarded to the central staff of the Prussian army a reprint, in pamphlet form, of an elaborate paper read by me before the Royal Society of Victoria on 30th November, 1859, together with some specimens of photolithography, which I have never seen excelled. This paper and these specimens are still in the possession of the military authorities connected with the topographical bureau of Prussia."

## PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Sidney Powell, a dealer in photographic prints, of Chandos-street, Covent-garden, appeared at Bow-street, on Saturday week, to answer a summons at the instance of Mr. Ernest Gambart, charging him, first, with having copied, or caused to be copied, an engraving of the "Horse Fair," without his consent; and, secondly, with exposing the same for sale.

The defendant pleaded "Not Guilty."

Mr. Prentice, instructed by Mr. Bowen May, appeared for the prosecution; Mr. Marshall, instructed by Mr. Redpath, for the defendant.

In opening the case, Mr. Prentice said,—In this case I appear for Mr. Ernest Gambart, who is well known as a printseller and publisher in London and Paris. He has invested many thousands of pounds in the purchase of some of the most celebrated pictures of the day. It is of very considerable importance to him, to know, whether such persons as Mr. Powell are to be allowed to make photographs from the engravings which Mr. Gambart had published at so great an expense. The first Act of Parliament to which I would call attention, is the 8th of George II., cap. 13, known as the Act for the Encouragement of the Arts of Designing, Engraving, Etching, &c., giving to the designer and engraver a copyright, for 14 years from the date of publication, which must be engraved on each copy, and imposing penalties for the infringement of such copyright. Now, this Act gave protection to the engraver who engraved and published his own design, but not to the publisher or proprietor for whom an engraving was made. The 7th of George III., cap. 38, extended the protection to "any person who shall cause to be engraved," &c., with all the same penalties for infringement, as in the former Act. By the Act of last Session, the 25th and 26th of Victoria, chap. 38, it was provided, that all penalties incurred under the two former Acts, could be recovered by proceedings before justices. Hitherto, they could only be recovered by action at law. After explaining in further detail the provisions of the several Acts, Mr. Prentice concluded by observing that, although he was instructed for Mr. Gambart by Mr. Bowen May, the solicitor to the Association of Publishers, Mr. Gambart wished it to be understood, that these proceedings were taken by him, and not by the Association. He would prosecute every case of infringement of his copyright, on his own account, and at his own charges, without any aid from any other members of the trade.

Mr. Ernest Gambart deposed,—I am a publisher of engravings, in Pall-mall. At present I carry on business in London only—formerly, both in London and Paris. I purchased the original painting of the "Horse Fair," from Mademoiselle Rosa Bonheur, in 1854 or 1855; I do not know the exact date. I engaged Mr. Landseer to engrave it, which he did, and the engraving was published on the 20th of April, 1857. I now produce a copy of that picture. The defendant keeps a shop in Chandos-street, for the sale of what I should call piracies. His shop is full of them. From the moment the photographs come out my sale is destroyed. I have no objection to state what I gave for the painting and copyright. I got it at a very moderate price. I gave £1600 for the picture and the copyright, and I paid 800 guineas for the engraving. I am the owner of the picture of the "Derby Day," by Mr. Frith, of which I am about to publish an engraving, and it is chiefly with a view to prevent the pirating of that work, that I have taken this proceeding. I have also purchased the picture which Mr. Frith is now engaged in painting.

Cross-examined by Mr. Marshall.—There is a duplicate of the "Horse Fair," also painted by Rosa Bonheur. I had both. I have parted with one. I have sold both, but one remains in my custody. I purchased the picture from Mademoiselle Bonheur, without reservation, which always includes the copyright. In selling them, I reserved the copyright. An artist's proof, or proof before letters, is one before the title is engraved on the plate. It is usual to issue a certain number, with as little writing as possible. A certain number of these are given to the engraver, as part of his remuneration. It was so in this case. Many publishers, not knowing the risk they run, publish artist's proofs, without any writing whatever. They do not understand their business; but I, who know my business well, have from the very first, taken care that every copy issued has the publication line, except in one or two cases when I did not care. In the present case, I put the publication line on the plate, long before the engraving was finished. The duplicate was presented to me by Mademoiselle Bonheur. It was thrown in. I parted with the first about two years afterwards—in 1859—to Mr. Wright, a private gentleman in New York. It has not been engraved. It is a common thing to photograph engravings, of any popularity, and to sell the photographs, but not openly.

Mr. Marshall.—They are sold in every shop.

Witness.—Pockets are picked in every street. I have been suing the photographers for years. I have not always succeeded in getting my costs, but I always got a verdict when we went to trial. I did not always go to trial. They usually apologize, and say they won't do so again. I mean to prosecute in every case where my engravings are photographed. I must do so, or give up my business. It is of no use for me to go on publishing engravings, if the moment I publish I am to be knocked out of the field by piracies.

Herbert Everett, formerly clerk to Mr. Gambart, produced the photograph referred to by Mr. Gambart in his evidence. Witness bought it on the 31st of July, at defendant's shop, for 5s. 6d. The price of the engraving was £10 10s.

Mr. Marshall had to submit to the magistrates, several points of a purely legal nature, and he contended that these Acts of Parliament, being penal statutes, and conferring a monopoly, must be interpreted very strictly. The Act of Victoria only bore on this case to the extent, that it enabled the prosecutor to recover penalties by proceedings before justices. We must go back, then, for the nature of the offence, to the Act of George III. That Act only prohibited any person from engraving copies of the copyright print. It did not prohibit any other mode of copying. The first Act, that of George II., prohibited any person from engraving or copying in any other kind of manner, and when these words were omitted in the second Act, it was clear they were not intended to apply. He contended, that the two Acts could not be read together as if incorporated. The first Act did not apply, as it only enabled the engraver to prosecute. But even under the first Act, he contended, that "any other manner" only meant such other manner as was contemplated by the Act, and of a similar nature to the processes specified,—viz., engraving, mezzotint, and chiaroscuro. He also contended, that it was necessary to show that defendant knew the picture to be copyright.

Mr. Prentice said, if Mr. Powell was not the person who made the photograph, let him give up the really guilty person, and the proceedings would drop.

Mr. Corrie said, that if the prosecution failed on the last point, it would be easy in future to give notice to all photographers, not to sell these copies, and then the proof of knowledge would be easy. But, probably, if the defence were driven to that point, the other two being decided in favour of the prosecution, Mr. Powell would be willing to promise not to sell any more, and that would satisfy Mr. Gambart.

Mr. Marshall.—Certainly. Let the law be settled, and we will obey it.

Mr. Prentice contended, that the two Acts were to be read as one, and quoted passages to show that the penalties in one applied to the other. He also contended, that the words "any other manner," covered any possible process, though not invented at the time.

Mr. Corrie reserved his decision.

Frederic Pipère appeared, by his solicitor, Mr. Lewis, to answer similar charges, which were withdrawn on his undertaking to sell no more copies of these engravings.

On Saturday, Mr. Corrie delivered his judgment on the points of law which he had reserved for consideration.

Mr. Corrie said there were, in this case, two summonses; one for copying, or causing to be copied, and the other for exposing copies for sale without the consent of the owner of the copyright. The evidence was, that a person, called as a witness, purchased a photograph copy of the engraving of the "Horse Fair" at the defendant's shop. The complainant was also called, and proved that he was the owner of the copyright, and had complied with all the technicalities of the Act, so as to bring him within its protection. Now, these proceedings were brought under the provisions of the 25th and 26th of Victoria, cap. 38, which, by its eighth section, provides that all penalties imposed, by certain former Acts, might be recovered before two justices. This was one of the Acts passed in consequence of the 23rd Victoria, cap. 43, which enabled magistrates to deal with several matters not formerly within their jurisdiction, and if they committed any mistake, there was an appeal to the judges; thus securing two advantages which had hitherto been believed to be incompatible—good law and cheap law. Now, as this Act provided a new mode of enforcing penalties, it was necessary to see what those penalties were. The Act of the 8th George II., cap. 13 sect. 1, in substance, gave to the original engraver of any design a copyright for 14 years, with penalties for infringement against any person who, without the consent of the owner, should engrave, etch, or in any other manner copy, or who should print, reprint, or import for sale, or, knowing the same to be so printed, should sell, or expose for sale, any copies of such copyright design. A few years afterwards, in the 17th year of the reign of George III., was passed the Act on which this case must be decided. After re-enacting, almost in the same words, the provisions of the former Act, it provided, that if any person should engrave, etch, or work, or cause to be engraved, etched, or worked, a design taken from any ancient or modern picture, or sculpture, he should be protected in the same manner as for an original design; and the copyright both of the original engraver, and of the person causing an engraving to be made, was extended to 28 years, instead of 14; and if any person should engrave, print, or publish copies from the copyright work, they were liable to the same penalties as under the former Act. But in setting forth what persons should be liable to the penalties, it omits to mention any person who should sell, or expose for sale. It was contended for the plaintiff, ingeniously enough, that he was entitled to recover under the words of the Act, "That any person that shall engrave, or cause to be engraved, any print, &c., shall have the benefit and protection of the same Act, in like manner as if any such print had been graved or drawn from the original design of such graver." But under this Act proceedings could be taken by a common informer; and though, in the present instance, the proceedings were taken by the person who was entitled to the protection and benefit of the Act, that might not be so in all cases. Supposing, then, that the proceedings should be taken by a common informer, it would be rather a strained interpretation to say that he was to recover the penalties under those words. But it went further, for after the clause about the benefit and protection, to show that it was not considered that the penalties had been enacted, section 5 proceeds to impose the same penalties as in the former Act, but omitting the third provision with reference to selling, or exposing for sale. It might be said that the words must have been intended to be repeated, and that it never could have been designed to let the seller go unpunished; but even so, he did not feel justified in importing into the Act words which were not there. He certainly could not insert them after a lapse of nearly 100 years. It was, probably, on account of these difficulties that the Act of the 17th of George III. was passed, which cited, that the intention of the Legislature had not been carried out. Under that Act, it was not even necessary that the vendor should be shown to have known that the copy was sold without the owner's consent. There was no doubt that Mr. Powell had committed a wrong, and that there was a remedy against him, but it was not under the penalties imposed by this Act. He had, therefore, come to the conclusion, though somewhat reluctantly, that the summons must be dismissed.

Mr. Bowen May, for the prosecutor, said that the Act, giving power to proceed before justices, would be rendered practically inoperative by this decision.

Mr. Corrie said they had a cheap and summary remedy in the County Court. The remedy, under the 17th George III., was by action on the case, and all such actions could now be taken in the county.

Mr. Bowen May said, that five of his clients, who had thousands of pounds invested in valuable prints, had actions pending in the superior courts at present.

Mr. Corrie.—You must succeed in the action. But in the proceeding here you will have to show, even if I had settled the main point in your favour, that defendant knew the work to be copyright. Of that there was no evidence whatever. So, in any case, I must have decided against you. But in the superior courts you do not require to show knowledge.

Mr. Corrie then dismissed the summons.—*Times*.

## Proceedings of Societies.

A COUNCIL Meeting of the Amateur Photographic Association was held November 7th, at 26, Haymarket, JAMES GLAISHER, Esq., F.R.S. in the chair.

The minutes of the last meeting having been read and confirmed—

The SECRETARY read a letter from Matthew Marshall, Esq., Chief Cashier of the Bank of England, expressing his regret that he was prevented by indisposition from attending the meeting.

The following members and subscribers were proposed and elected.

| | |
|---|---|
| Lady M. J. Matheson. | Lady K. Hutchinson. |
| Lady Pine. | The Hon. L. Wingfield. |
| J. D. Harding, Esq. | Lieut.-Col. J. McGregor. |
| A. W. Eskine, Esq. | Professor Emerson. |
| J. S. R. Moss, Esq. | W. W. Charley, Esq. |
| Rev. Jno. Williams. | Mrs. J. Bullar. |
| D. Laurie, Esq. | Rev. H. Read, M.A. |
| M. G. Delisle. | S. Barton, Esq. |
| Captain C. J. Cox. | J. Toynbee, Esq. |
| W. Carte, Esq. | Captain Davies. |
| G. R. Playfair, Esq. M.D. | G. H. Frothingham, Esq. |
| J. L. Smith, Esq. | Henry Coxwell, Esq. |
| J. F. R. Atherstone, Esq. | R. H. Smith, Esq. |
| P. Barker, Esq. | J. Campbell. Esq. |
| Miss McGillivray. | Mrs. Ponsonby. |
| S. C. Allsop Esq. | Major P. Innes. |
| W. R. Anstice, Esq. | F. Orpen, Esq. |

The SECRETARY then read a letter from Lieut.-Col. C. Holder, Member A.P.A., containing suggestions relative to the holding of an exhibition of photographs by the Association, the subject was adjourned for further consideration at the next meeting.

The CHAIRMAN, having asked the Secretary when he purposed returning the Association negatives now in hand, and calling in the ones for next year?

The SECRETARY replied, that he proposed to apply for next year's negatives about the beginning of January; and that, although members could always have their negatives returned to them on demand, yet, that, owing to the continued and rapid increase of members and subscribers, it would be greatly to the interests of the Association, that the negatives for one year should not be returned, until those for the year following were ready for publication.

The SECRETARY also mentioned, that the number of negatives now in hand were about three thousand. The proceedings of the meeting then terminated.

A. MELHUISH, *Hon. Sec.*

## AMERICAN PHOTOGRAPHICAL SOCIETY.

A regular meeting of this society, was held in the New York University, Monday evening, October 13th, with President Draper in the chair.

The minutes of the last meeting having been read, Messrs. D. T. Lawrence, of Newburg, and Geo. Bartlett, of New York, were elected to membership.

On account of the irregular appearance of the Treasurer, Messrs Pike and Thomspon were appointed Finance Committee, and Secretary Thompson was vested with authority to receive and disburse funds for the society.

Professor Seeley read a letter from Mr. Waldack, who is now abroad. The letter, among several items, spoke of the use of bromides in collodion, as being of no advantage.

Secretary Thompson asserted, that without bromides in the collodion, the negatives were hard. This is especially the case in dry plates, where without bromide, it is almost impossible to get detail in foliage, &c.

Professor Seeley had a couple of items to show the society. First, some prints on ordinary paper, from photozincographic plates; and second, several surgical photographs of membranes, &c., magnified about ten diameters. The samples of Photozincography, were by Mr. Hall, and the microscopic specimens by Dr. John Dean, of Boston.

President Draper, had photographed through the microscope, and found the great difficulty to be inaccuracy of focussing. This, he entirely overcame, by throwing the sunlight through a blue solution of sulphate of copper and ammonia. The focus obtained through this blue light is chemically and visually coincident.

Secretary Thompson showed several prints on albumenized paper. He called attention to the colour and tone, especially. Herein he claimed a new practice and discovery, inasmuch as he used nitrate of copper and zinc, in combination with his gold bath. He simply added to the usual solution of bi-carb. sodæ, some brass filings previously dissolved in nitric acid. The soda, which should be in great excess, neutralizes the nitric acid, leaving the copper and zinc in the solution. With a given amount of toning bath, containing this copper and zinc, he could tone 33 per cent. more surface than with the ordinary alkaline gold bath. He always added a pinch of salt to the toning bath, and fixed his prints in a fresh solution of hypos. sodæ 20 per cent. strong, to which has been added 5 per cent. of alcohol. The alcohol must be at least 95 per cent. Some of the prints shown, were from negatives taken with Mr. Sellers, at High Bridge, in the great trial of Wet versus Dry. Plenty of bromide was used in the collodion, and the detail in the shadows was consequently very great. He had brought for inspection also, the camera and changing-box used by him on that occasion.

This elicited much admiration, on account of its compact size, and the fine work it shows This camera was invented by one of the workmen in the factory of C. Jabez Hughes, of London. It was brought to this country by Mr. Werge, to whose kindness the Secretary was indebted for its possession.

The lenses were of Ross's make, and the pictures proved their superiority. The angle included, was far greater than any portrait combination, and all things from five feet from the camera to the horizon, were in sharp focus.

Mr. Pike said he found bromides of the greatest benefit in all dry plates. He had taken a negative of the Fireman's Monument, in Greenwood Cemetery, in bright sunshine. He had preserved every vein of the marble, and had not lost a leaf of the green foliage surrounding its base. This would be impossible to do without an excess of bromide in the collodion.

President Draper stated, the bromides were more sensitive to green colours than iodides. He found the iodide of silver is most affected by blue; the chloride of silver, by violet and indigo; and the bromide of silver by blue, green, and slightly by orange.

Secretary Thompson showed copies of the celebrated picture by Jacopo Chimenti, supposed by some, to be the discoverer of the stereoscopic vision. The members present, after much squinting, concluded, they "*couldn't see it*," and if "*any other man*" could see stereoscopic relief in the two samples before them, it must be "*all in his eye*."

Mr. Pike had worked the milk and sugar process with success. He admired it very much for transparencies.

Mr. Burgess said, that although he had not worked this new process himself, yet, should any of his friends begin in photography under the auspices of a *dry* nurse, he should certainly recommend, as becoming their infant practice, the milk and sugar process. Its results had been seen, and spoke for themselves.

Victor Piard presented to the society several very fine stereographs of green-house plants, and such like difficult subjects, for which he received the vote of thanks of the society.

Mr. Burgess moved, that when we do adjourn, it be to meet on the second Monday of November, at ***half-past seven*** o'clock in the evening, instead of eight o'clock as at present.—Carried, and upon motion :

Adjourned as above.

F. F. Thompson, Secretary.

## PHOTOGRAPHIC SOCIETY OF MARSEILLES.

The opening meeting of this society for 1862, was held on Oct. 8th, M. Gabriel, President of the society in the chair.

The President opened the meeting by expressing the satisfaction he felt, at seeing the work of the society resume its habitual course. Already the Photographic Society of Marseilles, by its zeal, its activity, and its initiative efforts, had acquired a place in the foremost rank of those societies devoted to the art of Niepce and Daguerre. The first successes promised much for the future of the society. It would always give him pleasure to assist at its progress.

M. Leon Vidal having thanked the President for the kind terms in which he had spoken of the society, continued as follows :—The year which has passed away, gentlemen and dear companions, has been for us a year of creation. We have had everything to commence, and, thanks to your intelligent efforts, we have succeeded. The Photographic Society of Marseilles has proved that it knew how to rise to the altitude of the mission it had imposed upon itself. It has never withheld its influence where it was likely to be of use. I will not speak to you of the numerous difficulties we have had to overcome. We struggled together. I do not consider it necessary to remind you of the various flattering testimonies which have appeared to reward your activity: you know them. The past, in one word, was ours; it is, therefore, with the future we have now to deal. Much has already been done; how much still remains to be done? our art is scarcely out of its cradle, it has all its career to accomplish—a career which will undoubtedly prove rich in marvellous discoveries, and in results and applications of increasing usefulness. I do not doubt but that you will have part in this progress of the future. Everything makes me hope—your aptitude, your initiative force, as well as the fortunate position of the society— gives the means of action. These means of action you will find in the "Union of Arts," recently inaugurated, and which progresses rapidly. You know the part therein assigned to photography. You will find there not only an exclusive centre, where you may meet on days other than those on which meetings take place, and where you may consult the especial publications, but there will also be a permanent exhibition of the products of our art, and a laboratory conveniently prepared, and all the applications of heliography. In the rooms, practical courses of study may be organised under our care. Here, my dear colleagues, are the conditions of success, which cannot fail to impart to our proceedings a new impulse. More than a year ago, we recapitulated the chief points of interest in the progress of our art. The direction indicated was as follows :—

*Dry Collodion*, rapid and instantaneous.

*Enlargement*, as perfect as possible.

*Positive Image*, obtained by a permanent process.

In these three lines is all the future of photography. I would urge upon my dear colleagues that they should receive with especial interest the labours directed towards the realisation of these improvements. Great progress has been made ; and you know that the efforts of our experimentalists are incessantly directed towards accomplishing still greater results. Permit me before the society resumes its proceedings, in your name to renew our invitation to the sympathy of the photographic world. The numerous communications which have been sent to us up to this time, are a manifest proof of the influence which is inspired by our zeal and our impartiality. The good traditions of our society will be perpetuated ; and it will be our honour to have contributed to the progress of an art we love, and which holds a distinguished place in the rank of useful inventions.

The Secretary then proposed a modification in the rule referring to the election of the committee, so that the members might be eligible for re-election.

After some routine proceedings, letters from the following gentlemen were read:—M. van Monckhoven, referring to a new process of preparing iodide of cadmium; M. Marion, accompanied by some of his collodionised paper and a bottle of the collodion; M. Ed. Potonie, Director of the International Photographic Exchange, presenting to the society some very fine German photographs by Messrs. Gustave Schauer, of Berlin, and Jos. Albert, of Munich, after the cartoons of Kaulbach's Shakspeare Album. M. Potonie, in another letter, called the attention of the society to the Permanent Exhibition of Photographs which he had organised in Paris. Copies of the rules were distributed among the members. A letter from M. De Courcival, officer in the 3rd French Chasseurs, presenting to the society some interesting African photographs. The thanks of the society were presented to these gentlemen for their gifts and communications.

The President, in referring to Mr. Hudelot's successful report, on the contents of different publications, stated, that a committee of verification to test new formulæ would be established.

M. Meynier introduced a new developer, consisting of a double salt of iron and ammonia, which he said possessed the advantages of iron and pyrogallic developers. A committee was appointed to experiment with this developer.

M. Tissot showed an instantaneous shutter, which differed essentially from most of those hitherto introduced; it opened from the centre towards the circumference.

M. Leon Vidal exhibited a new actinometer for measuring the varying intensity in light. M. Vidal showed also a cardboard box for holding ten sensitized plates.

M. Tessier showed several beautiful specimens. General Pellisier sent his card portrait for the collection of the society. Thanks were given to all these gentlemen for their gifts and communications.

M. Hudelot, secretary to a committee appointed to report on M. Vidal's autopolygraph, read the report, which was highly satisfactory, and stated the instrument to be a great success. It would enable the photographer to work in the field without a tent, double backs, &c. and carry sensitive plates in the least possible space. Instantaneous dry plates were now only required to make the equipment perfect.

After some further proceedings, attention was called to the rules of the Exhibition to be held in the rooms of the "Union des Arts" in 1863.

After further votes of thanks, the proceedings terminated.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris*, 29, *October* 1862.

M. Audry, whose colossal plastic productions in electro-metallurgy in the International Exhibition, have doubtless excited your admiration, has made a discovery as important as it is unexpected, and which has already received sufficient application to justify the belief that a great progress, if not a complete revolution in painting, has been realized. He ascertained some time ago that galvanic or electrolytic copper is susceptible of being pulverized, reduced to an impalpable powder, so as to become the basis of a new kind of painting, subsequently he had the idea of grinding this impalpable copper in a vehicle having benzine for a basis, which he has since always spread over the surface of iron before covering it with copper by the electro process. He thus became possessed of a paint of galvanic copper, easily applied to wood, plaster, cement, iron, the hulls of ships, &c., which perfectly covers the surface to which it is applied, dries very quickly, gives out no smell after four and twenty hours, and assumes a very agreeable lustre when dried, and what is truly remarkable, is capable of receiving, by means of chemical agents, every light or deep tint of bronze, verd antique, Florentine, &c., which hitherto could only be communicated to pure copper. Cast iron ornaments, statues in plaster, when covered with this new paint, lose none of their most delicate details, and completely assume the appearance of objects in bronze. These plaster statues, as well as those of stone, seem to become completely insensible to the changes of weather; we have seen them, after being exposed to rain for several months, without any sign of deterioration.

Proud of his first success, M. Audry has attempted to grind in his benzine vehicle, to which a small quantity of copper has been added, pigments having for a base, lead, zinc, &c., of which house painters generally make use, and he at once proved that the vehicle advantageously replaced turpentine, and all the oils, or sizings which, hitherto, have served for ordinary pigments. This metallic paint, so called because it contains a small quantity of pulverized copper, covers a surface much better than the old kind, it dries much quicker, gives out no smell after the second day, presents a very fine grain, such as hitherto has only been obtainable by the aid of pumice-stone, and shines with a very vivid, but also very soft gloss. M. Audry prepares two kinds, one very fine for interiors, another less fine for external surfaces. At the present price of benzine, the new paints, much preferable to the old, cost the same price as the latter for second qualities, and a third more for superior qualities, or for printing in copper. As benzine is now almost all converted into aniline and other dyes, it has become comparatively scarce, and as it will become dearer and dearer, it was important to learn if the volatile oil obtained from American rock oil and petroleum could be substituted for them, M. Audry found that the latter could be substituted for benzine, at least, for first coating, and if the lightest volatile oils are employed, for interior painting also.

The revolution will then be complete, the turpentines and drying oils replaced by volatile hydro-carbides, will be applicable to other purposes, and be materially reduced in price. It must also be added, that by mixing the pulverulent copper with certain fat-oils, without adding any chemical agent, M. Audry obtained very fine green pigments, varied in tone, and of agreeable hues; his new paint has been applied to several important public works, such as balconies, gates, railings, &c.

M. Mailand has suggested an improved kind of varnish for glass negatives. The varnish generally employed for this purpose, has the serious objection of softening by the action of heat, and in summer it frequently occurs that the paper positive adheres to the negative, injuring it, or receiving injury itself. Amber varnish melted in the fire, then dissolved in benzoin, and varnish composed of 10 parts of benzoin, dissolved in 100 parts of benzine, do not present the objections indicated, but the first is generally too dark, and the second, too brittle. M. Mailand gives the following formula for a very resistant varnish, which will sustain the softening action of a very hot sun.

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|---|---|
| Alcohol at 40° . . . . | 100 parts |
| Lac Resin, in grains . . | 10 „ |
| Elemi . . . . . . . . | 3 „ |

After solution, which takes place in twenty-four hours, if care be taken to shake it from time to time, it is filtered through paper, and left several days to settle, it is then filtered again, and employed as a varnish. The glass plate must be moderately warmed before the varnish is applied, and after draining off the excess, dry the plate before a gentle fire. Care must be taken with this, as with every other kind of varnish, to wipe the edge of the plate, where it drains, with a piece of blotting paper, to prevent the varnish returning over the dried surface.

The encaustics employed to give the final lustre to paper positives, are generally formed of equal parts of white wax and spirits of turpentine, or essence of lavender. This encaustic, rather stiff to use, is not always so hard upon proof to resist accidental friction. M. Mailand adds mastic in tears, dissolved in 10 times its weight of essence or spirit. This addition permits of the employment of a smaller quantity of wax for the same quantity of spirit, to obtain this, a very unctuous pomade, very easy to spread without greasing the paper, which upon the evaporation of the spirit, gives a very fine gloss, which resists every cause of deterioration.

## PRINTING DIFFICULTIES.

Sir.—It has ever been the lot of every new science to be beset with theories, which, like the "humpty dumpty" of our childhood, have suffered a great and speedy fall. The first glance at Mr. Eliot's paper caused me to imagine that my bantling, like the Hypanian insect described by Aristotle, was doomed to pass through its stages of life and death in one short day, but a more searching scrutiny speedily convinced me that Mr. Eliot has unconciously provided stronger proofs to support the theory advanced, and explained in my last two letters, and I am sure, that gentlemen will forgive the liberty I now take, in analysing the contents of his, (in many respects,) very excellent paper. Without arguing the propriety of using the Berzelius or any other scale of chemical notation: I have first to notice the remarks on Au Cl3 rendered minus free acid by the addition of soda carb.; by comparing this portion of his paper with the statements that follow, a strange incongruity is so plainly visible that I need not enter into details. Mr. Eliot very correctly states that a batch of prints being immediately immersed after mixing the solution, a false colour is given which dissolves in the hypo bath; the cause of this may be easily explained. In a former letter I endeavoured to show that by the action of light a portion of free nitrate was converted into what I named, a bastard albuminate of silver, which is removed by the action of soda during the process of toning. Now, I am satisfied, that the decomposition described in the letters before alluded to, does not commence for some five or more minutes after the solution is mixed, that is to say, if artificial heat is not applied, but if a batch of prints is immersed before natural action commences, a disturbing element is introduced, which for some considerable time will govern and prejudicially alter results, for except each print has been thoroughly sponged, and passed rapidly through several waters, and finally soaked in pure tepid rain water, it bears a portion of free nitrate in an unreduced state, which unites with the chlorine liberated; a white chloride of silver is formed, and the gold deposits itself over the entire surface of the paper, thus preventing the soda from performing its work, which it left for the hypo to accomplish: but whilst the unstable bastard albuminate is dissolved out with its coating of gold, the white chloride, by some unknown means, is rendered impervious to the action of the hypo, hence, not only one form of mealiness, but also, in all probability; the reason why silver cannot be entirely removed from the whites of prints, for albumenized paper, unlike plain samples, cannot be saturated with the fixing solution, its highly varnished surface being proof against the attacks of cold liquids. Now it is evident, if no prints are immersed for some little time after the bath is mixed, a natural decomposing action will spontaneously commence, the chlorine uniting with sodium as I have before explained. That such is the case Mr. Eliots arguments go far to prove; in case No. 3, he states that chloride of gold, having lost a portion of its chlorine, stands thus, Au Cl 2; one equivalent of chlorine being gone; where? not to the surface of the paper, for by his showing, the less of chlorine the more perfect the toning. Proceed again, if the surface of the paper received the liberated chlorine, why should an excess of soda exercise an influence upon this agent, and from whence is produced the carbonic acid, which it requires an experienced eye to detect from the hydrochloric acid. If from the soda, decomposition must have caused its liberation, to make room for a new comer; this more favoured one cannot be gold, for the surface of the paper claimed that, then most assuredly it must be the liberated chlorine, except it can be proved that this substance is ejected from the bath and mixes with the atmosphere. If such is the case, why employ soda at all? Heat is sufficient to liberate chlorine; and the acetate bath is a speaking proof, that an alkaline agent is not indespensable for the production of toning action; but the specific gravity of chlorine, 2·5, decides the question; being heavier than common air, the law of gravitation is a sufficient proof that it cannot ascend except rarified by the molecular repelling action of heat. Again, if toning proceeds best when decomposition has proceeded so far as soda will allow, why is it that a bath so soon becomes useless, even when no prints have been exposed to its action? If Mr. Eliot be correct in his statement, surely no necessity exists for the acetate bath being employed because of its keeping qualities: certainly there is no necessity for putting into practice Professor Hyme's suggestion, for we have a bath which is perfection itself. And now for point No. 4, Mr. Eliot states that one equivalent in excess, reduces the terchloride of gold to a binary compound, Au Cl, and this condition is sometimes produced by boiling the prints in a bath, (certainly a queer mode of toning,) why, the well known decomposing power exercised by heat, would, under these circumstances, produce a decomposition so complete, that Au minus Cl would speedily be seen floating on the agitated surface of the bath! A moderate heat, I will admit, quicken toning by hastening decomposition, but this plan is dangerous in practice, for chlorine is liberated two quickly for soda to imbibe it, and mealiness will be the result if the paper is at all given to that disease. True there are some papers that will not give evidence of the evil under any treatment; on examination you will find a very slight coating of albumen on its surface. I must postpone an examination of the beakers until next week.—I remain, yours, respectfully,

A Photo's Assistant.

P.S.—Having made a free use of Mr. Eliot's name in this letter, I enclose my own, which is at your disposal.

## DOES THE TONE OR COLOUR OF THE PHOTOGRAPHIC PROOF DEPEND SOLELY ON THE DEPOSIT OF GOLD IN GOLD TONING?

Sir,—In your No. 216, for October 24, you inserted a communication of mine, on the subject of gold toning. Will you permit me to raise the question on the above subject, as it does not appear to have occured to your correspondents, that the tone is due, to a very partial extent, to the deposit of gold.

To enable you to understand my doubt, as to the agency of gold in toning, I must refer to the case of the Daguerreotype, where the gilding was affected by means of a solution containing gold, the same as used in the Sel d'or process; now the chief difference in the gilding a Daguerreotype and of a photographic proof on paper, seems to be in the agency effecting the decomposition of the solution; in the case of the Daguerreotype every other element but the gold was driven *away* by heat, and, owing to the nature of the surface, we could perceive, with comparative ease, the amount of change effected by the attenuated film of gold in the tone of the picture; that it did produce very beautiful tones of color I do not intend to deny, but that the tones, and especially the *depth* of tone, so produced bore an exact affinity to the tone produced in a paper proof, I very much doubt, although the deposit of gold in each case is probably similar in amount, and in each case deposited during a process of decomposition.

Now, the great difference that seems to exist in the two cases is this, that in the Daguerreotype, as I have remarked, the elements present, in the first instance, with the gold, were driven off the surface, which, being non-absorbent, could be effected very perfectly; but in the present case the paper proof is not only saturated with the solution, but remains in it, during the decomposition of the bath, exposed to every change in the formation of its elementary components, and it is only after a certain amount of decomposition has taken place that gold is set free from its solution to deposit on the image exposed to its influence.

It is scarcely necessary to call to mind, that toning can be effected in many ways without the aid of gold, as in the sulphuric acid bath, phosphorus printing, development printing &c., this of course would be no proof that gold also does not effect the same purpose, but when we consider the amount of tone yielded in the case of the Daguerreotype, where the deposit is probably even heavier than in the paper proof, when we consider how little the image is in any way changed, except in the slight change of colour on the surface, we can scarcely believe that the gold is the sole agent in changing a bright red paper proof, to a deep purpley black: *for as red is one of the components of purple, the tone*, in such case, should be effected by *an agent possessing greater depth of colour* than appears on the surface of the proof.

All experiments that have yet been made on the colours produced by minute subdivision of particles of gold tend to the belief that the normal colour in such cases is a purple or violet. This, therefore, could scarcely give the great variety of tones produced in the many methods of toning, even where the original tint of the proof is very similar. How, then, shall we account for the colouring of the paper proof if it be not entirely due to the deposit of gold? Let it be observed, that I do not assert the gold to be entirely unaiding in producing the tone, but that it does not possess the power of effecting those extreme changes of colour often observed in Photographic processes.

In my former communication I expressed my belief that the decomposition of the gold solution was effected by electrical agency; but whatever be the cause there seems no reason to doubt that a certain small amount of solution undergoes this process setting free its component elements. Amongst the elements so freed from combination, there would be a certain amount of oxygen from the acids and water so decomposed, and it is to the presence of the oxygen that I believe we shall be able to trace the change of tone, taking place simultaneously almost with the deposit of gold, which I take to act rather as it was supposed to do in the case of the daguerreotype than as a positive agent in effecting change of colour; that is, as a preservative from atmospheric influences.

Lest this view should be considered too heterodox, let me remind those who may doubt it, that we really possess no knowledge of any element save oxygen—the presence of which effects change of colour, whether the means of producing it be as direct chemical or mechanical agency. In this point of view it would not be difficult to trace the true effects of an addition of acid in renewing the energy of a gold bath, and also why, after a certain time, alkalies render such baths of no avail in toning proofs; in fact, it is only so long as decomposition lasts that the bath can be of service, and when this shall have been perfectly effected, no matter by what agency, the bath is no longer available for its purpose.—Yours respectfully, E. E. L.

## THE MEDAL FOR CARD PORTRAITS.

DEAR SIR,—In last week's "Talk in the Studio" you observe that you made an inadvertent error in your previous number in remarking that I received the *only* medal for card portraits, and admit Mr. Mullins' claim to having received a similar award for the same class of pictures. If you will refer to the official book of awards, you will find that Mr. Mullins received a medal "for general photographic excellence," and that I am the only photographer of any nation who is mentioned in that book as having received a medal especially for *cartes de visite*. It is probably Mr. Mullins' misfortune and not the fault of his pictures that his award was confined to "photographic excellence." I have very much admired, and have received great profit from an examination of his pictures, and quite think that "card portraits" should have been made a speciality in his award, at the same time, as that was not done, I cannot give up my claim to having received the *only* medal for *cartes de visite*.

H. P. ROBINSON.

*Leamington, November* 1, 1862.

P. S.—In writing on the International medals, has it not struck you, as it has me, that we all ought to be ashamed of receiving our medals, when the greatest name in our art, I mean that of Rejlander, has only "honourable mention" tacked to it.—H. P. R.

[We have already expressed a conviction more than once, that it is a subject for unmitigated regret that Mr. Rejlander did not receive the highest honours the jury could award. As regards the medal for card portraits Mr. Robinson is right. The official list mentions card portraits with his medal only.—ED.]

## Photographic Notes and Queries.

### NEGATIVE VARNISH—CROWN GLASS—HOT DEVELOPMENT.

SIR,—I see, week after week, in the NEWS, that there are great complaints of negative varnish. If your readers would only try the varnish recommended by Mr. Fitch, I think they would be, as I am, perfectly satisfied with the same. Always taking care to obtain the best white hard carriage varnish, I dilute it with methylated spirits of wine in nearly equal quantities. When first added it causes a milkiness, but after standing a day or so it quite clears itself, and is ready for use: if it is too thick, I then add more spirit. I have used it ever since Mr. Fitch first recommended it, on plates *carte de visite* size up to 9×7. I frequently use the plate directly. After varnishing I have placed in the full sunlight, and not in one single instance have I had cause to complain of tackiness. I beg to thank Mr. Fitch through the pages of your valuable journal for the same.

I see in a recent NEWS, a correspondent recommends cutting the corners off the plates, as a cure for negatives breaking in the printing frames. I always use the crown glass for large and small plates, as they are much cheaper, and I find I can get pictures equally as good as I can on the patent plate. The simple plan I adopt for protecting the plates whilst printing, is to place a piece of velvet or cloth over the plate, (after the paper is out) and then a square piece of cotton wool over that, thus protecting the glass from any irregular pressure. Since using this means, I have never broken a single negative.

I thought perhaps the following might be worth recording, seeming to show that hot water has developing powers over tannin plates. I took a plate 9×7 with me (that had been prepared about 3 weeks) to take a view, but before I could give it sufficient exposure, the weather changed, and the rain came down in torrents, causing me quickly to make a stir for shelter. When I reached home, knowing the plate was not near exposed enough, I thought I would try the hot water process. After heating the water, I placed the plate in, when the view began to appear, and steadily continued till the detail was fully out, but on pouring the developer over, a great many stains appeared, thus spoiling the plate. This, I find is the great drawback to the hot water, the plate drying in patches as soon as it is out of the water. The water used was spring water boiled in an iron tea kettle.

If you think this worth insertion in the NEWS, you will please to insert the same.—I am, sir, yours obediently, J. DRAKE.

### CARBONATE OF SODA IN THE TONING BATH.

DEAR SIR,—In this week's NEWS I see a correspondent makes enquiries about carbonate of soda in the toning bath, and alludes to Mr. Leake's remarks thereon.

I believe I have tried most formulæ, but must certainly give the preference to carbonate. As I before stated, if care be employed in the manipulation, exquisite results will follow.

The bath is prepared immediately before use, and thrown away when the gold is exhausted.

I enclose a stereograph which was printed more than three years ago, and toned according to my formula given in the NEWS, May 30th, and I leave you to judge whether there be anything objectionable in the colour of the print.—I remain, yours respectfully, JOHN H. UNDERWOOD.

*Beech Cottage, Sale Green. November 1st*, 1862.

[The tone of the print received is a rich, deep, warm sepia which is very pleasing; but we may mention here that those who object to carbonate of soda in the toning bath, are generally portraitists, and it is a fact that the mode of treatment which gives good results with prints from intense landscape negatives, does not always do so with those from thin portrait negatives.—Ed.]

## Talk in the Studio.

Photographic Piracy.—We regret to learn that a system of wholesale piracy has just been discovered, in which the exquisite photographs of the International Exhibition and its art treasures have been copied to a large extent. The vendors have, we understand, given up their stock, and agreed to pay costs and damages, to avoid prosecution. The producer's name has also been given up, and it is the intention of the Stereoscopic Company to proceed with the utmost rigour of the law, so as to deter others from these disgraceful piracies.

Photographic Reproductions of Sculpture.—A series of fifty photographs of Italian sculptures of the Middle Ages, and the time of the revival of art, selected and arranged from the collection in the South Kensington Museum, by Mr. J. C. Robinson, will be published in a folio volume next month. The photographs have been executed by Mr. C. Thurston Thompson.

Photographic Profits.—The *Times* says :—"We are glad to say that Mr. Story, the American Artist, has now given his consent to photographs being taken of his two noble figures 'the Cleopatra' and 'the Sybil.' Without these, the photographic record of the sculpture of the exhibition would have been sadly incomplete. One may judge of the popularity of these photographs of statues from the fact that the copies of the 'Reading Girl' have had, and still have, such an enormous sale that the profits realized on this picture alone would more than repay the £2,000 paid to the Commissioners by the Stereoscopic Company for the right of photographing. Yet the orders for copies of 'the Cleopatra' and 'the Sybil' are larger than this again." We fear that large as the sales have been, that these are somewhat random figures. We apprehend that Mr. Nottage would be glad if the writer could, to use a popular phrase, prove his words.

"Clearing up" Negatives.—Mr. Osborne's plan of "clearing up" negatives of engravings, &c., has excited some interest, and has been tried with much success and satisfaction by several photographers largely engaged in reproduction. It is perhaps desirable, in order to prevent the misconception into which a contemporary has fallen, misleading others, to repeat our information derived from Mr. Osborne, that after the negative has been treated with a dilute iodine solution to convert any slight foggy deposit into an iodide of silver, it should then be well washed, and submitted to the action of a dilute cyanide solution, to remove the deposit on the shadows, which has been converted into iodide. This is necessary before proceeding to intensify, where the utmost density and the utmost transparency are required, as in maps, engravings, &c. The process referred to by our contemporary, of using a solution of iodine before applying pyro and silver, is very old, having been published as early as 1854, and very useful for ordinary negatives we have regularly practised it for many years. But the process of Mr. Osborne is novel, both in purpose and practice, and has reference chiefly to reproduction negatives requiring pure blacks and whites; and it is necessary to remove all trace of deposit from the transparent parts of the negatives before intensifying, in order to secure sufficient contrast.

## To Correspondents.

A. R. P.—The extent to which a bath of hyposulphite of soda may be used for fixing positives on paper with impunity, is somewhat difficult to decide, and the skilful photographer must be guided largely by observation and experience, as the result is affected by a variety of circumstances. The quantity of chloride of silver dissolved by hyposulphite of soda may be roughly stated at a third of its weight, but to make this knowledge available it is necessary to know the quantity of unreduced chloride of silver in your prints, which is very difficult to get at Read the papers of Mr. G. Price in recent numbers. Mr. Hardwich says, that one ounce of hypo dissolved in six ounces of water, will fix forty stereo prints, or about two sheets of paper; but for safety he recommends that it should only be used for half that quantity, as hyposulphite is cheap, and it is well to keep on the safe side. 2. We do not know of any one resident in Manchester who prints backgrounds. 3. A negative bath may be neutralized either by freshly precipitated oxide of silver, or by means of bi-carbonate of soda.

Homo.—The best mode of preparing an ammonia-nitrate bath for albumenized paper with which we are familiar, is, first make a 60 or 80 grain bath, add ammonia until the precipitate first formed is re-dissolved, then add nitric acid drop by drop, testing in the mean time until it will only just restore the colour of reddened litmus paper. It is, in this state, just on the alkaline side of neutrality. The paper must be floated rapidly: less than a minute will be sufficient.

Jedburgh.—Our remarks in the criticism on photographs of the Exhibition had no reference whatever to an article in another journal to which you refer. As stated in a foot note our remarks had been written and waiting for insertion long before the other article was published. The coincidence was singular, but still only a coincidence. Had we been writing a reply to any article we should have mentioued it, and not have referred to it by indefinite inuendo.

T. R.—We must consider your proposal before giving it publicity. Personally we could not attend to the matter, but will ascertain if any one connected with our publishing office could undertake the duty. To make the plan of any value a register ought to be kept at the office for subsequent reference, and we fear that would involve trouble that might not be properly carried out. We certainly do not see that the registrar can possibly refuse forms sent by post, although he may have the power of refusing stamps as payment. We will make some enquiry on the subject.

T. P. E.—We think it possible that the plan suggested in diagram No. 2, which allows a little light to fall upon the background from the roof behind the sitter, might be tried with advantage; but as we have not seen it done, we can only speak conjecturally. The plan suggested in the fourth diagram, we should think, would answer well, as it is good in principle. The only front light it gives you is quite above the sitter. No. 2 might be tried first: if any objection were found, we think that No. 4 would certainly do.

Jackson Brothers.—The parcel of fine photographs received. We shall examine and notice them shortly.

W. Downey.—We shall have pleasure in seeing you.

Cassan.—Albumenized paper prepared on an ammonia-nitrate bath does not keep long without discolouration. The less alkaline the solution the longer the paper will keep. If you add a few more drops of nitric acid, taking care to keep the bath very slightly alkaline. Some samples of paper, however, discolour in a few hours, even when excited on the ordinary bath.

Dathus.—We are not aware that there is any especial agent in London for Jamin's lenses; they are sold by all dealers. There is not, that we know of, any printed instructions for their use. A little examination will give you the best idea of the purposes of the different parts if you bear in mind these hints: when complete, with the central lens in its place, it has its shortest focus, and most rapid action, and covers the smallest plate. When the central lens is removed, an ordinary portrait lens remains, working slower and covering a larger plate. The next combination is more complicated. You must unscrew the entire combination from the flange, removing the hood from the front lens, withdrawing the tube and front lens from the outer mounting, and screwing on the extra lens to the end of the tube; the front lens is then reversed in position and screwed into the flange, so that it becomes the back combination, and the extra lens the front one. The hood is then screwed on to the part of the mounting that originally screwed into the flange, and in a reversed position. This gives a lens of still longer focus; and finally, the first lens only may be used as a single view lens. There is a multiplicity of purposes, but we cannot assure you that they are all equally well effected. A *multum in parvo* lens generally sacrifices efficiency to comprehensiveness.

Astor.—Many of your prints are very fine, the copy of a Daguerreotype is especially good. The double printing is very effective. You must guard against a little hardness, arising probably from a little over-intensifying. We should think a frame of your best might be sent to the Exhibition.

Dry Colours.—A correspondent, whose letter is at the moment mislaid, asked, if card portraits might be tinted with dry powder colours? A very pleasing effect may be obtained by skilfully tinting albumenized prints with dry colours; but with this drawback, that the pictures must be covered with glass, as the colours would otherwise rub off. The usual method of tinting card portraits is with water colours.

Mr. Warner, of Ross, desires to call attention to an advertisement announcing a slight advance in his charges for enlarging negatives, which he finds imperative, to make the undertaking remunerative. He asks for our opinion on the reasonableness of the charges. So far as we can judge, the prices are only fair and reasonable remuneration for good work.

Melbourne.—We regret that we cannot, with justice to our readers, insert further correspondence on a question so purely personal as Mr. Osborne's claim to priority in his process of photolithography. After due examination of these claims by a committee appointed by Government, and by another committee appointed by Mr. Osborne's opponents, his claims were decided as substantially valid. After our own examination, we come to the same conclusion. You appear to be imperfectly acquainted with some facts, with which we are familiar. But, in any case, the question is not of sufficient public interest to justify us in further filling our columns with its discussion. You will find some remarks on the subject in an article in the present number. There is one remark in your letter, on which we offer a word of comment. You deplore a common tendency in Englishmen to worship success. It is not an uncommon thing to condemn this tendency, as you do. We do not join in that condemnation. To honour success, is merely another form of honouring merit. Men do not honour success if they know it to be gained by unfair means; but success is, generally, more or less, the result of some kind of merit, and whilst merit is not always honoured, because it is not always a self-evident thing, success is honoured as the general voucher for merit.

J. S. H.—The slides received. We are much interested, and shall be glad to hear more on the subject.

Mr Osborne's paper, continuation of Mr. Price's article on "Albumenate of Silver," and several other articles and letters in type, and answers to correspondents, in our next.

*** Agents or subscribers having copies of the following numbers of the present volume, which they can spare, will confer a favour by forwarding them to the office, where they will be exchanged or bought at full price: Nos. 171 187, and 196 to 203.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 220.—*November* 21, 1862.

## RETARDING ACTION OF A CHLORIDE ON BROMO-IODIZED COLLODION.

We have recently received from Mr. Keene, of Leamington, a note on the use of a collodion containing equivalent proportions of a bromide and of an iodide, for dry plates, as proposed by Mr. Sutton, and he calls our attention to the fact that he has, for some months past, prepared and advertised a collodion containing such proportions. Having referred to this fact, Mr. Keene proceeds to another, which is at once curious and important, as it may possibly furnish the key to many varying experiences in reference to the sensibility of dry collodion plates. We give this suggestion as Mr. Keene writes it —

Have you ever noticed the *retarding* influence *a chloride* salt exercises in combination with a bromide, when the latter is in as large as equivalent proportions with the iodide? During a series of experiments with the above highly bromized collodion, in connection with the dry process, undertaken during the early part of September, I added, to a portion of it, one grain per ounce of chloride of magnesium with the hope of combining the *intensity* given by chlorides with the extreme *sensitiveness* of the bromides. *The intensity* I certainly obtained, but at the expense of sensitiveness, which was very materially *reduced*; and, upon reference to my journal, I find the result was the same if the prepared albumen contained the chloride (in this instance ammonium) instead of the collodion.

I was not prepared for such a result as I had never noticed the slightest diminution in sensitiveness when the ordinary (bromo) iodized collodion was used in connection with a preservative solution containing a chloride; and the very sensitive plates obtained by the Messrs. Walter, an account of the method of preparing which, appeared a short time since in the News, were prepared with a bromo collodion and preservative solution of prepared albumen containing chloride of ammonium.

This is a circumstance of much moment at the present time, when bromides are likely to be used in large quantities for all quick dry processes, and a *thorough* washing *previous* to the application of the preservative solution—should any such be a necessity—for, if chlorides exercise the same retarding influence under all other circumstances, when a large quantity of bromide is used, as they do when albumen is used as a preservative—my experience does not go further—*all* waters containing chlorides will have to be discarded for washing the sensitized plates, and pure rain or distilled water only employed.

I hope shortly to be able to send you something of interest, relating to rapid dry process photography.—I remain, dear sir, very truly yours, Alfred Keene.

That the use of chloride is inimical to sensitiveness in dry plates has often been held, but the grounds upon which the idea has been based have not always been very clearly stated. One reason which has been alleged has been that free nitrate was necessary to extreme sensitiveness, which could not, of course, exist in the presence of a chloride. That the presence of free nitrate is not necessary to sensitiveness has been, however, repeatedly proved. The cause of the often-noticed retarding action of a chloride is not due, therefore, simply to the fact that it removes free nitrate. M. Mc. A. Gaudin expresses a conviction that chloride of sodium will not fail to destroy the sensibility of iodide of silver, in the same way that excess of iodide of potassium, and all solvents of iodide of silver destroy it. The retarding influence of chloride of silver, formed in the film, and especially the especial action in the presence of large proportions of a bromide, are new to us, and we think it worth while to call especial attention to M. Keene's observations. We shall be glad to learn the experience of other operators in the same direction, and the farther results of Mr, Keene's experiments. If the presence of a chloride in a dry plale really be antagonistic to sensitiveness, it will be very easy to wash in successive baths of distilled water.

## THE COMMERCE OF PHOTOGRAPHY.

In a recent article, we referred to the immense impetus given to the art, and its great commercial development, which resulted from the spirited management of an enterprise like the International Exhibition photographic contract.

We have just been favoured, in further illustration of this subject, with some very interesting facts, by Mr. England, to whose ability and fine taste, the public are indebted for the entire series of exquisite stereographs, and some other pictures, of the Exhibition interior and its contents. The number of these stereoscopic pictures alone, produced during the summer, by Mr. England, has been upwards of two thousand gross, or considerably more than a quarter of a million slides. The card portraits from the same negatives, have not been quite so numerous, but they amount to very many thousands. The materials used in the production of these, are stated as follows:—

| | |
|---|---|
| Albumen . . . . . | 200 gallons |
| Paper . . . . . . | 70 reams |
| Nitrate of silver . . . | 2,400 ounces |
| Pure metallic Gold . | 35 „ |
| Making of— Terchloride more than of Gold . . . . | 20,000 grains |
| Hyphosulphite of soda, 25 cwt., or . . . . | $1\frac{1}{4}$ tons |

The number of persons employed in Mr. England's establishment, in albumenizing, exciting, printing, toning, fixing, washing, mounting, &c., may easily be conceived; and this is only one portion of the Exhibition work, and does not include any of the large pictures.

## THE PHILOSOPHY OF POSITIVE PRINTING UPON ALBUMENIZED PAPER, IN CONTINUATION OF "ALBUMINATE OF SILVER AND THE ABBE PUJO."

BY GEORGE PRICE.

The Table No. 2, given in my last communication,* shows a very great diversity in the proportions which the albuminate, chloride, and free nitrate of silver bear to each other, in the various formulæ I have analyzed; as we may safely assume that each person has given that which he himself considers will produce good, if not the best results, this extraordinary diversity goes far to prove how little is really known respecting "the philosophy of positive printing upon albumenized paper."

Of the three compounds of silver, we find the *free nitrate* is, in every formula, considerably in excess of either the albuminate or the chloride; and in many cases, *is more than double their united amounts.* Comparing it with the chloride, we find it ranges between the two extremes, of *less than twice the quantity*, as in No. 7, Mr. Aleo's, to *more than thirteen times the amount*, as in No. 12, Mr. T. R. Williams's.

* Page 523.

If we compare the *albuminate* with the chloride, we find that it is always in excess, excepting No. 10, Mr. Hardwich's, where it is *little more than half the quantity* ; and that it ranges from this up to *very nearly four times the amount*, as in No. 12, Mr. T. R. Williams's. It seems, therefore, to be the general opinion, that the albuminate should be in excess of the chloride—Mr. Hardwich, in his last edition of "Photographic Chemistry," having given the same formula as No. 8, Mr. G. W. Simpson's.

An inspection of the tables I have calculated, suggests several interesting questions, well worthy of discussion. Firstly, *which* of the three compounds of silver—the albuminate, the chloride, or the free nitrate—plays the most important part in positive printing upon albumenized paper? Table No. 2 seems to infer that the free nitrate does, so as it is largely in excess of the others; but I ask, whether such an enormous excess is really *necessary*? It must be borne in mind, that the quantity there given is produced by sensitizing upon only a *seventy*-grain bath; and if we use from "one hundred to one hundred and thirty," which we are recommended to do "from experience," we, of course, materially augment the excess there given; for we cannot make any addition to the quantity of albuminate or chloride by increasing the strength of the nitrate solution.

Secondly.—What part does the free nitrate play?—is it a *principal*, acting in co-operation with the albumiuate and chloride in the intricate process of the formation of the image? or is it but an *accessory*, though, perhaps, a necessary one, to its formation? We are told that the action of light upon chloride of silver decomposes it, by liberating the chlorine, and that silver, having a greater affinity for chlorine than it has for nitric acid, the nitrate of silver is in turn decomposed by the silver leaving the nitric acid to combine with the liberated chlorine; this decomposition and re-composition going on during the whole time of printing.

According to this theory, which is generally, if not universally received, the nitrate of silver, *as such*, has nothing whatever to do with the formation of the image, but only furnishes a larger amount of chloride of silver for its production than the paper originally contained, so as to give it more vigour and intensity.

This re-composition of chloride of silver during printing, must have its limits with respect to the quantity *necesary* to be supplied for the formation of a vigorous image; and therefore, the free nitrate beyond what is requisite to furnish this amount, must be useless,—if it plays no other part than this. If it *really* has no other duty to perform, we have only to give at once, the required amount of chloride of silver, by increasing the quantity of salting chloride in the albumen, to enable us to do without any free nitrate whatever; but we know, that however large the quantity of chloride of silver, even in conjunction with the albuminate, it will not yield as good an image without the free nitrate, as it will do when it is present. Methinks, this may fairly be considered as affording presumptive proof, that the free nitrate of silver *as such*, does in some unknown way, tend to the formation of the image, in co-operation with the albuminate and chloride.

Because chemical science is not sufficiently advanced for any one to be able to state *how* the free nitrate acts, it surely is an unwarranted assumption to assert, that *its mere presence is necessary to enable the chloride to give good results.* But whether it acts only as a necessary *accessory*, or, as a *principal* in co-partnership with the albuminate and chloride; what is the use of, or rather, the necessity for the greater portion of it; viz. that which is washed out after printing, and previous to toning? This *un*-used free nitrate, if I may so term it, is, in many cases, fully *four-fifths* of what the paper took up from the sensitising bath, and nearly the whole amount of free nitrate which the sheet contained.

Assuming, according to the Abbé Pujo's statement, 135 to be the maximum number of minims of undiluted chlorided albumen, that a sheet of paper ordinarily takes up; and also, according to Stockhardt, that only one-eighth of the albumen is left upon evaporation; 16⅞ grains of dry albumen is the greatest quantity which a sheet of paper will be surfaced with. If we consider the atomic weight of pure albumen to be 8206 as I have calculated it, this comparatively large amount requires only a *fractional part of a grain of nitrate of silver* to convert the whole into albuminate of silver.

These 16⅞ grains of dry albumen will *never* require more than a fractional part of a grain of nitrate of silver, to convert them into the albuminate, *unless the atomic weight of pure albumen be estimated much lower than we should be warranted in assuming that of such a complex organic compound to be.* I have had the curiosity to calculate this; and find, that for 16⅞ grains of dried albumen to require *one grain* of nitrate of silver to convert it into the albuminate, the atomic weight of pure albumen must be 2868·75. Thus, whatever may be the atomic weight, the greater or lesser portion of albumen in the albumenizing mixture, creates no necessity for a stronger or weaker sensitising bath; it is the quantity of salting chloride which it contains that must regulate its strength; I do not think sufficient attention is paid to this fact.

The greater the amount of salting chloride in the albumen, the more sensitive the paper becomes; but the quantity of chloride of silver which is *absolutely necessary* to produce good effects, is extremely small,—as evidenced by the results produced by using Marion's and T. R. Williams's low salting formulæ. Upon referring to Table No. 1,* we shall find the proportion of dried albumen to the salting chloride, is, in Marion's 9 to 1, the fraction being too small to be worth consideration; in T. R. Williams' it is 10¼ to 1. That the albuminate and chloride of silver will not bear the same proportion, I have shown in my first communication, proving the fallacy of the Abbé Pujo's assertion that they will do so;† nevertheless, in these low salting formulæ, the albuminate is much in excess of the chloride; in Marion's it is nearly 3½ times the quantity, and in T. R. Williams's *very* nearly 4 times.

Judging by the *quantity* of each compound of silver present in the sheet of paper, the albuminate ranks *next* in importance to the free nitrate, *and last of all, the Chloride*; and yet it is to this latter compound that the chief honour is given for the production of the picture. That the chloride is not of the paramount importance which has been attributed to it, may fairly be questioned, when we consider the beautiful effect produced by low salting formulæ.

I know not how it has arisen, but a strange misconception exists, respecting the amount of chloride of silver usually formed in a sheet of paper; I read of *thirty grains.* This quantity must be produced from what may be deemed an *exceptional* formulæ; as the sheet of paper must contain 11¼ grains of chloride of ammonium, or their equivalent; and taking 135 minims to be what it takes up of the albumenizing mixture, there must be *forty grains to each ounce of solution*, to produce such an amount.

I believe, photographers, as a body, are not much conversant with chemistry, and thus are led to believe a thing to be a fact, because the knowledge of chemistry is not sufficiently advanced for those who *are* chemists to explain *how* the contrary can be the truth. Thus, it has been confidently asserted, and as confidently believed, that the base of the salting chloride has no influence whatever on the colour of the picture. That this is *another* of "the fallacies of the scientific," any one may convince himself, who will take the trouble to observe *attentively* the different colours produced by the action of light upon papers salted with barium and ammonium; I do not mention sodium, as I have never printed on paper so salted. Much twaddle, under the guise of science, has been published in the journals respecting the use of chloride of barium, and I have even been

* Page 523. † Page 494.

told that it *cannot* be, and never *is* used in albumenizing paper; however, the opinion that the nitrates *do*, in some way or other, affect the colour, appears to be daily gaining ground; if it were not so, why the use of *two* chlorides?

Those who use barium in conjunction with ammonium, do so because they say it renders the tone blacker; and, as far as my own observation goes, they say so with truth; but what possible effect does a *modicum* of chloride of sodium have, when added to that of ammonium? I fear, that if those who thus employ it, were asked their reason for so doing, their only answer would be, because they *thought* it had some effect; but they could not tell you what had induced the belief.

In Mr. Hart's Formulæ (Bourquin's Albumenizer)* we find *one grain* in every eight is chloride of sodium; this substitution of one grain, cannot be because it is an easier way of reducing the quantity of chloride of silver, than by taking its equivalent of ammonium; as the reduction, by using one grain of chloride of sodium instead of ammonium is only 4-15th of a grain, which is but 1-80th of the quantity that would be produced by eight of ammonium. If the chloride of sodium be employed with the idea that the nitrates affect the colour, the nitrate of soda must be believed to have a very *powerful* colouring property. Taking the atomic weight of chloride of ammonium at 54, nitrate of ammonia at 80, chloride of sodium at 60, and nitrate of soda at 86, I find the nitrate of soda is but the $\frac{357}{3187}$th part of the conjoint nitrates.

The chloride of sodium, is said to give a cold tone, and that of ammonium a warmer one; we can, therefore, easily imagine how, if any preference be given to sodium for any cause whatever, that an equal quantity of chloride of ammonium added to it, may render the tone perceptibly warmer, and yet not destroy the particular colour it may give, as in Marion's formula;† but I must candidly confess my *own* inability to conceive the good of *one* of sodium to *seven* of ammonium, and strongly believe that the addition is more a *fancied* improvement than a real one. When the chloride of barium is used in conjunction with that of ammonium, it has, in every case coming under my cognizance, been in *equal* proportions, as in Maxwell Lyte's formula.‡

The theory which attempts to explain the formation of the image, by the decomposition of the chloride of silver, and the recomposition of additional chloride by the liberated chlorine seizing upon the silver in the free nitrate, is based upon the manner in which chloride of silver acts when placed in totally different circumstances to what it is in positive printing. It is well known that altered conditions in many cases produce totally different combinations; are we then, warranted in holding this theory, when in printing the circumstances are that a mere film is formed and dried on a sheet of paper, which film is said to consist of chloride of silver *in conjunction* with the albuminate, and with the *addition* of free nitrate; the said chloride is, therefore, placed under peculiar conditions. Has it ever been *proved* that the chloride and albuminate of silver produced by sensitizing a chlorided albumenized sheet of paper, are in reality two *separate* compounds, and not a *double salt*, which for distinction's sake I will term the *chlor-albuminate*.

In taking leave of the subject for the present, I can only say that should I even be proved to be wrong in *every* particular respecting the tables I have given, and it should but lead to a profitable discussion, by which a single fact is added to our imperfect knowledge, I shall console myself in the words of Burke, who tells us, that "a man who works beyond the surface of things, though he may be wrong himself, yet clears the way for others, and may chance to make even his errors subservient to truth."

Allow me, in conclusion, to recapitulate the subjects which I think worthy of discussion, and on which I invite your various talented readers to give an opinion.

1st.—Which of the three compounds of silver plays the most important part in positive printing upon albumenized paper; the chloride, albuminate, or free nitrate.

2nd.—Is the free nitrate of silver *a principal*, or only an *accessory* in the formation of the image?

3rd.—Is the enormous excess of free nitrate of silver, as indicated in Table No. 2, *necessary?* and if so, why?

4th.—Is the albumenizing solution a mere *mixture* of albumen and chloride, or does the chloride enter into a *chemical combination* with the albumen?

5th.—Are there two *separate* compounds of silver formed by sensitizing a chlorided albumenized paper, viz., the chloride and the albuminate, and do they act *independently* of of each other; or, is one *joint compound* formed? if I may use such an expression.

It is, perhaps, scarcely necessary to say, that *reasons* should be given for the holding of an opinion upon these subjects, and not mere assertion, even though it be backed by the authority of names well known to fame. I have lived long enough to have learned that it is unwise and unsafe to accept as facts the assertions of any man, *however high may be his rank in the particular art or science which he has made his study*; and very many of your readers can no doubt supply, from their own reading, numerous instances where a thing has been declared upon high scientific authority, to be either an impossibility, or not the truth, which almost every little, ragged, uneducated urchin now knows to be a fact.

* No. 13, page 523. † No. 14, p. 522. ‡ No. 6, p. 522.

## PHOTOGRAPHIC PORTRAITURE.

BY M. MC. A. GAUDIN.

Photographic portraiture has become an important branch of industry, which improves daily, amid a host of difficulties which still prevent its attainment to perfection.

These difficulties are of many kinds; the greatest are those resulting from duration of the sitting, which does not yet permit of our rendering that instantaneous expression, without which *life* cannot be manifested. From this impossibility of rendering instantaneous expression, it happens that the most satisfactory portraits are those taken in profile, where the eyes are fixed on an object, a portrait with a natural expression is obtained, which photography, in its present state, renders in perfection.

But the public desires something more than this, it requires a "full face" portrait, without shadows, which accumulates all the difficulties of the artist operator.

For the present I shall say a few words about a fact which is not usually taken into account, but which acts with more or less intensity everywhere; it results, from this general principle, that photography operates under the influence of the invisible chemical rays rather than under the influence of the rays most luminous in appearance. Thus it is that light loses a great part of its photographic power by simply passing through a sheet of very thin glass. By an analagous reason, *reflected* light never produces a photographic effect in proportion to the light it sends to the eye. For example, if an operating room be entirely hung with yellow, red, or green drapery, the greater luminousness resulting from the employment of yellow drapery, in proportion to that resulting from green, would lead us to believe that much greater rapidity of exposure in the camera might be obtained from the yellow than from the green. Experience, however, does not confirm this hope; with the employment of draperies of these three colours, the chemical rays of light will be almost wholly absorbed; only the direct light will be efficient, consequently the model will be wholly deficient in chiaroscuro.

Unless then, the operating room be hung with white, or, better still, with light blue drapery, to diminish the daylight, I say that the photographic picture will never represent the model as it appears to the eye, in consequence of the transformation of the reflected light, which greatly increases the intensity of the shadows, and this is partly the reason why the public does not like contrasts, because they instinctively feel that they are too strong, while the photographer, who believes that he has rendered nature to perfection, believes they are not strong enough.

To remedy this radical imperfection in a general way, certain photographers provide permanent reflections by the arrangement of lights, or rather, what is to them much easier reflect upon the sitter, by means of a white screen, a supplementary light, which acts only during the sitting, without considering that the reflection from the screen upon the corner extinguishes the light of the eye, and invariably falsifies the model, since the result is a lighting greatly at variance with nature.

This remark has been suggested to me by a portrait which presents a *bizarre* aspect, with an unnatural expression and false shadows. Upon enquiry, I ascertained that the photographer had employed a screen to lighten the shadows, and he succeeded so well that his portrait was—nowhere.

Consequently, an indispensable condition consists in covering the walls of the operating room with white or blue surfaces, for any other coloured reflection gives not only a loss of sensibility but of harmony in the shadows. The background, when uniform, must be white, and never of a non-photogenic colour; no inconvenience arises from this, as the eye of the sitter cannot be affected by its brilliancy, while a non-actinic colour is always injurious as part of the picture by contrast with the model. By closing the shutter of the skylight, we can always diminish the quantity of light to any desired point.

In a word, the pose and the lighting are the bases of fine portraits, and to succeed with them, we must, as much as possible, employ only actinic light in the reflections.—*La Lumiere.*

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration and Analysis.

*Lime Salts* (continued).—Amongst the plans suggested for preventing the incrustation of boilers by the precipitation of the carbonate, or sulphate, of lime contained in the feed water, perhaps the best is due to the ingenuity of Mr. Spiller. He adds caustic soda, which is now prepared at a cheap rate, to the water in the boiler. This decomposes the lime salts forming carbonate and sulphate of soda, and, liberating caustic lime, rendering the accumulation of hard scale in the boiler an impossibility. Not only is this plan perfectly effectual in preventing incrustation, but it is equally valuable in removing the deposit when already formed. If a little caustic soda be added to the water with which a boiler is fed, it will gradually disintegrate the hard cake of carbonate and sulphate of lime lining it, and reduce it to a fine sand, which may easily be blown out at the lower taps, when the boiler is emptied. The plan has stood the test of many years' experience in some Government, as well as private, works.

We have already explained that carbonate of lime, a perfectly insoluble body, becomes soluble in water in the presence of an extra quantity of carbonic acid. If any substance be added to this solution of carbonate of lime in carbonic acid, which will remove the excess of carbonic acid, will be at once precipitated, and it is by an application of this principle, that Dr. Clark has succeeded in softening hard waters by his liming process. A solution of caustic lime in water is prepared, and this is added to the solution of bicarbonate of lime in such proportion that the caustic lime shall just unite with the extra quantity of carbonic acid present. It thus becomes converted into carbonate of lime, which is precipitated in the soluble form, and, at the same time, by removing the solvent for the original carbonate of lime, causes it also to be precipitated. The following equation expresses the action :—

$$\underset{\text{Solution.}}{CaO} + \underset{\text{Solution.}}{CaO2CO_2} = \underset{\text{Precipitate.}}{2CaOCO_2}.$$

The process is equally successful on a large, as on a small scale, and is, or was very recently, practically carried out at the works of one of the metropolitan water companies. It affords a curious instance of a chemical paradox—the removal of lime from water by the addition of a fresh quantity of lime. The same chemist (Dr. Clark) has also devised a very useful test for the hardness of water, by means of a standard solution of soap. This determination is one of the utmost importance in an economical point of view, and the indications which it affords are of such great value to all who have to use quantities of water, photographers especially, that we shall give a brief account of the process, as at present practised. The test consists in ascertaining the quantity of a standard solution of soap, or spirit, required to produce a permanent lather, with a given quantity of the water under examination, the result being expressed in degrees of hardness, each of which corresponds to one grain of carbonate of lime in a gallon (70,000 grains) of water. The soap test is made by dissolving curd soap in proof spirit, in the proportion of about 120 grains to a pint. This is graduated by comparing its action upon a carefully prepared solution of chloride of calcium of such a strength that it shall represent a water of 16 degrees of hardness. This, as well as the soap test, can be purchased ready prepared at the operative chemist's. To apply the test, the water to be examined is introduced into a stoppered bottle, which should be half filled with it, and violently agitated, in order to disengage any free carbonic acid, which would increase the quantity of soap required to form a lather; the air in the bottle is then sucked out through a glass tube, and these operations repeated two or three times, until it is judged that the free carbonic acid is entirely removed. A hundred measures of this water are then introduced into a stoppered bottle of twice that capacity, and the soap test very gradually added from a bourette (the stopper being replaced, and the solution violently agitated from time to time) until a lather is formed, which remains for five minutes over the whole surface of the liquid when the bottle is laid down on the table. The carbonic acid should be sucked out at intervals from the upper part of the bottle. The number of measures of soap solution used is then noticed, and the hardness of the water is then inferred directly from them by reference to a table. Thus 3·2 measures of soap test indicate 1° of hardness, 7·6 soap test show 3° hardness, 11·6 soap test show 5° hardness, &c.

The indications given by the soap test are very valuable, not so much for their chemical accuracy, for they only give rough approximations to the analytical results; but on account of their showing in a perfect manner the fitness, or unfitness, of a water for domestic purposes. For this reason, no analysis of a water is considered complete, unless it contains the degrees of hardness according to Clark's soap test.

*Sulphate of Lime*, known more commonly as plaster of Paris, is a compound of universal application. It is found in the natural state in combination with two equivalents of water, as gypsum, alabaster, &c. When this native variety is heated to a little above the boiling point it loses the combined water, and becomes then converted into the compound known as plaster of Paris. When moderately burned gypsum is mixed with water, it forms a paste at first; but this quickly hardens, heat being evolved, and the water passing into the solid condition of water of crystallization. Sulphate of lime is slightly soluble in water, 460 parts of liquid being required for one part of sulphate of lime. Heat does not increase the solvent power of the water, but rather seems to diminish it. It is to the presence of this salt in some mineral waters that their excessive hardness is owing. Many, in fact, being saturated solutions of gypsum, from the water having trickled through a stratum of this earth.

*Chloride of Lime.*—This, although strictly speaking an incorrect form of expression, has now become the recognized term for the mixture of chloride of calcium with hypochlorite of lime in equivalent proportions prepared by the action of chlorine upon lime. This is prepared on an enormous scale for bleaching and disinfecting purposes. Well-slaked lime is placed on sieves, and chlorine gas is passed over it until it ceased to be absorbed. When the operation is perfectly carried out, the gas is absorbed nearly in atomic proportions,

$$2CaO+2Cl=CaCl+CaOClO.$$

Chloride of lime is a white powder, usually moist, and smelling strongly of hypochlorous acid; it must be preserved in well-closed vessels, kept cool, and away from the light. When exposed to the air, bleaching powder soon attracts moisture, and finally deliquesces slowly, evolving oxygen gas, and forming a liquid which no longer bleaches. When treated with water, bleaching powder yields its active ingredients; when filtered from the insoluble residue, it forms a transparent and colourless liquid, having a slight odour of hypochlorous acid, and an astringent taste. When boiled its loses its bleaching power, and evolves oxygen; the same change likewise goes on gradually at ordinary temperatures, especially if exposed to the light. All acids, even carbonic, convert chloride of lime into a lime salt and free chloride, according to the following equation:—

$$CaCl+CaO,ClO+2CO_2=2(CaO,CO_2)+2Cl.$$

When exposed to the atmosphere, the same change is effected, but more slowly. A crust of carbonate of lime is formed over the surface of the liquid, and if this film be broken up from time to time, the conversion into carbonate of lime and chlorine is completely accomplished in a short time. If, however, the crust is allowed to remain, the liquid beneath is resolved into oxygen gas (free from chlorine), and chloride of calcium. It is important to recollect this circumstance when employing solution of chloride of lime for disinfecting purposes; it must also be remembered that chloride of lime only bleaches or disinfects in presence of an acid to set the chloride free. When it is employed *per se*, it is the atmospheric carbonic acid which does the work, and if a more rapid action is desired, another acid, such as sulphuric, or hydrochloric, must be added.

## PRINTING ON RESINIZED PAPER AND SILK.

BY H. COOPER, JUN.*

WITH your permission, I should like to make one or two remarks upon printing on resinized paper and silk. Mr. Shadbolt, in an article in the British Journal, says that the comparison does not lie between albumenized and resinized paper, but between resinized and plain paper. I do not think this is quite correct, and I will give my reasons. In the first place, we wish to dispense with albumenized paper, for two reasons, the highly glazed appearance of the prints, and the great probability of their fading, caused by the silver retained in the albumen. If we dispense with it we must have a substitute. Now, hitherto, plain paper, the surface either prepared with arrowroot, gelatine, or iceland moss, has been the only one known. Resinized paper is, I think you will admit, capable of giving better prints than either of these, and is, therefore, the best known substitute for albumenized paper. From this, it follows that the comparison is between resinized paper and albumenized, as well as between resinized and plain paper.

In a paper read at the last meeting of the North London, I called attention to several disadvantages in the resinized papers. Some of these I have since removed, and I do not doubt that, if gentlemen engaged in the art of photography will give a little attention to the subject, they may *all* soon be remedied, and the prints produced upon resinized paper be equal, if not superior, to those upon albumenized. The decomposition of the paper, after sensitising, was the first. Determined to find from which of the resins it proceeded, I prepared several pieces of paper in the following ways (all the solutions of resin containing 13 grains of chl. calcium to the ounce) mastic alone, frankincense alone, chio turpentine alone, and various combinations of these three resins. I then sensitised a sheet of each, and also one of albumenized paper, and hung them all up to dry, and carefully watched every day for a fortnight the progress of decomposition. The results showed that the mastic alone kept the longest, the frankincense and mastic next, frankincense alone and albumenised paper next, while all those pieces containing chio turpentine turned yellow very rapidly. The formula I now recommend is: mastic 8 grains, frankincense 10 grains, chl. calc. 10 to 15 grains, and 1 ounce of spirit. This solution is easily filtered through paper, so that it can be used directly the ingredients are dissolved.

Another sore point in the process was the granular appearance of the proofs. Subsequent experiments confirm the idea I then held that it was due to the paper itself; but I find that it is increased by using too large a proportion of resin. With the formula just mentioned it does not appear to so great an extent, in the same paper, as with the old formula, but with a suitable paper I have entirely got rid of it. Thin negative *Rive* has given the best results, yet it has one objectiou; it is very liable to tear in washing. I think that the use of a little stouter paper might prevent this.

The prints also possess greater transparency and brilliancy in the shadows, and the lights are much finer if printed on a suitable paper immersed in the resin solution just recommended.

It has been said that all resins become yellow by exposure to the air. This they certainly do, but some to so slight an extent as to be of very little consequence in the paper prints. I am of opiuion that paper prepared with a small quantity of frankincense and mastic will become yellow much slower than albumenized paper, and I even doubt if it would become more yellow than plain paper, for this reason: it is a well known fact that ordinary paper becomes very much discoloured by keeping, whether exposed to the light or not; now if each particle of the paper be encased or "locked up" in a resin, I contend that it will be so far protected from atmospheric influence as to remain a pure white much longer than if it were left unprepared, and I do not think that the discolouration of the resin will make it so yellow as the unprepared paper.

I see that Mr. Sutton, in the *Notes*, recommends a solution of lac for preparing the paper. My own experience tends to show that this resin is totally unfit for the above purpose. When an alcoholic solution of lac is evaporated, cold, the resin is left in a semi-transparent, if not entirely transparent state. If paper be immersed in a solution of it and dried, the thinner portions of the paper will be rendered more or less transparent; which will cause the prints to be very mottled and granular. I may be wrong, but this is the result of my own experiments. I tried to use lac 3 or 4 months ago, and met with no success.

I find that my meaning in the following sentence has been much misunderstood, and perhaps it may not be out of place to explain it here a little more fully. The chloride being, moreover, *locked up* in a resin, does not, in my opinion, form as much chloride of silver, as it would do if it were employed in albumenized paper. What I meant to infer was this: that the particles of chloride are so thoroughly encased, that it is with great difficulty that the nitrate of silver can get at them, to form chloride of silver, even after a long floating. I do not mean to say but that after very prolonged contact with the nitrate bath, it might all be decomposed, but by a floating of five to ten minutes some of it will remain unchanged. But then the question arises, if it is so encased as to remain unchanged under the influence of nitrate of silver, how can it be removed by water; as a chloride would be very objectionable in the finished proof? But it seems to me that the long immersion in water, consequent upon a thorough washing, is quite effectual in removing it.

And if the most infinitesimal portion remain, how can it injure, by atmospheric influence, when it is proof against the attack of silver and water? Should my meaning in the "locking up theory" be still obscure, I shall be most happy to answer any questions that may occur to any of you.

* Read at the South London Photographic Society, November 13, 1862.

I have been making some very interesting experiments on resinate of silver.

I have here a print produced by the direct action of light upon resinate of silver. The compounds formed from the different resins and nitrate of silver vary considerably in their character, as regards their sensitiveness to light, and their colour after exposure. Those formed from common rosin and Chio turpentine are the most sensitive. The specimen print was prepared with Chio turpentine frankincense and mastic. The resinate also receives the latest impression very rapidly, which may afterwards be very satisfactorily developed. It is from this fact that I attribute the very short time required to print by development in resinized paper. I may mention that I have produced good prints by development on resinized paper, of a nice tone, and entirely from motleyness and measles, by soaking in distilled water before developing.

I had hoped to have printed some pictures on iron instead of silver on resinized paper, but have utterly failed to produce anything worth showing. I hope others may be more successful, for I think it is a very good line to follow up, the dispensing with silver and hypo in photographic prints.

It is worthy of mention, that since I have used Sutton's neutral chloride of gold, I have had much less difficulty and vexations in toning all kinds of paper prints, than hitherto.

I will now say a few words on the formula for printing on white silk, which I sent to the Photographic News of last week. I think I cannot do better than read those remarks.

(Mr, Cooper then read the communication which appears in the Photographic News p. 536 which see).

I have brought a print with me to show why the silk must not be floated on the nitrate bath. You will notice that the threads of the silk show very plainly, totally destroying all the beauty of the photograph.

I will endeavour to explain the reason of this. Silk is a fabric composed of threads, of greater or less size, according to the kind. The glacè silk on which the specimens were printed, is rather large in the thread, which, curious as it may seem, appears to give greater brilliancy to the prints. Now when the prepared silk is laid upon the surface of the nitrate of silver, the solution filters through and runs over the edge of the threads, but in its progress it is bereft of its silver, so that a solution containing very little, if any, silver remains on the other side of the silk, and dissolves out, to a certain extent, the unchanged chloride, and when the silk is removed and hung up to dry, it finds its way back again to the surface that is to be printed upon, and uniting with the free nitrate, deposits chloride of silver, irregularly, which renders the image blotchy and weak. You will therefore see that the *immersion* in the silver bath, can on no account be dispensed with.

The photographs on silk may be washed without injury to them, in soap and water, when they become soiled or dirty; this is best done by laying the silk on a sheet of glass and scrubbing it back and front with a brush or sponge; it may then be ironed in the usual way or stretched as I mentioned before. I have tried printing on silk by development but with no very good results. Also printing on cambric and muslin, with what success you may judge from the specimens before you.

In concluding this paper, I must ask you to excuse any faults in it as it was very harshly prepared.

## THE HELIOSTAT.

Messrs. Foucalt and Duboscq have greatly improved their heliostat. The new model is specially intended for photographic purposes in the enlarging of pictures. It causes a mirror, 16 inches by 32 to move, the larger dimensions of which always continue in the place of reflection, so that the rays, reflected in a fixed direction, generally present a useful diameter of 13 to 16 inches. A similar mirror, made to orient itself in its plane at the same time that it inclines under the wished-for incidence, turns upon the disc which supports it, without encountering much resistance. For the friction from sliding, which existed in the first model, there is now substituted a rolling of the back of the mirror upon three pinions, which determine the reflecting plane. With the intention of retaining the faculty of inclining the reflected ray, more or less, the column of the mirror in the first model, was connected with a central point by an articulated crank, for the purpose of maintaining the distance between the principal centre and the point of suspension of the mirror constant; it was, therefore necessary, that this column should be mounted on a slide upon the level that sustained it. But this was a complicated piece of mechanism without an object; because it is seldom that we do not give a nearly horizontal direction to the reflected rays. It was, therefore, to simplify the instrument, advantageously in suppressing those portions which are useless. Nevertheless, the new apparatus partakes with all the heliostats known up to the present time, the defect of opposing variable resistance to the moving gear, which in certain positions became insurmountable. These variations of resistance are explained by the constantly changing extent of the movements executed by the different portions under the action of the constaut motion of the motor axis. In those singular positions in which the column of the mirror must turn upon itself, with a comparatively prompt motion, the reaction upon the gear becomes excessive and insurmountable. But seeing that the difficulty was limited to this point, I had the idea of placing an auxiliary spring within the column, to solicit it, independently of the gear, to overcome the difficult position. This spring acts in some measure at the will of the operator, and its introduction changes in no respect, the working of the apparatus: its effect is only to secure the evolution of the mirror in all the positions through which the instrument can geometrically pass.

This magnificent heliostat has excited universal admiration. Nothing can be more surprising than to see a little pendulum of the metronome produce a continuous motion of the truly gigantic mirror, of which an idea can only be obtained upon viewing it. M. Duboscq claims the merit of being the first who, practically, enlarged photographic pictures by apparatus of his own contrivance, which contains the elements of all the apparatus constructed since.

## FORTHCOMING EXHIBITIONS.

### Photographic Society of London.

*Rules and Regulations of the Ninth Annual Exhibition.*

The Photographic Society of London will open their Ninth Annual Exhibition of Photographs early in January, in the Gallery of the Society of British Artists, Suffolk-street, Pall Mall.

The Society propose to award silver medals for—

1. The best portrait or group.
2. The best landscape.
3. The best photograph of any kind.
4. The Council will also award a medal for any special novelties or improvements, if they shall deem them of sufficient importance to merit such a distinction.

The Exhibition will not be restricted to members of the Society, but open to all, subject to the following regulations, viz.:—

1. Negative and Positive Photographs of every description, whether on paper, glass, or other material, including Daguerreotypes, will be admitted, and also Stereoscopic Pictures and Stereoscopes.

2. Coloured Photographs will also be admitted.

3. Positive Pictures, printed from touched or painted negatives, and also touched or painted positive proofs, must be described accordingly.

4. For the sake of economizing space, the margins of all Mounted Photographs must be kept within moderate limits, viz., not exceeding 3 inches for the largest pictures, or 2 inches in those under 8 inches by 6 inches.

5. Pictures sent for exhibition must be numbered consecutively, and accompanied by a schedule in the subjoined form. Every picture must be protected by glass, and bear on its front a duplicate of the entry on the schedule referring to such picture.

6. All Pictures with advertisements will be rigidly excluded.

7. Exhibitors desirous of selling their Pictures will be permitted to make arrangements for that purpose with the attendant in charge of the Exhibition; and a commission of 10 per cent. will be charged on all sales effected during the Exhibition.

8. Facilities will also be given to the Makers of Photographic Apparatus, &c., for the exhibition of such of their productions as may be considered of peculiar interest from excellence of construction or novelty of invention.

9. All works intended for Exhibition should be addressed to the Secretary of the Society, and delivered at the Gallery, 5, Pall Mall, with all expenses paid, on the 22nd of December.

Exhibitors and Members of the Society will have the privilege of free admission, and members also of introducing one friend without payment.—By order of the Council,

Hugh W. Diamond, M.D., Secretary.

Exhibition of the Photographic Society, 1863.

| Name of Exhibitor or Photographer. | Address. |
|---|---|
| | |

| No. | Description. | Process. | Price. |
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Regulations of the Second Exhibition of the Photographic Society of Marseilles.

The Photographic Society of Marseilles, in organising a public Exhibition of Photographic Productions and Apparatus, invites all French and foreign photographers to send contributions.

Manufacturers of photographic apparatus are also invited to this Exhibition, to which they can send all their special instruments, such as lenses, cameras, dark slides, camera-stands, dishes, &c.; in a word, all apparatus, or parts of apparatus, employed in photographic manipulations. The same invitation is addressed to all manufacturing chemists, authors, editors, &c., for specimens of chemicals, or works of theory or practice interesting to photographers.

The Society recommends the exihibition only of new proofs—that is to say, of those which have not been exhibited before. Special attention also will be directed to obtaining pictures illustrative of new processes, such as dry processes, enlargements, carbon or ink prints, photolithographs, photo-engravings, impressions on cloth, enamel, and other materials.

1. The Exhibition will open in the course of January, 1863, and will be held in a hall constructed with especial reference to its being used for this purpose, near the site of the *Union des Arts*. It will be open one month at least.

2. All parcels should be addressed, *carriage paid*, to the Secretary of the *Union des Arts*, before the 15th December, 1862, at the latest.

3. Each parcel must be accompanied by a detailed notice of the number of articles sent, and signed by the exhibitor. Manufacturers of apparatus are desired to attach to what they send, independent of their catalogue and prospectuses, full instructions and descriptions necessary to the exhibition of their instruments, which will be made at public meetings organised by the Society.

4. Except in special cases, to be decided beforehand by the Committee of Management of the Society, there will not be awarded to each exhibitor a space of more than from six to nine feet square.

5. All pictures exhibited, except those in albums, ought to be framed and glazed. To avoid expense, exhibitors may send their proofs, unmounted, to the Secretary of the *Union des Arts*, who will take care that those proofs which are to be placed under glass shall be done as economically as possible. In this case the packages should reach him by the 10th of December, at the latest.

6. All coloured or touched prints are disqualified for exhibition on this occasion.

7. All negatives on glass or paper, impressions on metallic plates, on stone, or on wood, which exhibitors may desire to send with their positive proofs, will also be received and deposited in suitable places in the Exhibition, with all the necessary precautions. The same applies to negatives which may be sent with the apparatus by the aid of which they have been obtained.

8. Exhibitors should write their names and addresses upon each print, or on the frames containing a number of prints; but they are desired, under pain of non-admission, not to attach any inscription the form or wording of which would possess the character of an advertisement.

9. It is necessary that each proof should be named, and a description of the negative process employed, such as wet or dry collodion, albumen, waxed-paper or not, attached thereto. The Committee will also be happy to receive any further information on the method of taking the picture.

10. The selling price must not be indicated, either on the proofs or frames, or apparatus.

11. The Committee of Arrangement propose to purchase a certain number of prints, to be drawn for by lottery at the close of the Exhibition. Those exhibitors who are desirous of selling their proofs are requested to state the price to the Secretary, who will furnish the information to the Committee of Recommendation, and to the public. The same is made to the exhibitors of photographic apparatus.

12. Nothing sent for exhibition can be withdrawn before the close of the Exhibition.

13. The Photographic Society of Marseilles will receive with gratitude, and place in their portfolio, all proofs interesting in point of art or process which any photographer may offer for that purpose. The proofs sent for exhibition will be examined previously by a Jury of Admission, named from among the active members of the Society.

14. All objects exhibited must be withdrawn, or will be returned, at the expense of the exhibitors, within fifteen days after the closing of the Exhibition.

15. Although the Photographic Society has resolved not to offer any prize or medal, it considers that it should, nevertheless, bring to the notice of exhibitors the fact, that the *Union des Arts* reserves to itself the right to recompense those objects exhibited in its rooms, which it shall consider worthy of special distinction. The proofs, apparatus, &c., which shall have been contributed to the Photographic Exhibition, will be admitted to compete for this advantage.

All letters and communications should be addressed to the Secretary of the Photographic Society, at the *Union des Arts*, Marseilles.

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Comptoir International des Photographs.

An Exhibition will shortly open under the direction of M. Edmond Potonie, at 97, Rue Richelieu, and 36, Passage des Princes, Paris.

*Rules Relating to Consignments.*

*Article* 1.—Photographs intended for exhibition at the Comptoir International des Photographes must be forwarded for inspection and (execution and price permitting) acceptance, to our Office, 46, Rue de Bondy, Paris, if from France, or any other country lying without the Zollverein; and to our Office, 6, Adlerstrasse, Berlin, if from any country within the Zollverein.

Such photographs only are accepted as are of a saleable nature, and are accompanied by a note of the prices that are to be paid by the Comptoir to the consignor after the sale shall have been effected. Portraits of unknown persons are not admissible.

*Article* 2.—The photographs consigned will receive a letter and number indicating their consigner, which will be entered in our books, so as to enable the Comptoir to inform the consigner, as often as he may wish, about the sale of his goods. Accounts will be settled every three months.

*Article* 3.—No consignment will be received for less than three months. A catalogue, published by the Comptoir periodically, will contain the designation of the pictures of each consigner, followed by the name of the photographer, the name of the painter (in the case of reproduction), and the selling price fixed by the Comptoir. Each consigner will receive a copy of this catalogue, as well as of every other publication of a similar nature that may be issued by the Comptoir.

*Article* 4.—At the request of consigners, the Comptoir will gratuitously undertake the nesessary measures for securing the exhibitor's copyright in photographs, whether French or foreign. In this case, four *additional* copies of each photograph must be forwarded to the Comptoir gratis, three of which will be deposited at the Ministry of the Interior, according to law, and one will remain at the Comptoir as a reference copy.

*Article* 5.—The expenses of transport and duty will be defrayed by the Comptoir. Foreign photographers are requested to be very accurate in their declarations, according to the requirements of the French custom-house.

*Article* 6.—The Director will give a written receipt for all pictures con-

**signed. The consigner likewise must give a written receipt on withdrawing his pictures, or on receiving the money for them in the case of sale.**

***Article* 7.—The Comptoir will do all that lies in its power for the good preservation of the pictures; but it cannot take upon itself any responsibility in this matter further than promising to give the greatest care and attention to the goods which shall be entrusted to its keeping.**

***Article* 8.—The present rules adopted by the consigner, shall serve as a contract between him and the Comptoir.**

## ENGRAVING BY PHOTOGRAPHY.

The following letter by M. Paul Pretsch, was published in the *Times*:—

Sir,—The dissolution of the juries of the International Exhibition, before the publication of their reports, leaves no means of correcting their blunders but the courtesy of the press. To this, as a foreigner, I appeal. The jury for photography have awarded me a prize medal for "improvements in photographic printing." Now, I can lay no claims to any such improvement. I have paid no attention to the processes of photographic printing. What I have done is photographic engraving. I have made light its own engraver, not its own printer. This is an important distinction; and, after a sojourn of eight years in England, for the purpose of completing my processes and bringing them before the public, I find the aim of my labours misrepresented by the verdict of a scientific jury.

You have done me the honour twice to mention my processes in your admirable articles on the photographic department of the Exhibition. In both instances you have been led, no doubt by the jurors' verdict to misrepresent my methods. In your first article, you class my process among the various modes of carbon printing, and in the second you state that I employ the electrotype in addition to photography.

Now my method differs essentially from the carbon printing processes. In the carbon printing, light is the printing agent, and light must print every copy. By the action of light I at once produce an engraved surface. I cause light to engrave a soft substance. Having obtained this engraved surface, I use the electrotype to copy it. Thus by a variation of my methods I can procure an engraved printing-plate of copper for plate printing, which plate can be coated with steel, to prevent wear and tear, or a raised block (surface-copper, backed with type-metal, mounted on wood like the copy of an ordinary wood engraving) for surface printing by the ordinary typographical press. I use light for the purpose of producing the engraved surface, the electrotype process to transform this into copper. Therefore an unlimited number of unfading faithful copies of any photograph, picture, or drawing, can be produced in printers' ink.

Trusting to your kindness to afford me your powerful influence in correcting what is likely to give a false impression of the methods I have invented, after many years of unwearied application, I am, Sir, your obedient servant, Paul Pretsch.

3, *Guildford-place, Russell-square, W.C., Oct* 31*st*.

## PHOTOGRAPHIC REPRODUCTION AND PIRACY.

(From the *Daily Telegraph*.)

After teaching the wind to drive his ships, the water to bear them, the fire to subdue and mould his metals, the beasts of the earth to do him "homage and service," and the steam, which is but the cloud of the skies super-heated, to whirl himself and his machines about, man has trained the sun to be his portrait-painter and arch-artist. Like all good servants, too, light has been shamefully tasked. It has been set to reproduce lofty things, and things of low estate—themes of thrilling sylvan or rural beauty, and pot-house interiors—the divine Diana of the Greeks, and the shameless guiltinesses of Holywell Street. "Didst ever see Titan, pitiful-hearted Titan, kiss a dish of butter?" asks Prince Hal in the play. Titan, in our time, has had many such a vulgar employment; and the result is the infinite reduplication of endless types of physiognomy, grand and greasy, and grades of art, mean and majestic. The last appearance of "light" is in the character of defendant in a police court. The radiant offender has, it appears, been reproducing, with his usual perfect counterfeit of line and shape, some of the engravings of Mr. Gambart, the printseller; and that gentleman has cited Light, in the person of Messrs. Powel and Pipere, photographic artists, to answer for the misdemeanor. Mr. Gambart owns, among many other popular and beautiful pictures, "The Horse Fair," of Mdlle. Rosa Bonheur, and "The Light of the World," an equally well-known labour of a name as great in art. For the picture and copyright of "The Horse Fair," he had given the sum of £1,600, besides paying £800 for the engraving made after it by Mr. Landseer. This engraving—the admirable result of great talent and pains—was naturally a favourite, and its sale was in a fair way to repay the publisher's outlay, when photographic copies of the work made their appearance in the windows of the two photographers named. Mr. Gambart assured the magistrate that the sale of the print was checked at once; and, unless the prohibition against such rivalry, on the part of the indefatigable and unerring sun, were enforced, he intimated that his business, and that of others similarly engaged, must come to an end. The presiding magistrate has reserved his decision—rather, as Mr. Gambart pointed out in a recent letter to us, upon technical grounds, than upon the question whether such ingenious piracy is to be held legal or illegal. But as everybody knows the pictures in question, and most people of any taste or information in the way of art, are familiar with the engravings and their photographic *replicas*, the case really rises from the insignificance of an alleged misdemeanour to one whose decision must have a good deal to do, not only with the future of photography and its professors, but with art generally.

In the first place, it is not denied that these heliacal forgeries of Mr. Gambart's property and other such engraving are very beautiful and perfect. They lack the value of thesoriginal, principally because the scale is smaller, and in point of colour, too, the doubtful browns of photography cannot match the clear whites and blacks of a steel plate. But the first objection could easily be removed by a new process lately patented; and as to the last, the collodion in the hands of a skilful manipulator is capable of giving tints of uncommon depth and equality. Thus the photographs are real as well as pretended rivals of the engravings; and indeed that point is sufficiently settled by the desire of the public to possess them. The first inclination of that public naturally is to get good works of art at little cost. If it cannot afford the picture, it secures a proof engraving; if that be beyond its means, it contents itself with one "after letters;" and in default of the necessary guineas for such a purchase, the photographers copy is prized and paid for. Our honest art-loving public will probably therefore set its sympathies at the outset rather against the printseller. Why should it not have perfect duodecimal copies of great works of art for half-a-crown or a shilling? What dog-in-the-mangerism forbids it so cheap and charming a boon? It begins to feel almost a grudge against Mr. Gambart and his grievance, like that instinctive indignation which is excited in its bosom when it hears of him as summoning his subscribers to witness the utter demolition of some beautiful and costly steel plate, which has worked off these engravings. Such might, they think, even after its first crispness of line, have furnished many a lowly home with a work of art, passable in respect of completion always, and lovely in design and outline. And this destruction of it, when the cruel cold chisel ploughs up the cunning labour of the "burin," does indeed seem outrageous, and an act of Vandalism. But let us be just to others before we are generous to ourselves. It would be delightful, doubtless, to all, and welcomed by the printsellers themselves, were the art of Holywell-street and the Seven Dials driven out of the field by artistic works, engraved or photographed after the best masters. But art is jealous, and jealous also are its votaries, so that one of them will often be rendered miserable if, having a "gorgeous Titian" or "glowing Claude," anyone else shall possess even a *replica* of the illustrious canvas. This benevolent feeling equally applies to engravings; subscribers to a plate will not be enchanted, however much their better feelings may be appealed to, with the idea that their choice proof is to have ten thousand "dittos" in the country. Unless they get guarantees to the contrary in some such way as the demolition of the plate, they will simply decline to ally themselves with the artist's enterprise; and there would be no engraving to multiply. So, too, with regard to the much debated photographs. Setting aside the slight fact that Mr. Gambart, having given £2,400 for his property, has the right to do what he pleases with it, one thing is very evident; if photographers may seize upon the first proof engraving they can get of any popular picture, and stop the sale of engravings made after it by their "negatives," there is an end to that special art. The dealers in prints will no longer produce an article which does not pay; and as the photographers will have nothing to copy, we shall get neither picture, nor plate, nor photographic reduplication.

Copyright must, therefore, be respected, on economical as well as equitable grounds. The public, as well as the publisher, is served by a strict regard for the law upon this head. But, at the same time, it is so highly desirable that good art, at a low price, should irrigate—should deluge, if possible—the country, that we should despair to think that the interests of the photographer and the publisher could not be reconciled. We believe they might, and by some of the numerous suggestions made on the kindred subject of patents. A royalty on the right to make duplicates for sale of any work of art the subject of a copyright—with some reductions, let us suggest, in the present exaggerated price of good engravings—might meet the difficulty. At present, there are two things certain; first, that photography must not expect to thrive upon the profits of the enterprise which gives it subjects; and, secondly, that the public will not be contented to have a beautiful and fertile field of art shut out from photography like a hay-field in summer time.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting of this society was held in the City of London College, Leadenhall Street, on the evening of Thursday, November 13th, Mr. G. Wharton Simpson in the chair.

The minutes of the previous meeting having been read and confirmed.

The Chairman called attention to a variety of specimens of photography, exhibited by various members. First was a series of fine delineations of rocky scenery, exhibited by Mr. Cole. In addition to these, were two albums, by Mr. Harmer, one containing specimens of chromo-photography, and the other of double printing; fancy vignetting, &c. Mr. Harmer also presented two of his chromo-photographs to the portfolio of the society. Mr. Wall exhibited a very fine solar camera picture produced on resinized paper. Mr. Warner exhibited his large album, containing eight card pictures of landscapes, or architectural subjects on one page. Mr. Harman, the secretary, exhibited a very fine copy of a lithographic head, and some groups executed at one of the open air meetings of the society. The Chairman exhibited a photolithographic print, by Col. Sir. Henry James, possessing a good many gradations of half tone, and presenting much promise of success in this important direction. The Chairman also showed some prints from instantaneous negatives produced by Mr. Hurst of Mirfield, Yorkshire, on tannin plates by a method, the details of which, he has promised to communicate shortly in the Photographic News. Mr. Martin mentioned the fact, that, Mr. Hurst used Horne and Thornthwaite's bromo-iodized collodion, in preparing his tannin plates.

The various contributions were examined and admired.

Mr. Wall called especial attention to the excellent delineations of rocks, showing the well marked distinctive character of each, in Mr. Cole's photographs, and referred to their value as drawing studies, to correct a common notion that all rocks were alike in general character. After a vote of thanks to the gentlemen who had exhibited or presented pictures, the Chairman remarked that a paper "On the Enlargement of Negatives," had been promised by Mr. Samuel Fry, but as he was not present, some unavoidable cause must be presumed to exist. He had pleasure in stating, however, that his friend Mr. Henry Cooper, jun., would read a brief paper "On the Production of Prints on Resinized Paper and on White Silk."

Mr. Cooper then read a paper containing additional hints on these subjects (see p. 557), and illustrated his paper by a number of admirable specimens of double printing on resinized paper, and on silk and muslin. These were examined with much attention and warmly admired. He explained the importance of immersing the silk in the solutions, as the results were otherwise imperfect.

Mr. Martin asked Mr. Cooper why he had abandoned chloride of cadmium and substituted chloride of calcium.

Mr. Cooper explained that the insolubility of chloride of cadmium caused a difficulty, which was obviated by the use of chloride of calcium, which was abundantly soluble.

Mr. Martin thought that the deliquescent nature of the latter salt would be an objection.

Mr. Cooper had not found any inconvenience from the cause.

After some further conversation on the subject,

The Secretary asked if Mr. Cooper recommended the use of the encaustic paste in all instances. If so, it would be a drawback to the commercial production of prints needing such an application.

Mr. Cooper said the application did not involve much trouble; but he only recommended its use where the prints seemed to require it. It conferred additional warmth and brilliancy.

Mr. Martin asked the nature of the encaustic paste.

Mr. Cooper had received it from Mr. Simpson.

The Chairman explained that Clausel's encaustic paste was a preparation made and sold by Mr. Bailey of Wolverhampton. He believed the recipe was communicated by the late Prince Consort to Mr. Rejlander, from whom it was received by Mr. Bailey. He (the Chairman) understood from Mr. Rejlander that it consisted of white wax and *oglio cotta* (an Italian baked oil), dissolved in an essential oil, such as that of lavender, the whole being made into a thick paste. Its peculiarity consisted in the fact that it gave depth, richness, and transparency to the shadows of the photograph, without communicating a vulgar glaze.

Mr. Wall remarked that the paste was valuable for applying to touched albumenized prints, as it removed the dullness from the touched spots.

Mr. Warner said that rubbing on a little albumen answered the same purpose.

The Secretary asked Mr. Cooper how long the resinized paper ought to remain in the silver bath.

Mr. Cooper said from five to ten minutes.

Mr. Howard suggested that the application of albumen after the completion of the print would give brilliancy and transparency to shadows; and as the objection to albumen consisted chiefly in the combination with silver, this would be avoided when it was used simply as a finishing varnish.

Mr. Wall said that Mr. Howard had overlooked the fact, that one great recommendation of Mr. Cooper's process consisted in the fact that the prints free from the vulgar glaze of albumen. The encaustic paste gave transparency without adding a glazed surface.

The Chairman remarked that albumen applied as Mr. Howard had suggested would not be coagulated, and would mark with damp fingers, &c.

Mr. Warner said he thought not if it were well rolled.

The Chairman said rolling might improve the print, but would not make the albumen insoluble or protect it from the effects of wet or moisture.

Mr. Price said that albumen contained sulphur, and would certainly be better kept from contact with the print.

After some further conversation on this subject, a desultory discussion, on the modes of intensifying, arose, in which the Chairman, Mr. Wall, Mr. Blanchard, the Secretary, Mr. Fitch, Mr. Warner, and others, took part. The Secretary and some others held that iodide of mercury, formed on negatives intensified with bichloride of mercury followed by iodide of potassium, was sensitive to light, and that the negatives became harder and denser by continued printing. It was held by Mr. Blanchard and others that this only occurred when pyrogallic acid and silver were used in addition to the iodide of mercury, and that the sensitiveness to light were due rather to a combination of the iodide with silver. Mr. Warner recommended the use of ammonia with the iodide of potassium after the bichloride.

The Chairman said the varying experiences at least tended to prove one point; namely, that there was some uncertainty about the negatives obtained by bichloride of mercury and iodide of potassium, and said that Mr. Hughes, who had been printing the royal negatives of the late Mr. Lacy, found that where large numbers were printed, negatives once soft gradually became hard and chalky.

Mr. Howard recalled the discussion to the subject before the meeting. He said that the process of Mr. Cooper seemed to promise a new era in photography, and was, he thought, a subject for congratulation amongst photographers. The public had of late, he feared, began to get very suspicious of photographs, and very chary of buying them, because of their doubtful permanency. A gentlemen whom he knew to be a very large buyer of photographs had regretted to him that many of his very fine specimens were gradually going: getting yellow, and showing less and less of the picture every time he looked at them. If this process of printing would give them prints which would not change, it would be a great boon, and they might even sacrifice a little brilliancy. The subject was clearly worth attention and experiment, and it would only be fair to Mr. Cooper that he should have some aid from other experimentalists in bringing the process to perfection, in return for his pains and liberality in giving the results to photographers. For copies of engravings it appeared very excellent, as some of the specimens well showed, their tone being as rich, soft, and mellow as though they came from the pencil of the artist.

Mr. Cooper said that he had observed that resinized paper registered all the half tone in a negative much better than albumenized paper, and gave, consequently, softer and rounder prints.

The Secretary referred to the fact that albumenized prints did not necessarily fade. Some remained permanent, and this proved that fading was the result of imperfect or careless manipulation.

After some further conversation on the subject, it was remarked that encaustic paste containing wax would gradually become yellow. To this it was replied that the quantity was so small as to be of slight importance in this respect, and Mr. Howard remarked that he had seen some of the exquisite turpentine wax-paper negatives of the Rev. Lawson Sisson, which were free from any tinge of yellowness.

A conversation followed on the discolouration of benzoin, in which Mr. Price observed that some paper prepared with it, sent to him by Mr. Cooper, had become more discoloured during the few weeks he had kept it. He intended to keep it twelve months as a test. Some further conversation on the importance of very deep printing on resinized paper, and on its suitability for colouring followed.

Mr. Wall asked if Mr. Cooper had tried printing on canvas for painting in oil.

Mr. Cooper had not tried prepared canvas, but the plain canvas would present no difficulty.

After some further conversation, and a vote of thanks to Mr. Cooper, the proceedings terminated.

## Correspondence.

### COAGULATION OF DRIED ALBUMEN: A FALLACY OF PHOTOGRAPHERS.

Dear Sir,—Taking the world in general, I think it must be concluded, that for every person who is able to detect a particular current fallacy, there are numbers who are unable to do so; and thus, error gets bandied about from one to another, till at last it comes to be considered as an accepted fact, even by those who should know better.

Amongst the "fallacies of photographers," there is none more prevalent than the belief in the possibility of *coagulating* dried albumen. I find Dr. Fowler disseminating this error, in his "Short Lessons on Photography" published in *Humphrey's Journal*, and given at p. 415 of your present volume. Speaking of albumenized paper, he says,—"It is certainly an advantage to coagulate the albumen on the dried surfaces, which prevents the solution of the albumen. This coagulation is best effected in the following manner:—The albumenized sheets are folded together in one roll, and then placed in a round tin box, much longer than the roll of paper; the box is now dipped into a kettle of boiling water, deep enough for the water to stand higher on the outside than the top of the rool on the inside. In this way the paper is submitted for some time to the heat of boiling water, which renders the albumen, in a measure, insoluble in the midia in which it has afterwards to be placed." I likewise have read, as the suggestion of various other photographers, that the albumenized paper, should be ironed with a hot iron, in order "to coagulate the albumen."

Now I unhesitatingly assert, that dried albumen, as existing on the surface of an albumenised sheet of paper, *is not, and cannot be*, coagulated by heat however applied; *nor* by sensitising it upon a nitrate of silver bath. The drier a substance be rendered, the longer the time required for its solution; and thus, the *drier* the state of the albumenized sheet of paper *at the time of sensitising*, the sooner the solution of nitrate of silver is enabled to render the albumen *insoluble* by its action upon it, and therefore, the less time has the water to ferment it sufficiently for solution: hence, the drier the paper, the less the discolouration of the bath. This insolubility, however, *is not coagulation;* to produce the latter, *fluidity* is necessary.

Albumen may be said to exist in three states: *fluid*, as in its normal state of white of egg; *coagulated*, as when the egg is boiled; and *dried*, as when the water it contains in its normal state, is evaporated at a lower temperature than that at which coagulation takes place. In each of these states, it has different properties. In both its normal and dried state, it is soluble in water, but not so, when it is coagulated; at least, such is generally said to be the case, although a *small* portion of it is still so; in its normal state it can be coagulated by boiling water, heat, strong mineral acids, and metallic salts, and thus is rendered insoluble, except in a very slight degree; but, *when once dried, it cannot in that state, be coagulated by any means;* it can, however, be still rendered nearly insoluble by strong mineral acids and metallic salts, *but not by heat, however applied;* and hence, from coagulation being accompanied by insolubility, insolubility has erroneously been considered to be accompanied by coagulation.

In short, strong mineral acids and metallic salts, cause insolubility *and* coagulation in its normal state, and insolubility *without* coagulation in its dried state. Fluidity being necessary for coagulation, dried albumen *as such*, cannot be coagulated by boiling water, heat, or any other means.

The dissemination of any error, however innocuous it may appear, retards the advancement of knowledge, much more than most people are apt to imagine, for the honour then of science and truth, do not let us hear any more of the possibility of coagulating dried albumen, *unless* indeed, what I state can be found to be false, and this I challenge any of your readers to do.—I remain, dear sir, yours truly,

George Price.

### PRINTING DIFFICULTIES.

Sir,—In the pursuit of hidden causes there is a fascinating influence exercised, that men care not to resist, for it is to this influence we are indebted for the many brilliant triumphs science has achieved. So long as visible results are the products of unseen causes our minds naturally remain unsatisfied, and the results are examined and re-examined with the most scrupulous care, and by a process of reasoning based on the information derived from our powers of observation, theories are propounded whose success depends on their stability whilst exposed to the fiery ordeal of scrutiny as they are being analysed by a thousand penetratingly powerful intellects, which perhaps have long been labouring and searching in the same direction. In dealing with Mr. Eliot's paper, we have results only to examine, for causes remain untouched; that gentleman is therefore in error when fancying that he has launched into the photographic world a new "theory," but in common justice I feel bound to acknowledge his researches to be in the right direction, and like the friendly finger post, give us confidence as we endeavour to to push forward over the dark, and hitherto little trodden track we have chosen. An examination of the "beakers" will perhaps bear me out in this last statement. beaker No. 1 contains ½ grain soda to the grain of gold, but though submitted to the decomposing influence of hot water, the prints when exposed to the action of the solution when diluted, generate a bad colour and general mealiness, whilst 3 grains of the alkaline agent with 1 grain of gold under similar conditions yields tones which are satisfactory. Although I have not experimented in this direction, I am quite satisfied that Mr. Eliot is correct in his statement concerning the results derived from the above described solutions, but at the same time he over estimates the decomposing power of his hot water. In beakers 1, 2, and 3, the quantity of gold is precisely the same, consequently the same amount of chlorine is driven off by the heat applied, and for some little time the atmosphere receives the whole, for water, when its temperature is raised much above 60°, cannot hold in solution the above-named gas, but when the several solutions are diluted, evaporation ceases, and a natural toning action begins. In beaker No. 1, the quantity of soda present is not proportionate to the amount of chlorine the gold still holds in combination, and for reasons given in my former letters, unsatisfactory toning is the result. In No. 3, the case is different, the soda and gold is nicely balanced, and an advantage is gained by the reduced quantity of chlorine, as in all probability a deeper deposit of gold is secured, and consequently a greater depth of colour is obtained. And now, bidding farewell to Mr. Elliot, who I hope will forgive the liberty I have taken, and accept my criticism on the contents of his paper in the same spirit in which they are offered, I propose, in conclusion, venturing a word or two on the able and well studied subject advanced in your last number by E. E. L.: he has started an interesting question respecting the agency employed in the production of the varied colours yielded under the influence of toning action. Now the first question which naturally suggests itself is the enquiry, what is colour? Considered in bodies, it is a sensation produced on our visual organs, by a decomposition of light produced by reflection and absorption, and the diversity of colours proceeds from the varying disposition of bodies to reflect light, so that any alteration in the molecular arrangements of a body, will modify, or completely change its colour, by absorbing or reflecting additional rays of light; in considering the various colours produced by the same toning bath, we must not overlook the fact, that, the surface on which the gold is deposited, is of an ever-changing nature. The subtle agent that reduces by its electric influence, the chloride of silver, is seldom long existing in the same mood, its changes are as frequent and directly, more plainly visible, than its effects on the surface of the paper, than the changes that are ever present in the operating department. To day vigorous prints are produced, giving, when toned, a fine dark and brilliant colour.* To morrow, under apparantly the same treatment and conditions, the prints are brown, giving depth of printing reduction, without a vigorous appearance, these prints, when exposed to toning action weaken, and if pressed for dark tones, give slatiness. I have noticed those changes in one day, and with one batch of prints—more especially at this season of the year—the early morning seldom yielding the same class of prints as at mid-day; the ever varying character of the negatives will also exercise an influence on the reduced silver surface; the light being strained through these, ere it reaches the paper, many modifications of its action must ensue, from the peculiarities of each negative, and as many changes must be effected in the molecular arrangements of the reduced silver; in one, the requisite conditions are present to aid in giving opacity to the coating of gold; in another, the conditions are such, that its surface is too transparent to admit of a deep colour, and an attempt to procure it by toning is altogether useless, for by another molecular arrangement, slatiness becomes visible, and the print spoiled. I fain would go fully into this subject, but fearing I have too long trespassed on your space, I will forego the temptation.—Yours, respectfully, A Photo's Assistant.

* I am here speaking of portraiture.

## Photographic Notes and Queries.

### The Invention of Photolithography.

Sir,—As the question of who first invented photolithography seems to be interesting the public at present, allow me, as the party entrusted with the working out of that known as Col. Sir H. James's photozincographic process, to say a few words on the subject.

Photozincography is a working out and application of the theory set forth by Asser and others. My first experiments were printing in carbon on paper prepared with carbonate of potash and gum, gelatine or albumen, for the purpose of transferring to the waxed surface of a copper plate, as a guide to the engraver. Finding that the carbon print, when transferred, gave too faint an impression, it was thought that printing-ink would be a suitable material, which was tried and found to succeed very well. It then occurred that these prints could transfer equally well to zinc or stone; this also proved successful, and was the way that the discovery of photozincography was made at the Ordnance Survey Office. The experiments were first made in the autumn of 1859, at about the same time as Mr. Osborne was at work in the same direction in Australia. Col. Sir H. James first published this process in his report to Parliament for 1859, and did not announce it in the Photographic News until March 1860, so you will perceive that England was not behind her colonies in bringing out this new art.—I am sir, your obedient servant, Archd. J. Rider.

P. S. As the application of photolithography commercially seems to be little known to the public, I shall be glad to send you shortly some specimens of valuable and rare reproductions, which I and my partner, Mr. Preston, are at present engaged with.

[This letter was omitted in our last through an oversight in "making up" the formes. We have since received the following satisfactory and explicit letter, to which we have pleasure in giving publicity. The mention of exact dates in such matters is always desirable. We are glad to record Mr. Rider's initiatory steps, and also Col. James's recognition of them. It so happens, that in the co-operative labours carried on in a large military establishment, honours as well as labours are divided, the chief honour culminating in the chief officer, as leading, guiding, permitting, or controlling the whole. We now append the second letter.—Ed.]

Sir,—In an article in last week's News, on "Photozincography, Photolithography, and Photo-engraving—Who are the Discoverers?" you refer to a letter from me, claiming a share in the invention of Col. Sir H. James's process; and, as you say it is scarcely sufficiently definite, perhaps you will allow me to state a little more fully in what way I am connected with it.

In the autumn of 1859 (I cannot give the date), being then engaged in the photographic department of the Ordnance Survey Office, I was ordered to prepare some carbon prints of reduced maps, with the view of transferring them to copper. The process used was that published by Mr. Pouncy, the paper being coated with a mixture of gum, bichromate of potash, and carbon; the results were not very satisfactory, as very little of the carbon could be made to adhere to the waxed surface of the copper. Seeing a description of a carbon printing process by M. Asser, in the News, of November 25th, 1859, I tried it, but did not get very good results, as I found it very difficult to make the ink adhere to the insoluble parts of the paper while in a moistened state. I next tried the application of the ink before fixing, and in this was successful. Gum and bichromate were first used, but in course of practice gelatine was found to answer better. After producing a transfer by this method, I showed it to Sir H. James, who then ordered me to copy a small etching and make a transfer, which was transferred to zinc and printed.

In the pamphlet just published, Sir H. James, in his introduction, gives a history of the process, but has omitted to mention my name in connection with it; but if you refer to his Parliamentary Report for 1859, you will find he names me as having introduced something new: also, in his letter to the News, of March 16th, 1860, speaking of the process, he says: "With the aid of Mr. Appel, who is so well-known for his skill in zincography, and with the assistance of Corporal Rider, R.E., who is one of our photographers, we have, I think, perfectly succeeded, our success being due to the fact, that we have in this establishment both first-rate photographers and first-rate zincographers, although I am myself neither the one nor the other." Again, speaking of the invention in the introduction to the *fac similes* of "Domesday Book," which were published before my leaving, he says to Captain

Scott, R.E., who has charge of this branch of the work, and to Corporal Rider, R.E., who is employed on it, we are chiefly indebted for this success.

In giving these quotations, I merely wish to show my claim to a rather large share of the invention, or application, of the process.—I am, sir, yours obediently, ARCH. J. RIDER.

P.S. I enclose a specimen of half-tone, which I have done on paper prepared with bichromate of potash and gelatine, and used on the same day of preparation. I may add, it is from stone, and is untouched.

[There is unquestionable lithographic half-tone in the specimen forwarded, although not so much as in that we received from Col. James. We shall be glad to see and hear more on the subject.—ED.]

### ACTION OF LIGHT ON WALNUT JUICE.

DEAR SIR,—I see in your number of the 31st ultimo, a letter from "J. H. W." herbalist, of Canterbury, claiming the discovery of the extract of walnut green shell having the same properties as nitrate of silver.

Having written to you of my discovery of the same two years ago, and which you then noticed in the NEWS "To Correspondents," may I beg of your insertion of this letter, claiming *priority* of discovery. I would further add that, after exposure to light, if the resulting picture be placed to soak for a few minutes in liq. am. fort. and aqua, in the proportion of 2 drams to 20 ounces, no further treatment will be necessary to ensure fixation. (Colour, rich brown.) The same properties belong to the juice of the elm, oak, sycamore, lettuce, and others, giving in each case, a different shade of colour.

Albumenized paper must on no account be used, as the stringent properties of the walnut and other juices completely dissolve the albumen.—I am, dear sir, yours truly,

W. H. WARNER, Photographer, Ross.

P. S.—If the juice *direct* from the walnut tree be taken, a colour similar to raw sienna is the result.

## Talk in the Studio.

INSTANTANEOUS TANNIN PLATES.—We have received from Mr. Hurst, of Mirfield, prints from some instantaneous negatives taken on tannin plates on the third of November. One consists of a sea view with portions of a partially submerged wreck, the other a coast view with moving figures. It would be too much to say that there was no trace of under-exposure, but it is very slight indeed. An instantaneous view, and one exposed for a minute and a quarter by another process are nearly alike in photographic qualities. Mr. Hurst wishes to verify his experiments before publishing the details. When he is perfectly satisfied, our readers are promised further information.

VARNISH.—A correspondent says:—"Many of your readers seem to lack a *good* varnish for negatives. I think they will be satisfied if they try Ponting's Bristol varnish. I always use it and never find it stick in the sun."

ERRATUM.—Messrs Helsby and Co., of Liverpool, inform us that the card portraits from their establishment, which we recently noticed, as produced by Ross's ordinary 5×4 portrait lens, were not so produced, but with Ross's card lens No. 3.

PHOTOGRAPHIC CONTRIBUTIONS TO THE LANCASHIRE FUND.—Lieut. Col. Stuart Wortley has addressed the following letter to the Lord Mayor. We shall be glad to see others follow his noble example.—"My Lord Mayor,—The Council of the Photographic Society, whose annual Exhibition of Photographs will open early in January, have allotted me space for a frame of pictures therein. They have kindly consented to allow me to place spare copies of these pictures on sale in their rooms, the produce of which sale I purpose devoting to the relief of the Lancashire operatives. As money is most urgently required at this time, I enclose herewith £25, feeling no doubt that pictures to this amount, at least will be sold, and hoping even to send you a further sum before the close of the Photographic Exhibition. I have published my intention of thus disposing of my pictures, in the hope that other of my brother amateurs may be induced to make some like arrangement for the benefit of our suffering fellow-countrymen.—I have the honour to be, My Lord Mayor, your obedient servant, Henry Stuart Wortley, Lieut. Colonel.

## To Correspondents.

NOTICE.—The Publisher will be happy to exchange, or pay full price, for the following numbers of the PHOTOGRAPHIC NEWS—6, 9, 41, 53, 66, 70, 75, 76, 79, 80, 81, 101, 102, 169, 198, 202, 203, 214.

*** We have to claim the indulgence of many of our advertising friends this week, whose announcements are omitted for want of space.

VIATOR.—If you wish your backgrounds to roll without cracking, you had better paint them in oil colours, using turpentine chiefly as a vehicle, so that the colour may dry flat. Distemper or soap flatting may be used with advantage by one accustomed to the work of scene painting; but unless you are familiar with the work, oil colour will answer your purpose best, as it does not dry quickly, and allows you to correct the drawing readily, if necessary. 2. A variety of methods have been recommended, and used with more or less of success for keeping the plate moist a few hours, such as nitrate of magnesia, honey or molasses, water and acetic acid, glycerine, &c. A very excellent preparation for the purpose is a mixture of honey and albumen. If card portraits are carefully rolled after colouring, a smooth surface is obtained; or the use of Clausel's encaustic paste will answer the same purpose.

A. B. C.—In copying, it will, of course, be necessary to have a camera which extends sufficiently to allow you to obtain an image of the desired size; but this will not affect the question of lighting. The best mode of lighting depends much upon the nature of the subject to be copied, and whether it has a polished surface or not. Many photographers prefer to copy in the open air, where the light falls on the picture to be copied from all quarters. If you copy in a room, let the light fall on the surface to be copied at right angles. If the subject have a polished or varnished surface, take care that nothing be in the way to cause reflections. Take care that the camera and picture to be copied are quite parallel. Cover up the front of your camera with black velvet, with a hole for the lens, otherwise the brass mounting of the lens, &c., will be reflected. Use your judgment and try a few positions, and you will doubtless succeed. 2. The amount of silver in the clippings of fixed prints is so infinitesimally small, that it would not pay for the trouble of recovery.

H. R.—The brass bindings for corners, focussing screw, and bellows bodies of cameras, are all made by different persons, who manufacture for camera makers. It is possible that one of the latter might be willing to supply you with them; but we cannot tell. We cannot tell you the price, but the screw is a very expensive article. We have heard about fifteen shillings mentioned as the price for a screw of a 10 × 8 camera.

SOCIUS.—The process by which Dr. Hill Norris's extra sensitive dry plates are prepared is not published. Our pages have contained descriptions of several rapid dry processes, but entire certainty in their use has not been obtained. 2. We have not experimented largely in the restoration of faded prints: but we have not much faith in any of the processes which have been proposed. 3. We have not tried the keeping of dry plates prepared with sugar, but it is probable that if any trace of free nitrate be left they will not keep long, as sugar has a reducing tendency. If they have been perfectly washed, we see no reason why they should not keep.

J. PAUL.—The solution of iodine we recommended as a preventative to the formation of a red deposit on the shadows during intensifying, should be applied to the plate after washing away the iron developing solution, and washed off before applying the intensifying solution of pyro and silver.

R. H.—We have not purchased Stockholm pitch, but should presume that it would be kept in large towns at oil shops, or perhaps at tool shops. Perhaps our correspondent, Mr. Nicholls, will state.

W. H. H.—The largest of the two lenses is infinitely best for the work, and should be chosen by those who can afford it, and have length of room sufficient to use it. Almost all the first rate artists whom we know use the larger one. 2. To keep up the ammonia nitrate bath keep adding from from time to time more strong solution, made as at first. It may be rendered colourless with kaolin.

W. M.—The maker you mark as No. 2 is first rate. Write to him, and he will tell you which is best suited to your room.

F. M. Y.—It is by no means uncommon, in working in the field, to develop with iron only, and defer intensifying or fixing until evening, at home. Some prefer to cover the plate with glycerine to preserve its moisture; others allow the plate to dry. In the latter case it is desirable to fix before intensifying, as, if the plate have been exposed to light before intensifying, whilst it still contains iodide of silver, it is apt to fog. By fixing and intensifying at home, the amount of water required is reduced to a minimum. A bath with water would be sufficient, leaving one plate in until another was ready. A bath holding a quart might wash a dozen or two stereo plates. We should not recommend delaying for more than a day or two, unless the plates were very perfectly washed. 2. You may add from half a grain to a grain of bromide of ammonium to Ponting's iodized collodion with advantage for many purposes.

JUSTITIA.—The best kind of negative for enlargement is one which is very full of detail and modelling, very sharp, very free from defects, and not very intense. The transparent positive should be very thoroughly exposed, and full of detail, and not very dense. It is in the kind of positive that mistakes are generally made. It should be more fully exposed, and much more full of detail than would be deemed sufficient to produce a good transparent positive for ordinary purposes. Both the original negative and the transparency should be very free from fog or abnormal reduction; with a few brilliant points quite transparent, but not more than *points*. The faults you describe are those which are most common in enlarged negatives, and which may be avoided, we think, by carefully following out these hints. Mr. Warner and Mr. Heath each use Dallmeyer's triple lens for enlarging. We believe it is the best lens for the purpose.

FRANCAIS.—There is not, we believe, a law of copyright which protects photographers in France, but the attention of the French Government has been directed to the subject. If such a law existed it would probably apply in this country, as the recent Photographic Copyright Act includes the provisions of the International Copyright Act. As the matter stands, French photographs have no protection, we believe, in this country.

H. C. S. G.—The card enclosed has many excellent qualities. If the background were little less heavy, the picture would be very good. The negative would have borne the least trifle more exposure.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 221.—*November* 28, 1862.

## THE GLASGOW ART UNION AND PHOTOGRAPHY.

We have received from Mr. Annan, of Glasgow, three very exquisite reproductions from paintings, the circumstances in connection with which mark another very interesting and satisfactory step in the history of photography. These three photographs, each about 15 by 11, will be presented this year to the subscribers to the Glasgow Art Union, and will take the place of the engravings hitherto distributed. Many of our readers may be aware that in this, as in the London Art Union, each subscriber of one guinea has been in the habit of receiving a fine engraving from some original picture, and a chance in the distribution of certain prizes. The Glasgow Art Union has been distinguished by the extreme excellence of many of the engravings it has issued, and its general liberality and beneficial influence in the encouragement of art, and we hail with peculiar pleasure its recognition by this year's distribution, of photography as amongst the sisterhood of the arts. We believe, moreover, that the project will be found successful and satisfactory, and that excellent as have been the engravings issued, three such photographs as those before us will possess a greater interest and higher value in the estimation of the picture-loving public.

We have no wish whatever to array the art of photography against that of engraving. We do not see in the advance of one art the necessary declension of the other. The productions of each have beauties of their own. But with the reproductions in question before us, we are compelled to echo the opinion of the able art-critic of the *Times*, as to "the superiority of photography, with all its drawbacks, over engraving as a medium of translating the painter's work into monochrome." The same writer, who will scarcely be accused of undue leaning to photography, after dwelling on the "inexpressible inferiority" of the very best engravings, which are styled "poor and dead," in rendering the spirit of the master, adds, "were we certain that photographs would last, we are not sure that we should not be content to see engraving numbered amongst the extinct arts." As we have said, we do not see in the success of the one the necessary extinction of the other, but we cannot but recall with pleasure the dictum of an art-critic of such recognized authority as Mr. Tom Taylor, in support of the innovatory step taken by the directors of the Glasgow Art Union.

The paintings reproduced consist of three of the prizes intended for distribution, painted expressly for this Art Union, by G. J. Sant, A.R.A.; J. E. Millais, A.R.A.; and Noel Paton, R.S.A., respectively.

The subject of Sant's picture, which is to our taste by far the best, is "The Better Land," and is an illustration of Mrs. Hemans' charming lyric, known by almost every child who can read. Seated on a sofa is a young mother, as sweet and maternal-looking as a young mother should be; her eyes are bent upon a noble boy of about six summers, who kneels by her side. She is telling him of this better land; and he is intently looking with rapt face in the direction whither, with extended hand, she points. The words on her lips, which have taken possession of the whole soul of the boy, and filled his young being with hitherto unknown reverent wonder and awe, are manifestly those in the closing lines of the poem:

> "Eye hath not seen, my gentle boy,
> Ear hath not heard its deep sound joy,
> Dreams cannot picture a world so fair,
> Sorrow and death may not enter there;
> Time doth not breathe on its fadeless bloom,
> Far beyond the clouds, and beyond the tomb."

The pose and expression of the mother, and the pose and expression of the boy, are exquisitely beautiful, and tell the story of the picture most admirably. The general arrangement of accessories, the composition, and chiaroscura, all are harmonious with the spirit of the picture.

Mr. Paton's picture is an illustration of Tennyson's "Morte d'Arthur." The wounded king is laid in the "dusky barge," supported, and wept over, by the "three queens with crowns of gold;" the deck is "dense with stately forms, black stoled, black hooded, like a dream." A huge canvas, covered with strange forms and mystic devices, forming the sail, stretches dark against the sky. Much of the glamour of the Laureate's poem seems transferred to the picture, which possesses a strange interest. The shape of objects, and the devices of ornaments, the forms and expressions of men and women, all seem to belong to a far back traditional period.

Millais' "White Cockade" is, to our taste, by far the least interesting picture, but, then, we must confess to the heresy, as regards latter day art, of admiring the paintings of Mr. Millais, with a very qualified admiration. Much of his excellence is of a kind in which he seems to emulate the literal detail of the photographer, and in this respect the photographer can beat him hollow. We have no objection, it is true, to a rather good-looking young woman, in the costume of the last century, sitting against a background of storied tapestry, sewing on to a three-cornered hat a white cockade, the emblem of adherence to Prince Charlie; albeit, the said young woman may be in a somewhat awkward position. But the picture is, doubtless, well painted, and will have many admirers.

As regards Mr. Annan's work, we can speak with unqualified satisfaction; better reproduction, we believe, it is impossible to obtain. That of Sant's picture is, perhaps, the most perfect reproduction from a painting we have ever seen, and is so perfect, as to have elicited the remark from several clever photographers to whom we have shown it, that the painting must have been executed with a view to the reproduction. It is wonderfully brilliant, and yet soft and detailed; rich, deep, and transparent in the shadows, without the slightest loss of those delicate greys and demi-tints, upon which perfect modelling, and roundness, and finish, so much depend. It would be very easy to believe that the face of the boy was photographed from nature, so perfect is the gradation of half-tone. The breadth of light, and depth of shadow are very good, and are rendered harmonious by the perfect gradation of tones with which they are united. The other pictures are just as well photographed, although from the nature of the picture this is most effective. The printing is also admirably done. We think it a subject of much satisfaction, that the Glasgow Art Union, having determined on such a course, entrusted the work to a photographer who has done such justice and credit to their determination, and, by the excellence of the results, will have contributed, we doubt not, to give perpetuity to the practice they have initiated.

Mr. Annan has favoured us with a few particulars of his operations in reproduction, which may interest our readers. The lens was a Dallmeyer's triple achromatic, with an equivalent focus of about thirty inches. In this instance a very small stop could not be used, on account of the loss of light it involved, as the paintings were only about one-third larger than the photograph, and required an extension of the camera to about four feet. A good commercial collodion, bromo-iodized, we believe: a strong iron developer with as little acid as possible, and further intensification with pyrogallic acid and silver. Regarding printing and toning operations, Mr. Annan makes a remark which was also made to us, a few days ago, by the first portraitist in London, and is worth remembering; it is, that much more depends upon the quality of the negative, than upon the method of printing and toning, as regards the value of the print. Important as good printing unquestionably is, it is impossible to get a good print from a bad negative. Our readers may see the pictures in the forthcoming Exhibition of the Photographic Society.

## PHOTOGRAPHIC PIRACY.

A very notable illustration of the importance and need of a law of copyright for the protection of photographs has just occurred. As all our readers know, the London Stereoscopic and Photographic Company paid to the Commissioners of the International Exhibition an enormous sum for the sole right to photograph the contents of the building: they employed some of the very ablest men in the profession to execute the task: they procured the best equipment possible of appliances for doing the work, without regard to cost: they entered upon the undertaking, in short, with a spirit which ensured the very best results. Just as they have won golden opinions from all sorts of people for the beauty and perfectness of the memorials of the Exhibition they have issued, and have won, we hope, something still more substantially golden than opinions, they discover a wholesale system of piracy in operation, by which their profits and their reputation are endangered together. By the operation of the new Copyright Act they have, however, a swift remedy and a sure prevention.

The case presents some singular features, and we shall briefly state the facts, as we find them related in that ominous document, a "Bill of Complaint" in a Chancery suit.

Some time ago, the Stereoscopic Company had in their employment, as operator, a gentleman who stated his name to be Albert, Count Leiningen, cousin to Her Majesty the Queen of Great Britain. How far this assumed title and relationship may be based upon truth, we cannot tell; for purposes of convenience, however, he assumed the alias of Albert Ceileur. M. Ceileur, as we shall call him, is an old photographer, and a skilful one. If memory serves us correctly, he was engaged in London in Daguerreotype days, and has been subsequently in New York. Two or three years ago, he was engaged by the Stereoscopic Company, and received an unusually handsome salary; a few months ago he was summarily dismissed, as it was discovered that he was conducting a private photographic business of his own at his residence, at the time he was supposed to devote his whole energies to the service of his employers. Something like a month ago, the Company incidentally heard that their quondam operator was carrying on a wholesale system of piracy, and that he had sold for export nearly a quarter of a million copies of their Exhibition photographs.

Shortly afterwards, they ascertained that Mr. H. L. Oppenheimer was selling these pirated pictures. They had lacked legal evidence of the former fact; but this was easily substantiated. Legal application was at once made to Mr. Oppenheimer, who, after some correspondence, agreed to give up and destroy all copies in his possession, and refrain from further sale. He also stated that he had been acting under a misapprehension as to the copyright, and gave the name of M. Ceileur as the person who had supplied him, adding, that he had believed M. Ceileur to be a partner in the Stereoscopic Company.

In some further steps which followed, we find M. Ceileur offering the Exhibition pictures at five shillings a dozen less than the price at which they were vended by the Company, and stating that he had the largest photographic business in London, employing not less than sixty hands in his establishment.

We may here pause to remark, that the extreme excellence of the Exhibition photographs, issued by the Company, would afford the best possible facilities to the pirate for obtaining good copies. Sharp, soft, round, brilliant, and wonderfully full of detail: very perfect and free from blemish, these photographs well rolled, to get rid of the texture of the paper, would copy admirably. The subjects, moreover, are those which present the least difficulty, as we find in the list given of those pirated, that they consist chiefly of the gems of sculpture with which the Exhibition abounded.

Notwithstanding this, however, it is impossible to produce photographic copies which shall at all equal the originals, so that, besides the loss of profit, there is the loss of reputation, which must result from the imperfect copies being attributed to the Company, who produced the originals, and the plaintiffs very pertinently state in their Bill, that "The defendant by taking such spurious photographs, as aforesaid, is not only causing great loss to the plantiffs, and injuring their trade in the sale of photographs, by selling at a reduced rate, but also injuring their reputation in such trade, as it is universally known, that the plantiffs have the sole and exclusive right of producing such photographs as aforesaid, and that these spurious copies would be considered by the public and the trade, as the productions of the plaintiffs, and bring them into disrepute." We may add that a portrait of the Lord Mayor elect, which was purposely reserved, and publication delayed, is also amongst those included in this action; some copies, ostensibly for export, had been obtained from the Company, so that by this ruse the pirated copies might be issued in anticipation of the genuine portraits.

Without entering into details, we may state that prompt action was taken, and a Bill in Chancery filed on the 12th of this month, Sir Hugh Cairns and Mr. H. Stevens representing the plaintiffs, and Mr. Swanstone the defendant. In a few days the case came for hearing, and a perpetual injunction was obtained, which not only restrains the defendant from further sales from the pictures he has pirated, but is prospective as well, and forbids him to copy any other registered photograph by the plaintiff, which either has been or may be taken, and compels him to pay all costs arising out of the action.

As we are anxious that the record of such cases should serve as preventives to piracy, we will add one or two extracts from a letter addressed to Mr. Nottage, by the able solicitor for the plaintiffs, Mr. C. H. Collette, of Lincoln's Inn Fields, in reply to some questions we had asked as to why proceedings in Chancery were taken instead of the summary process before magistrates, which the recent Act permits, as a Chancery suit is usually regarded as a tedious and expensive remedy. After giving some reasons why he preferred the jurisdiction of the Court of Chancery in this case, he adds:—

"The remedy by injunction is most extensive and summary; our decree extends at one blow to the prohibition of copying not only the 15 photographs named in the Bill, but all others which you may *have taken and may hereafter take and register*, of which you have not sold the copyright.

"As to the alleged tedious process, I got the order and injunction of the Court within twenty-four hours after proof of defendant's guilt was in our possession.

"As to the expenses, here again you are indemnified. In a criminal proceeding, you would have had to pay all your own expenses, whereas a decree which has been made perpetual against M. Ceileur, saddles him with every penny of the costs of every description.

"You might, had you desired to press it, have required an account on oath of all sales and payments of all consequent profits, and damages in addition, with this further advantage, that if Ceileur makes any other copies of your registered photographs, he can be summarily attached and put in prison for contempt of court."

That heavy damages have not to be refunded, as well as piracy immediately stayed, is, it appears, simply due to the forbearance of the Company. We are glad to find a remedy so prompt and comprehensive in actual operation, so that if, at any time, the summary penal process miscarry, either from a magistrate's crotchetty construction of the Act, failure of the kind of evidence necessary in such an action, or other causes, the Court of Chancery, despite its repute for tardiness, presents a full, certain, and speedy check to photographic piracy.

## Scientific Gossip.

### New Method of Manufacturing Oxygen Gas on a Commercial Scale.

Oxygen gas is attracting considerable attention just at present. It has especial interest to the photographer; for if procurable in quantity, and at a low price, it would place him in possession of intense and economical sources of light, and would thus give a great impetus to those branches of photography which depend, in some measure, upon intense light for their convenient prosecution, such, for instance, as the copying of microscopic objects. An important improvement in the manufacture of oxygen gas has recently been brought out by Mr. Webster, and as it is now attracting great attention, from its easy manipulation, as well as the cheapness of the process, we propose to bring the subject before our readers in a brief account of the chemical principles involved in the plan. Oxygen gas, as is well known, forms about one-fifth by bulk of the atmosphere, the remaining four-fifths being nitrogen. Disregarding, for the present, the part which nitrogen plays in the atmosphere by reason of its bulk—such as its influence upon evaporation, wind, &c.—we may consider it to be mingled with the oxygen simply as a diluent, to moderate and tone down to a manageable point the excessive energy of oxygen. Were there no nitrogen present in the air, the inhabitants of the globe would all be dead in a few hours, the unwonted stimulus throwing them into a high fever; whilst the first spark of fire which was lit would cause every combustible substance within reach to blaze with almost solar splendour, the coals in the fire-place and the iron forming the grate vieing with each other in their rapidity of combustion.

But although pure undiluted oxygen would be so fatal in every-day life, cases constantly arise in the arts and manufactures in which we require a more powerful supporter of combustion than is supplied to us in the atmosphere. Thus, in the metallurgy of platinum, Deville's beautiful oxy-hydrogen process entirely depends on the production of oxygen on a large scale; and the lime and bude lights are other instances of like value. Pure oxygen is, however, very expensive. In the laboratory, or for a lecture experiment, the manufacture of one or two cubic feet may not seem to cost much; but when wanted by 50 or 100 cubic feet at a time, it is very expensive when prepared by the ordinary methods. Thus, Deville has calculated that one cubic mètre (equal to 35·3 cubic feet) costs, when prepared from chlorate of potash, 8s. 4d.; and when prepared from oxide of manganese, upwards of 4s. The plan of making it from sulphuric acid would doubtless be cheaper; but on the large scale, there are serious difficulties to be overcome before this plan is adopted. Probably, any process whereby absolutely pure oxygen was obtained would be expensive. Comparing this gas to alcohol, the atmosphere might be likened to weak brandy and water, whilst pure oxygen would be represented by absolute alcohol—a chemical curiosity, very difficult to prepare, and also very expensive. If we want a stronger stimulant than brandy and water, brandy itself is taken in preference to absolute alcohol; and so, in like manner, if a stronger supporter of combustion than air is required, it may be found cheaper in every respect to use an analogue to brandy than to absolute alcohol —to employ a slightly diluted oxygen, obtained at a trifling expense, rather than make use of an absolutely pure gas. This is what Mr. Webster does. He does not attempt to prepare oxygen in a state of perfect freedom from nitrogen, but contents himself with getting a mixture three or four times as rich as the ordinary atmosphere, and in which combustion proceeds very vividly, although with slightly less splendour than if it were undiluted. The plan of operation is as follows: a portable fire-brick-lined furnace of iron contains an inner strong cast-iron vessel, ten inches in diameter, furnished with a cover and iron tube; into this is placed a second cylindrical iron retort, of seven inches diameter, open at the top, and provided with an orifice at the base, temporarily stopped with a piece of sheet iron, so that when the materials used are exhausted, the inner pot can be removed, and the contents easily knocked out with an iron bar. As the product left after the disengagement of the gas is not allowed to fuse, and only becomes slightly coherent or pasty, this form of retort, placed in the outer vessel of iron, which can be properly closed by a luted cover, answers remarkably well, and may be used by any intelligent workman. In connection with the outer iron vessel is an inch-and-a-half iron pipe, luted into a stone-ware tube, forming part of, and leading to the bottom of a 30-gallon stone-ware vessel, containing half a gallon of water, and eight moveable stone-ware colander-like shelves. Upon these are placed 48 lbs. of the alkaline residue from a previous operation. The purifier, thus arranged, is furnished with a lid dropping into a water joint, and the whole is connected with a gasometer. The oxygen is evolved from a mixture of nitrate of soda (Chili saltpetre) and crude oxide of zinc, 10 lbs. of the former, and 20 lbs. of the latter. As the success of the process, so far as the maximum of the oxygen is concerned, depends greatly on the thorough dryness of the materials used, the top of the furnace is converted into a hot plate, upon which the materials are dried. They are then roughly mixed together in an iron tray, and dropped through an iron funnel into the inner red-hot retort, which can easily be lifted in or out of the exterior one by means of a chain and small crane attached to the furnace. The cover is provided with a hole at the top, and is immediately luted on with a mixture of Stourbridge clay and sand. As soon as the proper tests applied to the hole show that oxygen is commencing to be evolved, the top aperture is closed, and connection with the purifier and gasometer opened. The gas comes over very rapidly; in two-and-a-half hours, when the operation is considered terminated, 33 cubic feet are obtained, the loss of weight of material being 5·5 lbs.

The gas obtained, upon being analysed eudiometrically, is found to contain 60 volumes of oxygen and 40 volumes of nitrogen per cent. Thus it is seen to stand about mid-way between the ordinary atmosphere and pure oxygen, and is probably as strong a gas as can conveniently be employed in manufactures without danger. It conjunction with a jet of coal gas in the blow-pipe, it melts platinum quickly, and when passed up into a gas burner or oil lamp, it produces a pure and brilliant light, by which natural colours are seen as well as by daylight. When used for the oxy-hydrogen lime light, it is but slightly inferior to pure oxygen, and it is only by comparing the two lights side by side that the difference in their relative intensities is observable. The cost of oxygen prepared by this method is still further reduced by the fact that the oxide of zinc can be repeatedly used, by merely washing it free from the soluble salts; whilst the aqueous solution, upon evaporation to dryness, yields a highly alkaline residue, which it is proposed to sell direct to chemical manufacturers, who would find the different ingredients readily separable by crystallization, and of considerable value in various branches of their art. Supposing all the products are realized in this way, it is calculated that the price of this highly oxygenous mixture would not much exceed that of coal gas; whilst, even supposing all the products are rejected, it would only cost about one-fourth that of the gas prepared in the ordinary manner.

## SOME ADDITIONAL NOTES ON PLAIN WASHED COLLODION FOR DRY PLATES.

BY W. HISLOP, F.R.A.S.*

About twelve months since, I asked the attention of the members of this Society to the fact, that no preservative whatever was required for dry collodion plates, but that they would retain their sensitiveness in every way unimpaired, and would allow of the development of the impressed picture better without than with the imposition of the numerous substances, simple and compound, that had been advocated by various manipulators.

Some gentlemen were unwilling to believe this, and when the results were shown, attributed them to various causes. Others averred that they had tried, but could not succeed, and that it could be done by no one but myself. Some said it had been done before; but not a few have communicated to me their acknowledgments for having had their attention called to a simple and certain means of obtaining good pictures. Since that time, I have, as an amateur, continued to use the method then advocated, as the best means I know of obtaining pictures on dry plates, and with more than the success of which I then spoke. The details of the manipulation have remained the same.

It may be remembered that I found the film very loose, after being again wetted, if the plate was not previously coated with some adhesive substance. Being in the habit of using a very weak solution of albumen as a substratum for wet collodion, I employed that for the dry plates, and found it satisfactory. I have subsequently tried india-rubber and gelatine in solution, but found neither of them as perfect as very dilute albumen. I had observed, however, that the pictures were more full of detail and half-tone when the film was supported by the bare glass only; but until lately I have not been able to find a collodion which would adhere with sufficient firmness to render it safe.

The plates I have used have been principally of stereoscopic glass size, and also larger ones, to nine inches by seven. I have found the larger plates equally certain and satisfactory with the smaller ones. In this process, however, as in every other with a dry plate, it is absolutely necessary that the drying process should be quick and uniform, if we wish for evenness of sensibility and intensity. I have not been able yet to use any method of artificial drying; but a close observance of what takes place in plates which have dried slowly, leads me to conclude, that the longer the film remains wet, the more insensitive it becomes, leading, if the drying be unduly prolonged, to stains and patches towards the end which has remained wet for the longest time.

The exposure I have employed has, of course, varied with the subject. From one to five minutes for a landscape, with a 4½-inch focus lens, and ¼-inch stop, has been the usual time; while for an orthoscopic lens of 17 inches equivalent focus, I have used from five to fifteen minutes for the same subject.

With respect to the keeping qualities, I have not kept them beyond three months, but have found them unchanged at the end of that time. After exposure, I have kept them for a fortnight before development, without any alteration that I could observe; but I have not experimented in this direction, being generally desirous of seeing results in as short a time as possible. I may here notice, that I believe many dry plates are spoilt from the boxes they are kept in not being air-tight. If I am travelling, or likely to keep the plates any length of time, it is my practice to paste strips of gold-beaters' skin or varnished paper over the opening, to exclude, as far as possible, the external air, as we can never tell where the package may be placed, or what deleterious fumes may envelope it. I have found plates soon spoilt that are kept in a box on a shelf near a ceiling where gas is burnt.

In most of my successful plates I have used Ponting's negative collodion; but within the last two months I have succeeded in obtaining a collodion which is a very great improvement, and which brings plain washed collodion for dry plates very nearly to a par with collodion in its wet state, for sensitiveness, while they are superior for detail, and as simple in manipulation.

The collodion in question is Ponting's bromo-iodized collodion. With this I can obtain a landscape in thirty seconds with a moderate light, while the details of foliage in shadow are beautifully defined. This collodion needs no substratum, it dries rapidly, and gives a beautifully clear and intense picture with an old nitrate bath.

I believe that the best means of promoting photography, especially among amateurs, is to endeavour to indicate those materials which are in the market, and can readily be obtained, rather than to make experiments on a necessarily small scale, which are likely to give different results when repeated under different circumstances.

To those who would like to save their time and to obtain pictures, I can confidently recommend this method of manipulation; and in order to make it as plain as possible, I will briefly state precisely the course I have found the easiest.

The collodion is Ponting's bromo-iodized collodion.

The bath is the ordinary 30 or 35-grain negative bath, slightly acidified with acetic acid.

The developer is 6 grains of pyrogallic acid, with 4 grains of citric acid, to 4 ounces of water. One or two drops of the nitrate bath are added to the necessary quantity for each plate.

The plate is cleaned, coated with collodion, and immersed in the bath. When uniformly sensitized, it is placed in a large dish, filled with common water. I use New River water.

The next plate is then dealt with in the same way, and when the first dish is full, the water is well waved to and fro, and the plates taken out one by one, and placed in another dish, so as to wash each equally. This is done a third time, and a small quantity of salt is mixed with the water in the last dish. The plates are taken from this, one by one, and a stream of water from a jug or tap is allowed to fall with some force upon the film, to remove any particles of chloride which might adhere to it, otherwise the film may be covered with transparent pin-holes. They are then set up on one corner to dry, taking care to draw off any moisture by means of blotting paper.

If it is suspected that organic matter exists in the water, it is desirable to immerse the plate, after the final washing, for a time in distilled water, or the negative may be found to redden in colour towards the edge which has been the lowest in drying.

After exposure, the plates are placed in a dish of water for a few minutes, and then developed, taking care that the developer flows equally over to the edges of the plate. The resulting picture is nearly of the same colour and intensity as if exposed and developed while wet.

In certain conditions of the bath, especially if it is new, it may happen that there is a want of intensity. In this case, a very small quantity of common resin, considerably less than is used for the resin process, say about a quarter of a grain to the ounce, will be found to darken the picture. Almost any intensity may thus be obtained.

* Read before the North London Photographic Association, Nov. 19.

I have not tried the effects of other resins sufficiently to speak positively of them; but I am disposed to think that shellac will prove better than any.

I have only further to remark, that if I have not been sufficiently clear, I shall be happy to give any further information I may possess.

## EXPERIMENTS ON THE CHEMICAL ACTION OF SOLAR LIGHT.

BY M. BAUDRIMENT.

These experiments, commenced in June, 1857, and continued until November, 1861, were divided into two principal series. Those of the first series were made upon coloured materials, in a square frame, contrived to receive nine plates of glass of different colours. The experiments of the second series were made upon vegetables, with the same frames of coloured glass. The coloured substances were: 1st, Chemical substances, salts of mercury, and of iodine, and chromate of silver. 2nd, Of papers impregnated with organic colouring materials soluble in water or alcohol, turmole, curcuma, alkanet, &c. 3rd, Of silk ribbons of various colours. 4th, Of dissolved substances contained in tubes, sealed at the lamp.

We regret that we cannot give all the details of these two series of experiments, but are compelled to limit our account of them to the general results of this important investigation, of which the most unexpected result is, that the quantity of water evaporated varied with the colour of the light illuminating the liquid, when the differences of temperature were very slight and insignificant.

The facts comprised in this investigation divide themselves into several distinct groups; the one consisting in the destruction, and probably also in the combustion of organic substances; the others, relative to vegetation, connect themselves with the formation of vegetable products by a kind of reduction; the last comprehend the reactions which take place by the simple action of light, without the intervention of any foreign body. Such is, probably, the case of the protochloride and the bisulphide of mercury.

Although these facts appear opposed to each other, it is evident they are due to the same cause, and that they have their origin in the action of solar light.

This identity of solar action suggests the idea, that it is possible to unite them with each other by a theory which permits the including the whole within it. I will here endeavour to give a sketch of the first elements.

The results to be deduced from the action which light exercises upon vegetables, are intimately connected with those researches upon various materials described in the first portion of this inquiry.

It is evident that the chemical rays recognised as belonging to the most refrangible portion of the solar spectrum, are not those which cause the fundamental chemical reactions that give rise to the organic products of vegetables.

These rays are found towards the yellow light, which is inert relatively to heliography, while the violet light, which is much more refrangible, is entirely incapable of exercising this action: but it must be recognized that no elementary light is capable of provoking vegetation completely of itself, and that the entire white light of the sun is requisite to produce that marvellous metamorphosis of inert into living matter.

Such is the simple summary of the facts observed; but to how many questions it gives rise!

How does the light intervene?

Does it act in a temporary manner, or does it remain in the products it helps to form?

Is it an imponderable acting by its presence in bodies? or rather, performing the part of a special dynamism, must it be regarded as a mechanical agent?

It is generally admitted that the carbonic acid which penetrates vegetables is reduced, that its carbon is fixed in them, and its oxygen liberated. But to those who have deeply reflected it must be evident that the accomplishment of this act is not so simple, that ammonia intervenes in the reaction, that it is possibly the same with many mineral substances; and, lastly, that instead of a simple reduction, there is a series of reactions analogous to those which we admit for the accomplishment of the nutrition of animals, and that act merely in an inverse order. Whatever it be, if we regard only the final reaction as it presents itself to us, and as it is accepted by all the world, the products formed should retain a certain portion of light, and especially that which corresponds to the refrangibility of the yellow rays; while the other portion, and chiefly that which corresponds to the most refrangible rays, must unite itself wholly with the oxygen, and remain in a latent state.

The oxygen given off by plants does not differ from that which enters into the constitution of the atmosphere; we are led to admit that in either case free oxygen contains latent light. When we burn any kind of organic matter, such as wood, coal, or charcoal, light appears during the combustion, and we have a right to conclude that this light was contained in a latent state in the body in question, as I have endeavoured to demonstrate in a work I published under the title of *Dynamique des Etres Vivants*. But, at the date of this publication I did not think that the light contained in vegetables differed from that contained in oxygen, and that they could complete each other to produce ordinary light.

From these facts it seems to follow that the oxygen given off by vegetables, in consequence of the kind of light it carries with it, may find itself in one of the singular states described by M. Schœnbein. The two lights condensed, the one in the vegetable, the other in the oxygen, will not only be complementary in respect to their colour, but they may also differ either as two rays of the same origin, rectangularly polarized, and still more, perhaps, as rays possessing contrary and complementary votary powers, which entail either *henriedry* or *plagiedry*, if the carbon and oxygen can at once assume a crystalline form.

In general, bodies lose light upon combination, and this light must be restored when they are separated, in order to restore them to their primitive state. But the field of hypothesis widens its horizon the further we proceed, and the end cannot be seen yet.

Some cotyledons take a foliaceous development, and produce green matter, like the graminacea, the *Lapidium Sativum*, and some of the synanthereas; and as this takes place whatever be the light which illuminates the plants, and also even in the dark, we are induced to think that these seeds must contain latent light, which becomes free and efficacious in proportion as the embryonic evolution is accomplished, and ends by disappearing, when the germ has acquired sufficient strength to draw direct from the solar emanations, the light indispensably necessary to the formation of the vegetable.

If we inquire in what special product, inherent to the seed, the light is found so condensed, we shall be led to recognise that it must be in the most combustible portion, in the oily matter that always surrounds the embryo; oily matter which during a long series of ages has been the principal and almost the only product that man has employed as the basis of lighting.

By an action the reverse of that which has produced it, the principal function of this matter will be that of uniting with oxygen, and thus commencing the series of chemical reactions which must be accomplished to produce organic matter.

Seeds are not the only primary matter which contain oily substances; it is the same with the eggs of every animal, whatever degree of organization it possesses, from the sponge to the human being, and doubtless the function of the oily matter is the same.

Germination and primary evolution of animals are, so to speak, confounded together. Both grow under the protection of light, both require the aid of oxygen, both consume organic matter, and do not create it. Germination, as I have long ago asserted, is an act of animal nature.

However hazardous these opinions may appear, they must not be too hastily rejected, for they are in perfect harmony with the entire grand theory of vibratory motions, which is the only one which, at the present day, will explain all the facts observed in nature.

## ON SOME OF THE DIFFICULTIES CONNECTED WITH THE PRACTICE OF PHOTOLITHOGRAPHY.

BY J. W. OSBORNE.*

In a paper read by me at the meeting of the British Association of this year at Cambridge, I gave exact directions for the execution of my photolithographic process, in as concise a manner as was consistent with a proper elucidation of my subject. On the present occasion I respond to the flattering request of Dr. Diamond, to continue the topic in a short paper before the Photographic Society, and I request the members to consider the few observations I have to make as supplementary to the paper just referred to.

Foremost among the difficulties which beset the operator engaged in the reproduction of drawings and engravings, should be enumerated the circumstances affecting the production of a good negative. I have already referred to the importance of this first step in the process, and explained my method of "clearing up," and pushing the development, with a view to obtain contrast upon the glass; but more yet remains to be said upon this theme alone than I can possibly find space for within the limits of the present communication.

It must be obvious to all, that the quality of the negative depends, first of all, upon the original from which it is taken. A drawing from which a very tolerable silver print copy can be made will not unfrequently cause the photolithographer much difficulty, which he is conscious of when endeavouring to produce a negative suitable for his purposes. This depends to a certain extent upon the peculiarities of the process, but chiefly upon the fact that we apply quite a different criticism to artistic productions emanating from the press and to those from the pressure-frame. In the one case we expect perfect cleanliness, sharpness, and solidity; in the other we are satisfied if the general effect upon the mind is such that we are forcibly and irresistibly reminded of the original. To secure, then, a good negative, the design to be copied, if drawn by hand, must be executed in a certain style, which will not be invariably followed by draughtsmen, unless their attention is particularly directed towards it; and this is true of those who work mechanically with the drawing-pen and scale, as well as of persons engaged in the essentially artistic expression of their conceptions.

That the acquisition of a good method of drawing is no insurmountable difficulty, is established by the success which has attended the introduction of improved systems into the Ordnance Map Office at Southampton, and the Survey Office in Melbourne. In the last-named department, the improvement in the character of maps, and plans generally, has been very considerable, and is, quite independently of photolithography, a great boon to the office. I may add that some of the reproductions of pen-and-ink sketches which I exhibit are from originals which leave nothing to be desired.

The object which the photolithographer should have in view, is not only to reproduce existing originals of convenient and suitable size; but, abstractly to bring the quality of his work, whenever that is possible, up to that of the best lithographic productions drawn by hand. And while I admit that the copy of an indifferent sketch, etching, or ancient manuscript, may from circumstances connected with its history, or from other causes, be a legitimate and useful application of the art, I am still of opinion that, until the excellence of ordinary reproductions by this means is ensured by adopting the necessary precautions as regards the original, photolithography will not take the honourable place it is destined to fill among the graphic arts.

Up to the present time, the draughtsmen and artists have drawn with the knowledge that they were to be followed by the engraver, whom they not unfrequently regarded as a mechanical man, whose business it was to set all right, and give finish and uniformity of style to their productions, by his rendering of them. The draughtsman (and I refer more particularly to the compiler of maps, and to the producer of mechanical drawings and designs) has now to remember that the lines he draws, and the word he writes, will be printed as he renders it, and that the ultimate quality of the work depends in the first instance, on him.

If it leaves his pen as a ragged broken scratch, it is out of the question to transform it, by the application of any amount of care or cleverness, into what it ought to be. Photolithography has not yet passed into general use. As far as practical results are concerned, its adoption has been almost restricted to one or two Government Departments; but its extension is inevitable; and for publications by its means, a number of originals have yet to be drawn, greater, I would hope, than the vast store of time-honoured manuscripts and engravings which the past has so temptingly provided for us.

It is to point out the necessity for the maintenance of a correct style, and plain and firm work, that I have urged this subject upon your notice on the present occasion. The chief and leading error which ordinary draughtsmen commit is the use of pale grey ink for all fine, delicate, or distant work. Such ink flows more easily through the pen, and the work, when finished, has a softer effect, owing to the fact that a grey line looks finer than a black one, and the imperfections of such a line are not so readily seen. When the photographer endeavours to copy such a drawing in the camera, he experiences much difficulty in making from it a negative of the requisite quality, because a long exposure, desirable for the sake of getting intensity, which would easily be borne by the blacker and heavier part of the work, is sure to cloud over with a considerable deposit the paler and fainter lines. Unless this cloudiness can be totally cleared away, it prevents such lines going down on the stone with firmness and solidity.

Depending upon the converse of this state of things for its explanation is the fact that engravings are, as a rule, much easier to reproduce than drawings by hand, the fine and distant work upon such being produced, not by paler, but by finer lines and markings, with larger spaces between, than are let remain in the foreground and shadows.

Let us now consider how far it is possible for the photolithographer to equal the lithographer in the quality of his work. If, without reduction, we copy a well-executed map from stone or copper, using the best instruments, the purest chemicals, and the greatest care, all that it is within the bounds of possibility to obtain, is a fac-simile somewhat inferior to the original in quality. How much inferior, depends upon the process, and upon the operator; and the constant endeavour of the latter will be to reduce that quantity to a minimum: but however much he may exert himself, a difference will always exist.

If we now suppose that the engraving or drawing is fitted for reduction, and that the operator, taking advantage of this, diminishes the copy in size, we shall find that the result may be a finished work, quite equal to, or even superior to the original in excellence,—this result depending upon the fact that, when the minute imperfections of a drawing are reduced beyond a certain limit, they ceased to be observed by the unassisted eye, and for all practical purposes cease to exist. It is by availing ourselves of this beautiful power of the camera, that decided superiority may be obtained by the judicious employment of photolithography. At the same time it should be remembered that the camera

* Read at a meeting of the Photographic Society, on Tuesday evening, Nov. 4, 1862.

never changes the general character of a drawing, but only refines upon it, and that an original, the several parts of which are out of keeping with each other, and wanting in finish, will never, by any amount of reduction, be made to produce a pleasing effect.

A just appreciation of this subject is one of such paramount importance to the future of photolithography, that a short treatise on it, appropriately illustrated with originals, of various kinds and qualities, accompanied by their reproductions, both good and bad, on various scales, might be written with much benefit to the rising generation of draughtsmen and artists.

Leaving this topic, I wish to draw your attention to one cause, which I am convinced militates more frequently than is generally believed against the production of good negatives. The disturbing influence to which I refer is vibration. This may exist either in the camera, in the original to be copied, or in both; and its amount may be quite imperceptible to the senses, and yet be productive of much mischief. The tables upon which cameras are placed, the floors upon which they rest, the plan-boards to which originals are attached, and the methods employed to secure them, are rarely as firm and solid as they ought to be.

When we consider that the image of a fine line upon the sensitive collodion has only to oscillate to the extent of one-fourth its own width (equal to about $\frac{1}{700}$th of an inch), during a long exposure of three or four minutes, to take much from its sharpness and delicacy, the importance of adopting sufficient means to ensure stability will be manifest. On this account alone, if other reasons were wanting, I object to copying in the open air; for there are few days so still and free from wind, on which a slight tremor is not imparted to the instrument or plan-board; and I prefer to sacrifice a portion of the light, for the sake of securing perfect rigidity.

In concluding this paper, a few words on the nature of the difficulties affecting the production of photolithographic half-tone may not be out of place, as they will also serve to explain one of the chief uses of my "clearing up" process, the object of which, as I have already mentioned, is to obliterate half-tone, and to make the greatest amount of contrast to be obtained by subsequently pushing the development.

The gradation in tint observable in impressions from a lithographic stone are invariably found to possess a certain definite structure; that is, a shade is composed of a systematized arrangement of perfectly black markings of more or less determined form, separated from each other by clear white blanks and spaces. The distinctive characters of lithographic drawing depend chiefly upon the form of these markings, while the differences in depth of colour and tone depend upon their size and proximity.

Thus we have crayon drawing, stippling, cross-hatching and ruling, which are some of the methods employed to produce shadows of varying depth; and however even and soft the tints produced by these means may appear to the casual observer, they will each be found, upon close examination, to possess a certain characteristic form. Further, a little consideration will show that, while the printer works with an *opaque* ink, the colouring matter in which is carbon, and while it is only possible to prepare the stone in such a way as either to *take* or *reject* the ink on different parts of its surface, middle tints must continue to be constituted in a manner resembling that I have described. Now, in the negative picture from natural objects, we have no structure, as its shadows are simply the result of the action of varying amounts of light, and the particles of opaque solid matter deposited in the film are so minute as to defy detection and isolation, even with a high magnifying power. Here, then, is the difficulty. To give structure to these shadows, to express them on the stone in a manner more or less conventional, to print them by a mechanical process on paper, and still keep up that delicacy of character which the subtle luminous influence, by its chemical power, has imprinted on the plate, is the great problem to be solved.

Although, by modifying my process, *half*-tone can be and has been obtained, I cannot say the same of the infinite number of intermediate tints which constitute the charm of a photographic picture. I am confident that it admits of extension in this direction; but want of time has hitherto prevented me from devoting the necessary attention to it. I believe that my predecessors have too ambitiously aspired to the attainment of this most desirable, but most difficult object, and that had I followed them in this respect, and not circumscribed my field of operations to the production of simple black and white, my labours would not have terminated so successfully.

I do not doubt that we shall ultimately possess a good photolithographic process, capable of giving half-tone as good as any now obtained from the stone by the ordinary manipulations; but much remains to be done before this is accomplished. It should also be borne in mind, that it is not sufficient for the stone to furnish one or two good proofs; the quality of the work upon it must be such as to supply an indefinite number, if the method by which it was produced is to be of practical value. Looking at this subject from a business point of view, I think you will agree with me, that the quality of future results must closely approximate the perfections of a good silver print before they become commercially valuable.

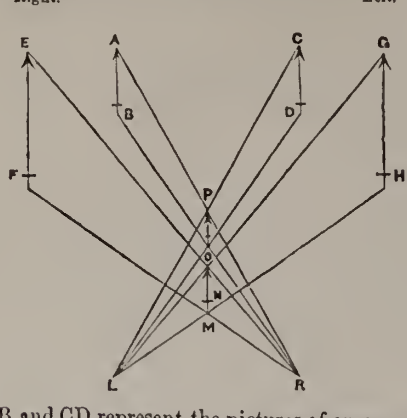
If, in the ordinary application of my process as I have described it, a portion of the work to be copied is washed in with a brush, or faintly drawn with pale ink or pencil, we obtain a negative which exhibits corresponding half-tone. Now the question may be asked, Why does not this print from the stone as a tint? The reason of its not doing so will be readily understood if we remember that the means by which the superfluous ink is removed from the transfer paper, after the blackened print has been sufficiently soaked, is a mechanical one, and deals roughly with the particles of matter (if I may be allowed so to express myself), compared with the delicate deposition and removal of atoms by chemical agency. If, then, the portion of the positive print sunned under half-tone in the negative has sufficient affinity to retain the ink, it retains a homogeneous and connected coating, which transfers to the stone as a solid patch of greasy matter, which will print black. If, on the other hand, the gelatine has not been sufficiently altered, the sponge removes the ink from such under-exposed places, clearing it right away, or at best leaving a broken line or shadow composed of inky patches which darken (if the transfers be effected to a smooth stone) with every impression taken in the press. Such results, save in as far as they can be made instructive by the investigator, are utterly worthless; and yet I take this opportunity to express my firm conviction that lithography, partly on account of its chemical character, and partly because of the excellent half-tone which the stone may be made to yield, is better fitted for union with the photographic art than are any of the other means of producing artistic works in the press, such as engraving, or surface-printing.

## THE STEREOGRAPH AND THE STEREOSCOPE.*

*The Stereoscopic Picture in front of the Photographs.*—In the first place it will be well to show, that when the stereoscopic effect is once produced with the strabonic stereograph, the axes of the eyes cross. Mark the left photograph with the letter R, and the right with the letter L; then, when three pictures appear (that is, the middle or stereoscopic one clear and distinct, and the two outside ones faint and indistinct), close the left eye; it will now be found that the axis of the right eye is exactly on the photograph R; reverse the experiment by closing the right eye; the axis of the left will now coincide with the centre of the photograph L. A peculiarity arising from the operation is, that when the eye is suddenly closed, the single unstereoscopic picture

* Continued from p. 442.

appears only of half its natural size, a phenomenon attributable to a short retention of the impression on the retina after its formation and its cessation; for, by suddenly rectifying the eyes to ordinary combined vision, the single image will at once be recognized of its natural size.




Let AB and CD represent the pictures of an arrow, as seen by each eye at a given distance, and EF and GH the pictures of the same object at a nearer distance. Let the photograph taken by the lens on the right side be mounted on the left side, and vice versa as in the adjoining figure. Let L and R represent respectively the left and the right eye. Draw lines from the right eye to the top and bottom of each arrow in the photograph marked "right," also from the left eye to the photograph marked "left." At the points of intersection draw the arrows MN and OP; these arrows will represent respectively the positions of the pictures of the original objects projected in space, with all the distances and sizes in true proportion; but these arrows might represent parts of one and the same solid object, so that the points of intersection would depict the corresponding points of a solid picture.

The arrows, of which AB and EF, etc., are supposed to be photographs, are supposed to be placed perpendicular to the plane of the observer, or to the surface of the paper, and to be twice as high as the elevation of the eyes above the horizon. The pictures are mounted so, or so deposited in the figure, that the distances BD and AC are respectively equal to the distance LR, or the distance between the centres of the eyes. For this reason BO will be equal to OR, as also DO to OL. In like manner AP and PR, and CP and CL, are equal to each other: and since the arrows are supposed to be perpendicular to the paper, and the eyes above the plane of the paper at a distance equal to half AB, the distances AP and CP will be equal to BO and GO; therefore, the superimposed pictures at PO will be equal to half AB or CD. The arrow, of which AB and CD are the pictures, is supposed to be placed at a great distance off, so great indeed that, in the strabonic stereograph, the distance from A to C will be equal to the distance between the eyes; but the distance between all nearer objects, as from E to G will be greater; therefore, the intersections of the two lines ER and GL, as also of FR and DL, will take place nearer to the eyes than P or O, and in such a manner that EN or GN is less than NR or NL, as also FM or HM is less than MR or ML.

From these circumstances we deduce the following conclusions: the superimposed pictures at MN are less than half the size of EF or GH inversely, as EN FM (which are supposed equal, since the arrow is intended to be perpendicular to the plane of the paper) is greater than NR or MR (likewise equal). Secondly, the picture MN will always be greater than PO, because the angle ERF will always be greater than the angle ARB, as long as EF is nearer to the eyes than AB

It is evident too, in the third place, from the similarity of triangles, that the same proportion exists between the two superimposed pictures MN and OP, as between either pair of photographs EF and AB on one side, or GH and CD on the other.

As I have already remarked, the two new pictures MN and OP thus formed by superimposition, will be *very brilliant;* in the first place, because they are condensed, on an average, to one half the size; and secondly, because the light of either photograph is superadded. In addition to the superimposed picture, we have other two pictures much less brilliant, and at the same time indistinct, one on the right and the other on the left; that is, EF and AB are seen independently by the left eye to the left of the brilliant picture, whilst GH and CD are seen by the right eye independently to the right of the new solid picture.

These secondary pictures I have not introduced in the diagram, because the lines would merely confuse the more important demonstration of the solid pictures. Their position is found between the lines drawn from R to C and D, and from R to G and H on the right side; and then from L to A and B, and from L to E and F, on the left side; and their size too, by some peculiar physical sympathy, is about half that of the originals, or in the same proportion as OP to NM, and probably respectively equal to them.

*Application of the Strabonic Property.* — Whenever the practical photographer, or amateur, has taken a favourite stereograph, he is desirous right away of seeing a proof-sheet of his workmanship in the stereoscope, or of having a print taken of his negative, in order to test his success. On a tour it is not always convenient to carry a stereoscope to gratify his ardent desire; but it is not at all difficult to practise the strabonic exploit; and when this is once attained, you can examine your negatives the moment they are fixed. It is not only a great pleasure to be able to do this, but it is a saving of time. Again, with this property made quite easy and familiar, your right and left printed stereographs may be promiscuously mixed together without any subsequent embarrassment; for picking up two photographs of the same view, and placing them on any flat surface, as on a book, in juxtaposition, you can easily and instantaneously say which belongs to the right side and which to the left, or whether they both belong to one and the same side. Besides this, I have no doubt that before long we shall have strabonic stereographs on sale as numerous as the ordinary ones; for each person's eyes will be his stereoscope.

I do not know a greater treat in photography than that of taking up two card pictures, taken in the open air with a natural background, and with the binocular camera and to be able to produce the stereoscopic superimposition. Each blade of glass, each flower, the old hollow tree, the irregular rocks, the log-house, and the lake, are all presented in miniature solidity with the beloved friend in the midst in living nature. What a difference between such card-pictures and those flat silly things that are daily presented to us, whose background is almost universally a broken pillar or a baptismal font! Strabonic card pictures once introduced, and their beauties once descried, would soon drive away all those stiff photographic contortions and snobbish grimaces depicted in front of columns and regal staircases to the land of Proserpine.

*Injury to the Eye-sight by the Strabonic Manœuvre.*—Hints are frequently expressed, both by the laity and the medical profession, that such attempts as recommended in the present article, will be likely to produce permanent injury to the eyes, by producing internal strabismus. Such medical men do not investigate the grounds from which they derive their opinion; they take it for granted, I suppose, that since to be able to see strabonically requires at the beginning an effort, therefore it is unnatural, and must of course produce an unnatural result. Before such a conclusion can be established, we must first ascertain whether those persons who have obtained the faculty of thus regarding the stereograph, have had their sight deteriorated, the axes of their eyes changed, or, in fact, have suffered any inconvenience whatever. For my own part I must and can with a good conscience (and I have made a hobby of this stndy), aver that, with daily practice in viewing strabonically, not the slightest result of an injurious nature has manifested itself, and no one has yet detected any ontward signs of the nnmistakeable squint in my optical apparatus.

Others, friends of mine and of science, have been in like manner wonderfully gratified with the strabonic experiments, and testify to the normal action of the eyes as soon as the stereograph is laid aside. In fact, there is no reason why the sight shonld be thns impaired: for the axes of the eyes are normally convergent, and this convergence is a variable angle with different persons, depending upon the occnpations of men, and with the same person in accordance with the transition from different objects. In viewing near objects this angle is greater; in viewing more distant objects it is less. The convergence changes involnntarily as we raise our eyes from the lines that we are penning to the distant shore on the other side of the lake; and I do not regard it as more injnrious to the sight to make this involuntary transition than it is to make a volnntary convergence when required. By what nerves and mnscles this voluntary effect is produced, I am not yet prepared to state. The study is worthy the attention of our most distinguished physiologists, and they will certainly not despise the undertaking.

In my next commnnication I shall demonstrate the mode of seeing this stereoscopic effect, produced by a less degree of convergence of the axes of the eyes, so that the solid pictnre is seen, as it were, behind the stereograph and magnified.—*Humphrey's Journal.*

## Critical Notices.

### PHOSPHORESCENCE, OR THE SPONTANEOUS EMISSION OF LIGHT BY MINERALS, PLANTS, AND ANIMALS. By DR. T. L. PHIPSON, F.C.S., &c. With numerons Woodcuts, fcap. 8vo. London: Lovel Reeve.

OF all physical phenomena, that pecnliar emission of light called *phosphorescence*, which manifests itself in certain circumstances in minerals, vegetables, and animals, has hitherto been less known than any other. The work before ns, by Dr. Phipson, brings the somewhat neglected question of phosphorescence np to the scientific level of the present day It is the resnlt of many years' labonr and numerous experiments, bnt the anthor has devoted his pages to the works of others as well as to his own researches, and has, moreover, given, in a copions appendix, a list of the works which have contribnted to our knowledge of phosphorescence from the fifteenth century to the present time.

It is true that Aristotle distinctly speaks of the light of glow-worms, and the phosphorescence of pntrescent substances; that Pliny was acquainted with lnminons properties of certain *medusæ*, and had seen dead *pholas* shine in the months of those who ate them. But it was not nntil Fabricius *ab* Aquapendente first called attention, in 1592, to the peculiar light emitted by the flesh of dead animals, and after Cascariolo, the cobbler of Bologna, had discovered the famous solar-phosphorns, or Bologna-stone, that inquiry into these phenomena was fairly set on foot; and the first thing that strikes ns on opening the interesting volume before ns, is the enormons nnmber of substances and beings which are capable, in certain circumstances, of emitting light, often powerful enough to allow us by its aid to read the smallest print.

The author's work is essentially divided into fonr parts, the first of which treats of the phosphorescence of minerals and chemical substances; it includes also a very interesting chapter (Chap. V.) upon meteorological phosphorescence, or the emission of light by rain, hail, snow, fogs, aërolites, &c., &c. The second part is devoted to vegetable phosphorescence; and the third to phosphorescence in the animal world. The fourth includes the historical notes connected with the subject, the theory of phosphorescence, and practical considerations concerning its nses to man.

As we have already stated, the number of well observed cases of phosphoric phenomena, which we possess at the present day, is very considerable. In the mineral world we find phosphorescence induced by insolation, or exposure to the light of the sun; by heat, by friction, by electricity, by cleavage and crystallization, and by chemical change. The author treats separately of all these circnmstances in the first part of his work, bringing forward a mass of curious information, showing ns not only what has been done, bnt what still remains to be done, in connection with this mysterions evolntion of light by bodies. In the chapter devoted to meteorology, onr attention is called to numerons cases of luminous rain, snow, and hail, and to certain dry fogs which emit so much phosphoric light, that a traveller sees his way through them withont the light of the moon; to lnminons waterspонts, and several other very interesting phenomena.* In the vegetable world we find phosphoric properties developed to a high degree in certain *fungi*, which are phosphorescent whilst living; for instance, the famons *agaricus olearius*, which grows at the foot of the olive trees in Italy, and of which the anthor gives a beantiful drawing, and certain *rhizomorpha*, which are also figured, growing in damp mines. But the phenomena of phosphorescence is observed also in phanerogamic plants, and Dr. Phipson calls attention to the *euphorbia phosphorea*, the jnice of which leaves a vivid phosphorence on paper over which the broken stem of the plant is passed, and several other light-emitting plants of high organization.

In the animal world, from *infusoria* and *rhizopods* to *insects*, and *myriapods*, there is scarcely a group of animals that does not possess numerons individuals endowed with phosphoric powers. Ehrenberg has described npwards of one hundred species of phosphorescent infusoria, and nnmerous medusæ, polypes, aurelids, mollusca, crustacea, &c., have been added to the list by other observers. The common earth-worm, *lumbricus*, is luminous in October during its period of coupling; and the *cgrosoma atlantica*, and *salpoe* among the *tunicata* illuminate the warmer seas for miles and miles with a pale phosphoric light. Many of these interesting creatures are figured by the author, who next proceeds to examine luminons insects, the *lampyridæ, elateridæ, fulgosa.* In Chap. VI. of the Third Part, Dr. Phipson alludes to certain problematical cases of phosphorescence in snperior animals, and phosphoric phenomena observed in man. Our limited space forbids us to follow the author as we would wish, through this interesting investigation, bnt we must draw attention to a set of phenomena which Dr. Phipson has called *subjectile phosphorescence.* These happen when the optic nerve is cnt or injured, no pain is then felt, bnt flashes of light are perceived. The light, like that of the glow-worm, and other phosphorescent animals, is of a greenish yellow tint. It occnrs, likewise, when an electric cnrrent is passed along the optic nerve, and in febrile diseases, and by the use of narcotic medicines. "A prodnction of light in the above circumstances," says the author, "is exceedingly interesting, and tends, perhaps, more than we are aware, to establish the fact that the phenomena of light are owing to a *vibratory* movement of matter."

The historical and theoretical portion of this work wonld require more space than we can afford to do jnstice to them, we must, therefore, abandon our readers to these interesting pages, assnring them that the subject is well worth their attention; and that it is not devoid of ntility, Dr. Phipson has shown, by proving in his own laboratory, that the most powerful light hitherto produced by man, *viz.*, that produced when oxygen and hydrogen burn in contact with lime, is a phosphorescent light.

* In this section of his work, Dr. Phipson devotes several pages to the mysterious phenomena known as the *Will-o'-the-Wisp*. He shows that several very distinct phenomena are huddled together under this peculiar denomination. The generally admitted theory of phosphuretted hydrogen is shown to apply, only problematically, to one of these, whilst the others are shown to be electrical mists, insects, and inflamed hydro-carbons. To the latter belongs our ordinary English *Will-o'-the-Wisp*, which is burning carburetted hydrogen, or marsh gas, the flame of which is invisible in the day time, but attracts attention at night.

## Proceedings of Societies.

### North London Photographic Association.

The usual monthly meeting of the Association was hold in Myddelton Hall, on the evening of Wednesday, November 19, Mr. G. Dawson in the chair.

The minutes having been read and confirmed, Mr. H. Hemans and Mr. Lonsdale wero elected members of the Society.

Mr. Hill (Treasurer) exhibited a series of very exquisite photographs 7×4½, taken with Dallmeyer's No. 3 triple lens. The pictures were similar in size, and also very similar in many of the qualities to those recently issued by Mr. Wilson of Aberdeen.

The Chairman exhibited a number of card portraits, taken with Mr. Ross's lenses, by Messrs. Abbott, Helsby, McNab, Deane, Ruff, and others. He also called especial attention to a series of theatrical portraits by Southwell Brothers, of most excellent quality, being delicate, soft, round, and brilliant in an unusual degree.

Some conversation followed, in which the question was asked as to which lens was used in the production of the last-named pictures. The Chairman being uncertain, Mr. Wharton Simpson said that Messrs. Southwell Brothers worked with Mr. Ross's card lens, No. 3, which had, he believed, an equivalent focus of about eight inches, and a back focus of six inches, or six inches and a half.

The Chairman then read the following letter forwarded by Mr. Wall:—

"To the Chairman of the North London Photographic Association.

"Sir,—Having just read a letter from the celebrated painter Mr. George Lance, published in the papers of to-day, and suggesting that his brethren of the brush should unite with him in aid of the Lancashire Operatives Relief Fund, by painting each a small picture to be sold for that special purpose at the ensuing exhibition of the British Institution, may I venture, through you and the Society over which you preside, to make a similar suggestion.

"It is urged, that, as the British Institution will open in February, the proposed aid would be raised at a time whon it will prove to be the most needed. Now photographers also have an exhibition, which will open at even an earlier date; and I think we have yet to learn that, as a body, we are more wanting in charity and patriotism than professors of the sister arts. I, therefore, venture to suggest, that a certain number of proofs from the negative of works exhibited should be set aside and announced in the catalogue as for sale, in aid of funds now being raised for the relief of our unfortunate and patiently-enduring countrymen in the North.

"Trusting that you will kindly see fit to proffer this suggestion in the course of the evening, and permit it to appear in the reports of the proceedings of the Association, I am, dear sir, yours obediently, A. H. Wall."

"*November* 19, 1862."

It will be seen, from a reference to our last, that a similar suggestion had already been made by Col. Stuart Wortley, who had initiated very handsomely the step he recommended.

The Chairman said, that the Secretary had received from Mr. St. George, photographic printer, a hundred copies of a very excellent card portrait of Mr. Hardwich; Mr. St. George wished to present to each member a copy of this portrait. The portrait excited much admiration as a brilliant photograph and a characteristic portrait.

Mr. W. Hislop then read "Some Additional Notes on Plain Washed Collodion Plates" (see p. 568). At the conclusion of his paper, Mr. Hislop exhibited some very fine transparencies and negatives taken by the method described.

Mr. Seely asked how long the negatives were in developing?

Mr. Hislop said about the same time as wet plates. As a general principle he preferred slow development, as it gave the manipulator more power over the result.

Mr. Seely asked if Mr. Hislop had tried development with iron with these plates?

Mr. Hislop was not in a position to speak with certainty as to the use of iron for the purpose.

The Chairman, referring to some of the negatives exhibited, said he never observed the deposit present such a piled-up appearance before. That in his hand might almost be used as matrix for an electrotype.

Mr. Seely asked Mr. Hislop if he found any uncertainty in the process?

Mr. Hislop said, no uncertainty but what he could trace to the neglect of proper precautions. If the manipulations and materials were right, the result was certain.

Mr. Seely said one great advantage of the tannin process was the great range of exposure it permitted without spoiling the results. Had Mr. Hislop found this to be the case with the simply washed plates?

Mr. Hislop could get pictures with much under-exposure, but not as good as with proper exposure.

Mr. Morley remarked that the negatives exhibited seemed to possess great intensity.

Mr. Hislop said the amount of intensity was quite under control.

Mr. Hill thought the prevailing error in dry plates was under-exposure and over-development. The negatives, from which the prints he had exhibited were printed, looked very thin, but they gave sufficiently brilliant results in printing, without being hard.

Mr. Seely asked if Mr. Hislop had used hot water?

Mr. Hislop had obtained a negative with five seconds exposure with the aid of hot water in developing, similar in character to one obtained in three minutes in the ordinary way. The chief difficulty with hot water was the tendency of the plate to dry in parts and cause stains.

Mr. Seely, referring to one of the negatives, said he thought it was solarized.

Mr. Hislop said it was a plate which had been long kept, and the defect was a slight amount of fogging at the edge of the plate due to long keeping. It was not solarization.

Several members confirmed this view of the case.

The Chairman said it was strange that this question so often mooted, had never been settled; and that plates simply washed and dried had never come into practical use. The very simplicity of the process ought to cause it to drive out all others, and now, since a suitable collodion had been found, he thought it would probably come into general use. The process had been recommended many years back, as early as 1854, when M. Gaudin in *La Lumière* praised it very highly. A month afterwards, however, he modified his opinion of its advantages, and suggested the use of honey, treacle, &c. A suitable collodion really appeared the thing required, and Mr. Hislop appeared to have met with one. A bromide appeared to be necessary, and that was consistent with general experience in dry plate photography. He saw no reason now why it should not supersede all other dry processes.

Mr. Hill referred to some analogous suggestions from Mr. Barnes, who was very early in the field of dry plate photography.

Mr. Wharton Simpson said he thought it was an important principle in awarding the honours of discovery to individuals, to recognize chiefly those who worked out ideas to practical results, rather than to those who merely made suggestions as to various possibilities, without working their suggestions into a practical form. Regarding the early date at which dry washed collodion was first proposed, it was even earlier than the Chairman had stated. As early as 1851 or 1852, Mr. Archer and Dr. Diamond had used excited collodion plates, simply washed and dried, and with some degree of success, but not sufficient to justify them in continuing it at that time. Probably, they felt what many since had felt, that some uncertainty attended the results. The right kind of collodion was not understood, and upon that much seemed to depend. The knowledge that a certain commercial collodion was suitable for the purpose, and the sight of such negatives as Mr. Hislop had produced, would doubtless, as the Chairman had suggested, give a new impetus to this simplest of all dry processes.

After some further conversation, the Chair was taken by Mr. Hislop, and

Mr. Dawson exhibited a number of instantaneous shutters, describing their mode of work and results. The principle upon which even those most recently brought out was old, almost every form having been used years ago. The first and most obvious mode of covering the lens was with a cap or cloth. Advancing a step, the flap shutter was introduced, which had the advantage of exposing the foreground first, and shading the sky. Next came a spring blind inside the camera. The next form was very ingenious; it was invented by Mr. Montefiore Levi, and described in the first volume of the *Photographic Journal*. The same shutter had recently been patented by another gentleman, who appeared not to have been aware that it was an old invention. By the kindness of Mr. Dallmeyer he was able to show one made under the new patent, which was very neat and well made. He, also, showed another neat form of the same principle, made by Mr. Ross. The distinctive feature in that described by Mr. Levi, and in those he now showed, was that the opening commenced at the centre of the lens, and gave the longest exposure with the best part of the lens. He was not quite certain that this was really an advantage, as in all double combinations there was already a tendency to excess of light in the centre. He also showed two shutters invented in 1854, by Mr. Wilkinson, of Pall Mall; one of which was a double-flap shutter, and the other based upon the spring-blind principle. He next showed Messrs. Horne and Thornthwaite's guillotine shutters, and Mr. Window's roller shutter; and finally, Mr. England's shutter on the guillotine principle, but working immediately in front of the exposed plate, inside the camera, instead of outside the lens. Its great advantage was, that every part of the plate in succession received the whole power of the lens; and that, moreover, as the aperture could be made larger, or less, it gave a certain amount of control over the duration of what might be termed an instaneous exposure.

Mr. Blanchard regarded the latter feature as a most important one. It was most valuable in instantaneous operations to have such a control, and secure as it were an intelligent agent in doing the work. The shutter he used for such exposure combined the principle of two of those exhibited, and worked inside the camera. It would give, if necessary, more exposure to the foreground than sky.

After some further conversatiou the subject dropped.

Mr. Simpson called attention to some prints from instantaneous negatives on tannin plates by Mr. Hurst. The mode of producing them was not yet published. He also called attention to an untoned and unfixed print on resinized silk, to show how much more deeply printing was required than was generally necessary on albumenized paper.

Mr. How, successor to the old established business of Knight and Son, Foster Lane, exhibited some fine apparatus intended for use in India, and some card portraits taken with Maddison's collodion.

The presentation print, consisting of a very pretty "Peep through the Trees," by Major Gresley, supplied by the Amateur Photographic Association, was distributed.

After the usual votes of thanks, the proceedings terminated.

## Correspondence.

### THEORY OF ALKALINE GOLD TONING.

Dear Sir.—I cannot but think that your correspondent must have greatly misunderstood me, as he has taken exception to the only part about which there is the least reason to object. I hardly intended to have brought forward any new theory, and should, perhaps, not have used the word, it should rather have been the practical results of the toning bath, as the theory has been so well explained by Mr. Hardwich, in his "Photographic Chemistry," as to leave very little more to be found out; if your correspondent has the fifth edition by him, and will turn to page 157, it will, I think, help him to understand the meaning of one or two points in my last, in which I think I differ from him, as to the causes of one or two difficulties, which require to be thoroughly understood to be able to overcome. And first, as to the cause of mealiness; your correspondent agrees with me, I believe, in saying, that when the alkali is first added to the gold, it only neutralises the free acid, and decomposition does not begin for some little time, heat accelerating the action; so that the gold is still in the state of terchloride; now what is the rationale of the process when a print is immediately introduced in this state,—"the chlorine, previously combined with the gold, passes to the reduced silver, it bleaches the lightest shades, converting them into white protochloride, and gives them a violet tint; at the same time metallic gold is deposited, the effect of which is not visible, *since the same violet tint is perceived when a solution of chlorine is substituted for the chloride of gold*." Now from this we have a very clear explanation of the causes of the false toning, and probable cause of mealiness. Chloride of silver contains only one equivalent of chlorine and tercloride of gold three, consequently there are two equivalents in excess, which produce the false violet tone which, as Mr. Hardwich observed, was entirely dissolved off in the hypo. Now as to the second point: what I wished most particularly to insist upon was, the mischief that arises by having any free carbonate of soda or other alkali in the bath; upon adding only one or *not quite* two equivalents of soda carb. to the gold previously deprived of free acid left in the manufacture; the same amount of chlorine passes from the gold to the alkali forming common salt, which plays no action whatever in toning, further than combining with the gold and forming a double salt which keeps it in solution; but when more than this of alkali is added, it reduces the gold to Au Cl, and then spontaneously precipitates it in the toning dish. I need hardly mention that Au Cl, or the protochloride of gold by itself is insoluble, but that in the state of a double salt Au Cl + Na Cl is soluble. I stated that this salt is useless for toning, on account of its almost insensible action. I will endeavour to explain the reason why the gold being obliged to be deposited in the state of metal, can only part with its chlorine to the metal silver, and to do this it requires a very little chlorine in excess over its one equivalent to commence the attack, when it is once started all will go right until the greater part of the gold is reduced on the print, so that those who use large quantities of alkali in reality do not use above a quarter of their gold, and probably throw the greater part down the sink.

I believe I shall shortly find some certain way of bringiug the gold to an uniform state, before adding the necessary quantity of alkali to bring on decomposition.—I am, Sir, yours sincerely, Francis G Eliot.

## Photographic Notes and Queries.

### Nomenclature of Stops, &c. &c.

Sir,—Would you allow me to offer a suggestion to opticians Few, if any, have any system of diaphragms for photographic lenses: now I would suggest one or two plans for their adoption.

1st. That the number on any stop should represent its diameter in tenths of an inch, or differ from this by a constant. This would apply to all the lenses in a shop.

2nd. That the time of exposure for the full aperture being taken as unity, all the stops should bear numbers proportional to their exposures, or inversely proportional to the square of the diameter of the stop. This would be most convenient for the individual photographer.

Another great advantage would be gaiued, if opticians would give the equivalent focal length of their lenses. By combining these two data, photographers would benefit by each other's experience, especially if the species of lens were defined by a fraction whose numerator was the working greatest aperture, and the denominator the focal length.

For instance, I have a Ross orthographic for plates 8½ and 6½. I should call this lens orthographic $\frac{0.90}{12.5}$ and the stops whose diameters are 0·85, 0·7, 0·6, 0·5, 0·4, 0·3, nearly.

| | | | | | | |
|---|---|---|---|---|---|---|
| On 1st system | 8½ | 7 | 6 | 5 | 4 | 3 |
| On 2nd system | 1 | 1½ | 2 | 3 | 4½ | 8 |

Either way would bring about a system by which the purchasers of lenses knew what they were buying, and we should be able to judge which lenses are quick in reality.

I know M. Claudet says that stereomonoscopic pictures are not attainable. I have one where the relief is marked (of course a good deal is out of focus) when properly looked at. I have not a print to send this mail, but hope the weather will let me make one, and try a plan for producing pictures without the waut of definition in the foreground, but having the same effect.

Allow me to remark that in your spectroscope experiments you are rather too particular. I, aud many others in India, are in the habit of using an unguarded candle for working in a perfectly dark room without any ill effects. If you take a stearine candle, and examine its spectrum, I don't think you will find blue rays wanting, at least I do not with what I use.

I have rarely fog since I took to strong iron and weak acid on a bromo-iodized collodion. Fog usually means *under exposure*, so do stains.

If you really want a photographie candle, could you not induce some candlemaker to use a highly salted stearine. It would be nearly perfect.—Yours faithfully, J. P. P.

*India, September 17th*, 1862.

[In our stereoscopic examinations of specimens of glass, we give their absolute actinic qualities, as considered in relation to the severest tests to which they can be put, and since really non-actinic glass can be procured, it should, both for safety and theoretical propriety, be used. Where it cannot be obtained, experiment must determine what amount of departure from it is permissible.—Ed.]

## Talk in the Studio.

Vignetting Glasses.—Mr. Charles Derby, a correspondent, sends us a method of making vignetting glasses, which he finds very efficient. After pointing out the disadvantages of the vignetting glasses usually sold, and the troubles of various other methods, he says: "I annex my process of producing real good vignetting glasses of any size, and of any shape. I first take a piece of sensitized paper, whole plate size, as for an ordinary print, and perfectly clean. I place it in the printing frame, with a clean glass before it. I now take a large piece of paste-board about four inches larger all the way round the printing-frame, and nicking it in the four corners, turn down the edges to make like a box lid of it to fit the printing-frame. I then black it inside, and cut a hole out in the centre, about $1\frac{1}{2}$ inch $\times$ $1\frac{1}{4}$, according to the shape of the vignette wished for. I now place this box lid as I call it, over the printing frame, and fix it about one and a half inch from the printing-frame glass, where it is fastened with four little tacks, so as not to shift. Now place it in the shade (not in the sun), expose the sensitized paper, as for a print, then tone the paper and fix it in the usual manner. It should be a little over printed, so as to get the centre perfectly black. When dry, paste this vignetting negative on a nice level card, and take from that, in the camera, negatives for photographic vignetting glasses, any size and any number, on a one-ninth, one-sixth, one-fourth, &c., &c., glasses. The sharper the better, and the finer I get the beautiful graduation of the vignette produced by the rays of light. The more intense you can bring the borders of the vignetting glass, the better. Avoid fogging the centre, which must be quite transparent. If any of my brother photographers will use my way of producing vignetting glasses, they will find it very cheap and very useful. To those who cannot spend a deal in useless experiments, I am desirous of contributing my hint, through the medium of the Photographic News, which, thanks to you, has been the first to bring those useful dodges, freely to the knowledge of photographers."

The Origin of Landscape Card Pictures.—Since Mr. Warner's claim to the originating of landscape card pictures, we have received several communications, making similar claims. We remember seeing the suggestion of the idea, as a novelty, in a contemporary journal, long after it was to us a familiar fact. Mr. Wm. Bosley, now of Ipswich, has sent us two very pretty examples of this kind, one of Wolsey's Gate, and another a view in Ipswich Arboretum. He states that he has long been taking them without having seen any others. We have seen some of the same size and style, taken by Dr. Diamond, as early as 1852, but the name by which they are now designated was then unknown. It is a matter which many persons might naturally originate, without knowing it was done by others.

## To Correspondents.

New Rapid Dry Process.—We have received, just before going to press, an interesting communication from Mr. Alfred Keene, on a "New Rapid Dry Process," which promises very successful results. The article will appear in our next.

Half Tone in Photozincographs.—We have just been favoured by Colonel Sir Henry James with some further specimens of half tone in photozincographs, which show decided advancement in the process. We shall shortly have more to say on this subject.

*** The Photographic News Almanac for 1862.—The Publisher has just received a few copies of this Almanac from an Agent.

An Amateur.—The print received is one of the worst samples of imperfect fixation we have met with. We have often explained the cause; it arises from weak hypo, old and exhausted hypo, too short immersion, or the prints sticking together in the hypo. Most likely one of the two first mentioned causes. There has been just sufficient action of the hypo to form insoluble hyposulphite of silver, but not to form the soluble salt, which would be at once redissolved in the solution. The insoluble hyposulphite of silver rapidly decomposes in the light, and produces the dirty yellow or brown which your print exhibits.

W. A. Y.—We have not much knowledge of Busch's lenses, they have not been much used in this country. The others we know more about. The No. 3 lens of maker No. 2 will probably be best for your purpose. It is only called a half plate lens, but we have seen excellent whole plate pictures taken with it. No. 1 is a good maker, but the lenses do not generally cover well for standing figures, having a very curved field. That you have by maker No. 3 will probably be much slower than either of the others. So far as we can judge, the lens by maker No. 2 will be quickest.

Liverpool.—We do not know the address of MM. Foucalt or Duboscq, but it is probable a letter addressed to Paris would find them, as they are both well-known scientific men. In any case a letter addressed to the care of the French Photographic Society, 11, Rue Drouet, Paris, would reach them, we think.

Subscriber.—We should think it very probable that a frame of transparent positives would be admitted at the next Exhibition, if some contrivance were arranged for showing them. But the usual hanging would be useless, and, if we remember rightly, the lighting is chiefly from the top of the room. Dr. Diamond can give you the correct information. We will take an opportunity to ask him.

X. L.—The notion that alcohol will coagulate dry albumen on albumenized paper is altogether a fallacy. It does nothing of the kind, we have an article on the subject in type, which stands over for want of space. It will probably appear in our next. The only modes of preventing the solution of the albumen by the ammonia in an ammonia-nitrate bath, are either to have very little of it, nitric acid being added until the solution is nearly neutral, or to have the bath very strong, so that the silver combines with albumen before the ammonia has acted. It is well also to have the paper thoroughly dry. We have not tried the fumes of ammonia with Fothergill plates, but see no reason why it should not be successful.

Jimby.—It is somewhat difficult to say with certainty the cause of imperfection in your prints. They are certainly not up to the mark. The sample of paper does not seem good, and the negatives are not quite sufficiently intense and brilliant to give brilliant prints. Try the acetate of soda in the toning bath. Make your toning bath neutral, and float a very short time. These suggestions may help you; but whilst the prints are far from satisfactory, the nature of the defect is not sufficiently marked to make it easy to decide the cause.

John Pearson.—With a half plate lens you will unquestionably require more than 14 feet for taking card portraits. It is probable the distance between the lens and the sitter will require to be about 20 feet. You may, of course, take the camera out of the folding doors, and if it be well shielded from diffused light, that will answer. But remember that the lens is a window through which diffused light can enter the camera as well as the rays of light from the sitter, and if the camera be placed in a bright light there is danger of the picture being flat and poor from the action of the diffused light. A cone of card-board lined with black velvet, fitting on to the hood of the lens, projecting a foot or eighteen inches forward, gradually widening its aperture, will be useful in such a case. Your half plate lens will probably give sufficient definition, but will be slower than a lens made for the purpose by either of the makers you name. We prefer the last.

Albumen.—Good collodion transparencies are quite as well fitted for the magic lantern as those on albumen. Some by Mr. England, on tannin plates, exhibited at the Polytechnic Institution, were as good as could be desired. You will find, however, the albumen process used by Messrs. Negretti and Zambra, described on p. 265 of the fifth volume of the Photographic News, being No. 144, June 7, 1861. It is, of course, too long for publication in this column.

C. F. W.—The size of the plate a lens will cover is determined by its focus, not by its diameter. We cannot tell you the prices of Jamin's lenses. They are applicable, for both views and portraits. 2. We like plenty of light in the dark room, provided it be quite non-actinic.

Robert Henry, Jun., Tasmania.—We are glad you find the News so useful, and shall always be glad to hear from you. You will find our forthcoming Almanac a valuable *resumé* of such processes as have been successfully practised by the best men.

Henry Regnier.—The defect to which you refer, where the films of collodion, "*se feudillait comme une dentelle*," is a familiar one to English photographers, who describe it as "craping," or "reticulation" of the film. It generally proceeds from the solvents containing too much water. Certain kinds of pyroxyline favour the tendency. The iodides do not usually affect the matter. The best plan with a sample of collodion with this tendency is to allow it to set well before immersion in the silver bath, as in that case the film becomes less permeated with the water from the bath. The Almanac shall be sent. The papers arrived, and will be placed to your credit.

P. G.—The resinized paper should be floated, not immersed: the word, *in*, to which you refer, in Mr. Cooper's answer to the Secretary of the South London meeting should have been *on*. The paper should be floated from five to ten minutes. The silk should be *immersed* from 15 to 30 minutes, and Mr. Cooper has used a 20-grain bath with results as good as when a 60-grain bath was used. Mr. Price, referring to the benzoinized paper he had received from Mr. Cooper, said, it had *not* changed since he received it. The word, *not*, was omitted by a careless printer.

E. A. R.—The triple achromatic is the best copying lens we know. It is quite free from distortion. We do not know any other lens in existence which is so.

Errata.—In Mr. Price's letter on the "Coagulation of Dried Albumen," which appeared in our last, p. 562, for "ferment," 2nd column, 7th line, read "permeate;" in last line but one, for "found," read "proved." Some other literal errors appear in the same letter, which will not, however, mislead the reader.

Several Correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 222.—*December* 5, 1862.

## FALLACIES CONCERNING COAGULATED ALBUMEN.*

Fallacies generally have a very persistent vitality; but no photographic fallacy, that we remember, has had such undisturbed and tranquil longevity, as that which pertains to the coagulation of the film of dried albumen, used in different photographic processes. The origin of the notion we do not know, but it appears to have gained universal credit amongst trustworthy authorities, as well as mere sciolists. That the idea is utterly groundless, a few very simple experiments will prove, and a very little reflection will suggest that it is very foolish besides.

In regard to albumenized paper, the notion has universally prevailed, that, the coating of albumen on its surface could be coagulated by the same agents which would produce coagulation in white of egg in its normal condition. Heat is one of these agents, and it has been often recommended, that albumenized paper should be submitted to heat in various ways, in order to produce coagulation, and thus secure better keeping properties, less discolouration of the silver bath, &c. It has been recommended that the albumenized paper should be hot-pressed, passed through heated metallic rollers, ironed with the hot iron of the laundress, floated in trays of boiling water, rolled up and placed in water-tight tubes, and then placed in boiling water, and heated by a variety of other methods, all for the purpose of coagulating the albumen. It was known that white of egg in its normal condition was coagulated by submission to a temperature of from about 145° to 150° Fah., and it was *taken for granted* that dried albumen would be coagulated by similar means. Now it is a fact, that dried albumen is not coagulated by heat at all, that it may be submitted to a temperature of 212° Fah., without any alteration of its properties whatever, and that no degree of heat produces coagulation. This is a very simple fact, easily verified, and probably known to many interested in organic chemistry, but it has not been recognized by photographers generally, the contrary notion being constantly cited and acted upon without challenge or contradiction. Mr. George Price, whose letter on the subject we published recently, first called attention to the fallacies in a letter which appeared in our pages some time last year, but a reference to the writings of many authorities show that the notion still prevails.

Amongst the few who recognized the fact that dried albumen was not coagulated by heat, it has still generally been held that coagulation might be effected by the various other agents which produced that effect on white of egg, such as gallic acid, alcohol, ether, &c.

Gallic acid has been recommended for application to a film of dried albumen on dried plates, for the purpose of producing coagulation. Alcohol and ether have been constantly recommended for application to albumenized paper, to produce the same effect. Some short time ago the French photographic journals contained a recommendation to float or soak albumenized paper in alcohol for the purpose of coagulating the surface, the result, it was alleged, being that a much weaker silver bath might be used for exciting the paper with perfectly satisfactory effects. In England, and elsewhere, the same views have prevailed. It has been a very common recommendation to add a certain proportion of alcohol to the silver bath, in order, it was said, to produce rapid coagulation of the albumen, and thus secure the double purpose of keeping the image on the surface of the paper, and preventing the solution from becoming discoloured. In America, where the ammonia-nitrate of silver bath has been recently introduced for the purpose of exciting albumenized paper, it is generally recommended that a portion of sulphuric ether, about one part in sixteen, should be added to the bath to produce coagulation of the albumen the moment it came in contact with the bath, and so prevent it from being attacked and dissolved by the ammonia. Sometimes alcohol is added for the same purpose, some photographers using as much alcohol as from 25 to 30 per cent. In short, the idea that ether, alcohol, &c., would coagulate dry albumen, has been universally held. We recently received a letter from a very able photolithographer in Edinburgh, in which, whilst he has discovered that heat will not coagulate dried albumen, he, in common with others, believes that alcohol will. He says:—

"I have tried heat in every way to coagulate the albumen on paper, and cannot do it. I have boiled water in a tray, and *floated* the albumenized paper face up on it while boiling briskly—have boiled water in a vessel, and *dipped* the paper in—have applied sharp *steam* direct from the large boiler of a 30-horse engine to the back, and then to the face of the paper, all with the like result—that of *washing off* the albumen, not coagulating it. I have heated a steel plate and run the paper through the press on it, but no heat short of scorching the paper, would coagulate the albumen on its surface—of course it is easy enough to coagulate albumen on paper by alcohol, silver, &c., but I think it cannot be done by *heat*, unless you or some of your readers can tell *how*."

Having for some time had reason to believe that the idea that dried albumen could be coagulated by any of the agents referred to, was a fallacy, we recently undertook a series of experiments, for the purpose of testing very definitely the truth of these notions. We found in every instance that the ideas to which we have referred were altogether erroneous. We will now, without further remark, give the details, which were very simple.

No 1. *Heat.*—A plate of glass was coated with pure white of egg, and dried rapidly before a very hot fire, securing a temperature from 150° to 170° Fah.; the plate was subsequently baked in a hot oven. On examination no coagulation was found to have taken place, the film becoming quite soluble after masceration for a short time in water, as is the case with simply dried albumen. Another plate so prepared and dried in a similar manner was plunged into boiling water, with the sole result of dissolving and washing off the albumen. Various samples of albumenized paper were submitted to ironing, baking, and to boiling water with similar results. No coagulation took place in any instance.

No. 2. *Sulphuric Ether.*—Various samples of highly albumenized paper were brushed over with ether of ·725 specific gravity. On examination, no coagulation was found to have taken place. To make the experiment more satisfactory, a strip of the paper was immersed in the ether, and left for a quarter of an hour. It was then withdrawn, and placed in a dish of water at a temperature of about 60° Fah., which dissolved off the albumen in a few minutes. The experiment was again repeated, taking care this time to dry the paper well on withdrawing it from the ether. The results were the same; in no case was there any coagulation.

* The substance of this article we recently contributed to *Le Moniteur de la Photographie*, in the last number of which it appeared.

No. 3. *Alcohol.*—Experiments in this case were similar to the last. Various samples of albumenized paper were brushed, or soaked for a quarter of an hour with absolute alcohol. The albumen remained quite soluble, and easily washed off; there was no coagulation.

No. 4. *Gallic Acid.*—Various samples of highly albumenized paper were placed in a saturated solution of gallic acid, and left for a quarter of an hour. In each instance the albumen was found on withdrawal to have been dissolved, and washed off the paper by the immersion; no trace of coagulation whatever taking place.

On submitting dried albumen to the action of metallic salts, the result was, as we had anticipated, different. Albumenized paper immersed in a twenty-grain solution of bi-chloride of mercury, had its surface coagulated and rendered quite insoluble in water, without affecting its colour or appearance. Albumenized paper immersed in a thirty-grain solution of protosulphate of iron was coagulated, the compound produced, turning rapidly brown in sunlight. A two-grain solution of chloride of gold partially dissolved the albumen, and coagulated it in thick uneven ridges, turning it a permanent yellow colour.

We have used the word coagulation in reference to the change produced upon dry albumen by metallic salts in accordance with popular practice. But is it not incorrectly used to describe that change? To coagulate is to change a fluid body into a solid or congealed state, and the coagulation of normal white of egg by heat, &c., is an isomeric change; dry albumen cannot be congealed. What is meant by the term as generally used, is the state of insolubility, and the change which is effected by a metallic salt, which renders dry albumen insoluble, is really the formation of a new compound, which requires a new name, and which, when silver is used, we have called, for want of a better word, albuminate of silver.

To conclude this part of the subject, we recapitulate that dried albumen cannot be coagulated; that heat, sulphuric ether, alcohol, and gallic acid do not render it insoluble, that it is rendered insoluble by the action of nitrate of silver, bi-chloride of mercury, protosulphate of iron, chloride of gold, and other metallic salts; and that the change produced is not coagulation, but the formation of a new compound or combination with the metal. The perfect dessication of albumen is doubtless an advantage, as when the albumenized paper is thoroughly dry, the compound formed with silver is more completely kept on the surface, the bath is less discoloured, and the image is more brilliant.

In another page appears a further letter from Mr. Price on this subject, with especial reference to some remarks by Mr. Dawson. We prefer to discuss a subject of this kind in its general bearing, without reference to the views of individuals; but Mr. Price attacks a special error, promulgated by one who has recently laid himself open to special correction.

## A VALUABLE PRESERVATIVE PROCESS.

BY VALENTINE BLANCHARD.

The following preservative process, which has never been published, will be found very useful to those who desire a quick and simple method of preparing plates for use out of doors, in cases where long keeping properties are not essential.

I am indebted for the particulars to my friend Mr. Fysh, a gentleman who, through its instrumentality, has produced some charming photographs, and as it frequently has been of great service to me, making quite easy tasks that otherwise would have been attended by much trouble, I have obtained his permission to make it public.

In manipulation, this process will be found to be scarcely more troublesome than the preparation of an ordinary wet plate, as no washing or drying is necessary, and the picture may be developed by iron or pyrogallic at the will of the operator.

With iron development, when everything is in the most favourable condition, the exposure will be very little longer than is requisite for a wet plate.

The following solution will not be found very troublesome to prepare, and will be improved considerably by keeping.

Take of English honey, old and crystallized, 4 ounces, Price's glycerine 2 ounces, and nitrate of silver 30-grain bath, new and iodized, 6 ounces; shake well up together, and when thoroughly mixed, add kaolin about ½ ounce, and again shake well, repeat the operation occasionally for an hour, and then stand the mixture aside in a light place, but not in sunshine, for two days. When wanted for use, filter as much as is necessary into a clean bottle. Prepare a plate in the ordinary way with collodion, and immerse in a 30-grain bath, made faintly acid with *acetic acid*. It is important that the bath used in the solution, as well as that in which the plate is immersed, should contain no trace of nitric acid, as the glycerine is readily decomposed by it, and mortifying failures would be the result.

The plate, which by this time has been sufficiently long in the bath, may be now taken out and coated with the solution, which, if properly prepared, will be very bright and very clear, resembling glycerine in general appearance, but not quite so quick. Keep the preparation on the plate, moving it backwards and forwards until oiliness ceases. Return the solution to the funnel, and pour on a second quantity. Let it remain on a minute, return the surplus to the funnel, and stand the paper on blotting paper to drain. In a quarter of an hour, the plate will be ready for the holder, care being taken in putting it in that it be not reversed.

The plates thus prepared will be found to keep four hours in summer, and a day in winter. It is well, however, to use them as soon as possible, as sometimes in very hot weather reduction of silver commences round the edges of the plate two hours after preparation.

On returning to the dark room, the developer is poured on as on a wet plate, no wetting with water being necessary. The negatives will be found much more beautiful in appearance, than those produced by the ordinary wet process, for they have that peach-like bloom so frequently met with in negatives, produced by pyrogallic acid, but in a much more exalted degree, and faintly indicating, occasionally, two or three of the natural colours. The sky will frequently be seen of a pale azure blue on the surface.

For photographing interiors, this process will be found very useful indeed, in all cases where a plate is required for use at a spot distant from home, without all the washing and drying so imperative in the preparation of dry plates.

## A NEW RAPID DRY PROCESS.

BY ALFRED KEENE.

In my last I mentioned that I hoped soon to have something interesting on dry photography to send you. I have been very closely engaged upon it lately, and now forward particulars of a modification, which is diametrically opposed to the generally entertained opinion that, with the use of tannin or gum as a preservative, the previous removal of all free nitrate of silver is an essential, and which I find more sensitive and more nearly approaching wet collodion, both in in this respect and in its general character, than any previously published.

Before describing the process, a brief account of my previous proceedings may not prove uninteresting. Upon the appearance of Mr. Sutton's paper on gum as a preservative, in connection with a strongly bromo- (iodized) collodion, I tried it under the conditions indicated, and, though struck with the many good qualities it possessed, did not find it so sensitive as described, nor so full of half-tone as could be desired. The sensitiveness I increased fully twenty per cent. by washing off the preservative (gum) solution, instead of allowing it to remain on as directed; (increased sensitiveness, by the same means, I found to hold good with all the various preservatives subsequently tried). I then ascertained that sensitiveness was not further influenced either way by excess of (over a thorough) washing either before or after applying the preservative, a stream of water from a tap, falling upon one point only, producing no perceptible effect. Solutions of bromine, and also iodine, were next separately applied to the plates, and again washed off previous to the preservative, so as perfectly to remove all trace of free nitrate, and convert it into a bromide or iodide; the former reduced sensitiveness more or less, whatever preservative was used, but only very slightly with some, whereas iodine materially reduced, and, in one or two instances, all but entirely destroyed it. Finding no advantage either as regards sensitiveness, or freedom from tendency to stain, under a forced development from the above, I tried, first of all, less washing of the preservative without advantage, and finally of the sensitized film; the increase of sensitiveness, in the latter case, was very marked, and encouraged me to proceed further in the same direction. I then prepared a batch of plates, part of them on the same principle I introduced for the Fothergill process, commonly known as the four drachm washing, viz., the use of one drachm only of distilled water to every five superficial inches of sensitized surface, poured on and off till all greasiness is removed, and even dilution insured, when the preservative is to be applied and subsequently well washed off, and part by applying the preservative direct to the sensitized surface, without previous washing of any kind, and finally well washing it off.

I have just completed developing these, and find sensitiveness to have increased in proportion to decrease of dilution of bath (silver) solution on the surface, the maximum being obtained when the preservative is applied direct to the sensitized plate, the surplus being subsequently removed by a thorough washing, without, as far as I can perceive, the slightest increased tendency to fog or stain, but rather the reverse, the more concentrated solution plates being remarkably free in this respect.

The following is a list of the different preservatives tried:—Milk, milk and tannin, albumen (plain) and tannin, prepared albumen and tannin, gum, honey and tannin, glycerine and tannin, and gum and tannin; also collodion, containing jalap resin, as recommended by Mr. Maxwell Lyte, without any preservative. The most sensitive and best plates have, invariably, been with the tannin and gum, and in the experiments with the free nitrate of silver, I have confined myself to it—tannin and honey, and plain gum.

Collodions have been tried, prepared with different kinds of pyroxyline, and proportions of the bromide and iodide salts, varying from one of the former to four of the latter, to two to one. That containing equivalent proportions with my dry process normal collodion has answered best.

*Baths.*—35 grains of silver per ounce, neutral (nearly so, containing one drop of glacial acetic acid in twenty ounces), and acid, with nitric acid in the proportion of one and five drops to twenty ounces. The neutral bath preferred, decidedly.

Having given these preliminary particulars, I will now proceed to describe the process:—

*Collodion.*—Extra bromo-iodized dry process containing equivalents of the bromo-iodide salts.

*Bath.*—Neutral, containing 35 grains of nitrate of silver per ounce.

*Preservative Solution.*—Equal parts of a filtered 15-grain per ounce solution of tannin and mucilage, or gum water, (made with four ounces of picked gum-arabic, dissolved in sixteen ounces of filtered rain or distilled water), with ten minims of glacial acetic acid added to each ounce.

*Developer.*—The excellent one introduced by Major Russell, as follows:—

No. 1.—Pyrogallic acid (English make) 96 grains alcohol, with a little ether added, one ounce.

No. 2.—Nitrate of silver 10 grains, citric acid 10, 20, or 30 grains, distilled water 1 ounce; add to each drachm of distilled water 6 or 8 drops of No. 1, and 3 or 4 drops of 2, when required for use, or a 2-grain per ounce pyrogallic developer, with 1 grain of citric and 10 minims of glacial acetic acid, may be substituted, adding a few drops of a 15-grain solution of silver to each drachm, when used.

Sensitize the plate in the usual way, except allowing it to remain at least half as long again in the bath as with ordinary collodion (the conversion of the bromide salt into the silver compound being slower than that of the iodide) drain for a second or two, apply the preservative solution rather liberally, commencing at one corner and allowing it to proceed to the second, third, and off at the fourth, carrying with it the surplus bath; drain rather closely, apply a second or even third quantity in the same manner, passing it several times well round the plate; the last lot will do for the first of next plate, but should not be mixed with the stock; drain, pour on a little water, and work it about till mixed with the preservative on the surface, to facilitate even and complete removal with the subsequent washing (lukewarm water answers best with the present low temperature), then well wash with soft water under a tap, in dishes or any convenient manner, and place to drain and dry, face inwards, on blotting or filtering-paper, upon and leaning against glass; change the paper after about ten minutes for a fresh piece. Expose about the same time, or if anything, a trifle longer, than for wet collodion and pyro developer. Soak a few minutes in soft or distilled water, and develop in the ordinary way with the solution before described, changing it, should it become discoloured before sufficient intensity has been obtained, which will be the case when a short exposure is given and development have to be forced. Fix with hypo, or cyanide, the former by preference.

I have not tested the keeping property of plates thus prepared, but from the clean manner in which they develop, and the amount of forcing they will bear without any material deposit on the surface, argues, I think, very favourably for them in this respect; nor have I tried the ammonia and pyro development, lately recommended by Major Russell, and previously by another correspondent in one of the photographic publications, for tannin plates, which probably may have the same accelerating effect on these, and thus still further lessen the necessary exposure; though I should look for the ammonia in conjunction with pyro to have a great tendency in all cases to produce fog, from it possessing the power of decomposing both iodide and bromide of silver even in the dark.

The appearance of the negative, as far as my present experience goes, is very favourable indeed, the impressed image appearing well in the film and full of detail, more approaching an iron-developed one in this particular.

It is somewhat singular that tannin and gum combined should give more sensitiveness than either separately, but such has invariably proved the case, and may probably be attributable to the gum increasing the density of the solution, and thus causing the tannin to penetrate more completely the porous cells of the collodion.

It has hitherto been a maxim, that when gum or tannin are used as preservatives, all free nitrate of silver must be previously removed; but I think I very clearly show, by this modification, such an opinion to be fallacious, and that the free nitrate is not only not injurious, but may be advantageously retained; this at once occurred to me as probable when I saw the result of my first experiment in this direction, for, unlike albumen, they are not coagulated, but remain perfectly liquid, and to appearance unchanged, and all surplus is consequently easily removed by washing.

I find I have omitted stating that I give preference at present to a substratum of india-rubber dissolved in benzole, as recommended by Mr. Sutton, but shall be very glad to find an equally good substitute, as it is difficult to get quite clear, being as tedious to filter as collodion. I have tried plates coated a second time with preservative, and allowing it to remain, after previously washing the first applications off, but do not find any gain, but *loss*, of sensitiveness; though, for keeping, this plan might prove advantageous, by shutting up the sensitive compound from direct contact with the atmosphere.

All my spare and available time has been so completely occupied with this investigation, that I have not had any opportunity of further examining the influence of chlorides in connection with the use of highly bromo-iodized collodions. I purpose, however, following it up the first opportunity, and hope some of your numerous readers, who have time at command, will be induced, by your recent remarks upon my communication on this subject, to take the matter in hand, and ascertain its correctness, or expose its fallacy—it being of great and increasing importance, particularly as regards such modifications as the one now sent.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration and Analysis.

*Magnesia Salts.*—As the basis of all magnesian compounds, we will commence with the metal magnesium itself, inasmuch as the vivid light which it produces when burnt in the air, must some day, when magnesium is produced at a cheaper rate, prove of value in the arts and sciences, and especially so in photography. This is, perhaps, the easiest obtained of any of the alkaline or earthy metals, and as no special apparatus or chemicals are required beyond those met with in most laboratories, we will give the most successful mode of preparing it, in the hope that some enterprising chemist will take up the subject, and supply scientific men with the metal at a reasonable price. The process is one adopted by MM. Deville and Caron; 600 parts of carefully prepared chloride of magnesium are mixed with 100 parts of a fused mixture of chloride of potassium and sodium and 100 parts of pure fluoride of calcium, the whole previously powdered. The mixture is put into a large wide-mouthed stoppered bottle and 100 parts of sodium cut up into small pieces are added: the whole is then well mixed by shaking together. A clay crucible is heated in a fire to dull redness, and the contents of the bottle are thrown, by means of an iron spoon, into the crucible, which is then closed with its cover. In a short time the reaction takes place with a considerable noise. When all noise has ceased, the crucible is removed, and the mixture stirred with an iron rod until all the fused parts are homogeneous, and the upper part of the bath is well exposed, when the globules of magnesium are distinctly seen. The crucible is then allowed to cool away from the fire, and when the saline mass is ready to solidify, it is again stirred with an iron rod, and all the little metallic masses collected together, so that they may form a single one; the whole is then poured on a plate of iron. By breaking up the scoria the globules of magnesium may be removed, and the scoria may be fused once, or even twice, affording a little more magnesium each time; 600 parts of chloride of magnesium with 100 parts of sodium yield 45 parts of magnesium. The crude metal is put into a charcoal tray, enclosed in a tube of charcoal, and heated nearly to whiteness, whilst a slow current of hydrogen is passed through the apparatus. The tube is strongly inclined in the furnace, and all the magnesium condenses in front of the tray, and is easily collected when the tube is cold. It is then fused in a mixture of chloride of magnesium, chloride of sodium, and fluoride of calcium. By gradually increasing the quantity of the latter, which is added by degrees to the fused bath, the scoria is rendered just less fusible than the magnesium, so that the latter may be poured off just as the scoria is about to solidify. Magnesium has a density only a little above that of water, namely, 1·75. It is malleable and ductile. It files easily, and burnishes wonderfully. When pure and polished it resists the air very well; it is very similar in this respect to zinc, which metal it also resembles in its fusibility and volatility; at a temperature a little higher than its fusing point it ignites, producing a brilliant flame, in the midst of which indigo blue tufts are seen, especially when a jet of oxygen is thrown upon the fused metal from an oxyhydrogen blowpipe. Magnesium is readily drawn into wire, and in this form may be set on fire in the flame of a candle, like a piece of paper, when it continues burning till it is all consumed. Bunsen and Roscole in some photo-chemical investigations, tested the illuminating capacity of a magnesium thread, when it was discovered that the splendour of the sun's disc was only 524 times as great as that of the metallic thread. Bunsen also compared the magnesium flame with ordinary lights, and found that a burning thread of 0·297 millimetres diameter, produced as much light as 74 stearine candles, of which five go to the pound. It is plain that it only needs a mechanical device to wind a magnesium wire into the flame of a spirit lamp, at such a rate that the loss, owing to its consumption, would be just supplied, when we should have a very efficient and portable magnesium lamp, more convenient and complete than the arrangements for the electric or bude light. A spool with its thread, clockwork movement to wind it off, with a spirit lamp would be easily transportable, and would become a rival to the strong lights now in use, could the metal be obtained cheaply. With a similar arrangement, moved however by hand, Mr. Crookes, some years ago, took photographs at night, and showed conclusively that the expense alone prevented this powerful light from being invaluable to photographers. It was found to be, not only a magnificent light, as far as its illuminating power was concerned, but was intensely rich in those highly refrangible rays which are of chief use in photography.

Magnesium forms only one oxide, magnesia. This is a well known fine white powder, of frequent use in the arts, on account of its property of perfectly neutralizing acids, without possessing a caustic action, like potash or lime. It is prepared by prolonged ignition of the carbonate of magnesia, and as it is the starting point in the preparation of many compounds of this earth, which are used occasionally in experimental and practical photography, we will give the best plan of testing it for the impurities which are most frequently present. *Carbonate of ma nes'a* can scarcely be called an impurity in a photographic sense, as there is no use to which the earth is put, which would be rendered ineffective by an admixture of carbonate. It may be detected by moistening the earth with water, and then adding hydrochloric acid; an effervescence shows the presence of carbonic acid. Even when the magnesia has been prepared free from carbonate, it gradually absorbs this acid upon exposure to the air. A more serious impurity is *lime;* this may be detected by moistening with water, and then dissolving the earth in dilute hydrochloric acid, employing an excess of acid. The solution, when clear, is rendered alkaline, with ammonia and a little oxalate of ammonia added. If lime be present, the addition of this latter re-agent will produce a white turbidity, or precipitate; whilst, if the magnesia be pure, no change will be apparent upon adding these various tests. Sometimes *oxides of heavy metals* are present. These can be detected by super-saturating the hydrochloric solution with sulphuretted hydrogen, and then adding ammonia. The characteristic precipitate is produced, and, from its colour, the kind of metal present may be inferred. *Silica* is not an uncommon impurity: it will be found insoluble, when the earth is boiled in slight excess of dilute hydrochloric acid. *Sulphate, or chloride of potassium or sodium,* is frequently present, arising from the carbonate of magnesia not having been sufficiently washed. Water boiled with the magnesia extracts these salts from it, and when filtered clear gives the reactions of sulphuric, or hydrochloric acid. After evaporating, also, a saline residue is left. The substance known in pharmacy and commerce as *magnesia alba* is a hydrated carbonate of magnesia, prepared by precipitating sulphate, or chloride of magnesium, by carbonate of soda, and well washing the carbonate which falls down. The most important salt of magnesia is the *sulphate,* known also as Epsom salts. It occurs in many springs, and in the bottom of sea water; it is prepared from various sources on an enormous scale, and, like most products of this class, is liable to contain many impurities. *Sulphate of soda* is detected by shaking up an aqueous solution with carbonate of baryta. Sulphate of baryta and carbonate of magnesia are formed, and if sulphate of soda is present, carbonate of soda is also produced. This latter is highly alkaline to test paper, and may be thus detected, and the presence of sulphate of soda in the original salt inferred. *Chloride of magnesium* gives a tendency to the salt to absorb moisture from the air. It may be detected by adding weak nitrate of silver to a dilute solution of the sulphate. Ordinary sulphate of magnesia of commerce contains seven atoms of water of crystallization; it forms transparent prisms and needles, which effloresce slightly in warm, dry air. When heated the crystals fuse, and at a higher temperature lose water and become anhydrous, forming a white spongy mass. After ignition, sulphate of magnesia dissolves very slowly in water: the crystals, on the contrary, dissolve rapidly, one part requiring only four parts of ice-cold water for solution, and less than its own weight at the ordinary temperature.

## PHOTOGRAPHY UPON GELATINE.

BY M. A. POITEVIN.*

Gelatine, which I have extolled since the year 1850, has always appeared to me the most advantageous material for obtaining photographic negatives upon; and every time I renew my experiments, I recognise new qualities in this substance, the employment of which, it appears to me, has been too much neglected until the present day. Quite recently, I have studied a new mode of preparing the film of iodide of silver; my aim was to solidify the gelatine, which enables me to obtain thin coatings, which do not shrivel up in the bath; moreover, I operate upon the surface, either moist or dry. I thus obtain very intense negatives, the lights of which are not veiled. My new method of operating is as follows; perhaps it may be adopted for this new kind of photography, and suggest new manipulations, applicable to other photographic processes.

In one hundred grammes of distilled or rain water, I dissolve, by a gentle heat, six grammes of gelatine; after filtering the liquid through fine linen, I add about fifty drops of a concentrated solution of bichromate of ammonia or of potassa. With this mixture I cover the well-cleaned surface of a glass plate, leaving on it a thin uniform film. I then place each plate as prepared in a horizontal position, until the gelatine film becomes solidified, which takes about ten minutes I afterwards expose the plates to light for nearly the same space of time; then the bichromate reacts upon the gelatine, and prevents it from creasing in the water during the subsequent operations. After this exposure, but before drying the gelatine film, I apply the glass plates, gelatine side downwards, upon a neutral bath of nitrate of silver, of the strength of about 8 per cent. Chromate of silver is formed immediately in the substance of the gelatine which covers the plate. I then wash it in plenty of water, to remove the excess of the nitrate of silver; then immerse the plate in a bath of iodide of potassium, of the strength of 6 per cent., previously saturated with iodide of silver. I never withdraw the plate from this bath until after the complete disappearance of the red hue of the chromate of silver. I next wash the iodized plate in plenty of water, and allow it to dry spontaneously, without protecting it from light. It is scarcely necessary to observe, that all these preparations can be made in full daylight, the iodide of silver produced in presence of an excess of iodide of potassium not being reduced by light. I can thus prepare a great number of plates before hand, and when I wish to make use of them, I sensitize the film of iodide of silver. This is done by immersing the plate in water for several minutes, till the gelatine is completely impregnated by it; then I pour upon its surface, several times, a solution of nitrate of silver, of the strength of two to three per cent. I then immerse the plate in distilled water, to remove the excess of nitrate, and I can immediately place it in the camera obscura; but I can defer this operation for an hour at least, because the gelatine film retains its humidity long enough; the exposure need not be much longer than with collodion.

If I wish to operate by the dry method, I wash the sensitized surface several times, leave it to dry in the dark, and develop it just as before described, that is to say, after the exposure; I immerse the plate in distilled water, in order to restore to the gelatine all the water it can absorb to replace the moisture it has lost. I next immerse the plate in a bath of gallic acid, to which some drops of solution of nitrate of silver have been added. but without acetic acid, which is unnecessary. I can also develop with sulphate of iron acidulated with tartaric acid, then intensify with gallic or pyrogallic acid. The sulphate of iron reduces the silver in a white state. If I consider the negative strong enough for this developer, I make it black by means of a weak solution of chloride of gold. I fix these negatives by means of cyanide of potassium, or hyposulphite of soda, but the employment of a weak cyanide is preferable, because it acts more promptly. and it is easier removed from the gelatine than hyposulphite is. The negative obtained and dried, can be employed for positives on paper without being varnished, but generally I varnish them like those on collodion as a measure of safety.

## INSTANTANEOUS PHOTOGRAPHY.

BY JOHN KIBBLE.*

After exhibiting some instantaneous specimens, and stating they were produced by Grubb's No. 3 aplanatic, and by his E stereoscopic arrangement, Mr. Kibble proceeded :—

To prepare the nitrate bath :—A saturated solution of metallic film in nitric acid, to be boiled, in contact with a surplus of the metal, for an hour or two, when part of the nitric acid forming the nitrate is decomposed, a portion of its oxygen combining with the silver, the salt becoming the hyponitrite of silver, a much more unstable body than the former. A sensitising bath composed of one part of this to three of the fused nitrate of silver is very active; and, if properly prepared, should show an immediate alkaline reaction with litmus paper. From the time it is once used it rapidly deteriorates for instantaneous action, but still may be considered quick for ordinary exposures.

The bath prepared with the following proportions is what I use: forty grains of the mixed salt to one ounce of water, saturated with freshly precipitated and thoroughly washed iodide of silver, which, after settling and then being decanted, is ready for use. The less you filter through paper the better. The above over an iodide silver surface is highly sensitive to the actinic rays, but, at the same time, I must confess, a little troublesome. The extreme of cleanliness is absolutely essential; also manipulating with the least quantity of light possible, otherwise fogging will be the result.

Another very important point in developing is not to allow the fingers to remain long in contact with any one portion of the plate, but to be continually shifting, as a very few degrees of additional heat communicated will cause a more rapid development at the points of contact. One quarter of an inch all round the plate is quite as much as any good protographer ought to allow, or less. The developer :—Ten grains photosulphate of iron, five drops of acetic acid, and five drops of alcohol to one fluid ounce of water: less of the two latter if the size of the plate will admit of being expeditiously and evenly developed without.

In very rapid exposures, as a rule, the image makes its appearance so slowly, that the silver necessary for the building of the image, is generally reduced from the nitrate by the chemical action of the protosulphate of iron, long before

* Read at a Meeting of the Marseilles Photographic Society.

* Read at the Glasgow Photographic Association, Oct. 2nd, 1862.

the very delicate tints so necessary to the beauty of the photograph have become apparent; hence a second, and, in many instances, five or six, additions of the developer are resorted to.

To prevent deposit, the exhausted developer is washed off the plate previously to adding more; but a much better arrangement is to have several vessels charged with the exact quantity of aceto-nitrate of silver in each, so that, should all the details not make their appearance, the protosulphate of iron can at once be added to one of the vessels, and the plate well flooded over in a manner so as to wash off all of the exhausted developer before it, and so on in rotation with the whole series if necessary.

Practice has already informed us that half a grain of chloride of sodium to the ounce of water will destroy the image of an ordinary exposed surface; so that we may argue from that, that a mere fraction of that strength will destroy the weakly-acted-on portions of an instantaneous exposure. No doubt distilled water could be resorted to after every addition of the protosulphate of iron, but that is not always at hand, and complicates the process.

In showing specimens of instantaneity, the question has been often put to me—"How do you ascertain what the twentieth part of a second is?" That, I think, can be simply and satisfactorily answered, viz., by using a spring attached to the disc for cutting off the image, then photographing a moving body the velocity of which is ascertained. For example, let me adduce the Loch Long steamer. Her length is 150 feet, her speed in the deep sea nearly fifteen miles per hour—that is, equal to twenty-two feet for every second of time; in other words, she moves through a space fully equal to one-seventh of her entire length in one second. It necessarily follows, that if her hull be photographed at full speed at a right angle to the axis of the lens, and the result divided into seven equal parts, if the time of exposure has been one second, one-seventh of the entire length will be blurred, for the fifth of a second one-fifth of that division, and so on; so that by using a finely-divided scale, and, if necessary, a magnifying power, you can arrive at a pretty exact estimate of the time of exposure with that particular spring. Its action may be pronounced constant. Of course, if any addition be added to the power of the spring it must be ascertained, as in the first instance, against a moving body the velocity and length of which is known.

I am also often asked—"What arrangement is considered best for rapid exposure?" That is not quite so easily answered; indeed it depends entirely on the subject to be photographed. For an extensive plain, on the foreground of which no very tall objects rise, the opening in front of the lens so as to expose the nearest objects first, the sky last and shortest, I have found in my own experience to give the best result; but should any tall object, such as a tree or spire, rising above the horizon intervene, you can easily perceive the higher portions will run the risk of being underexposed. My own arrangements are so constructed, by turning on an axis, that I can cut off the image horizontally or vertically. But one thing I would strongly urge, viz., that the shutter, disc, or whatever it may be, should be as small as possible—that is, as near to the size of the stop to be used as is consistent with safety. On a stormy day, with one shutter (as in the stereo. arrangement) to cover both lenses, the atmospheric resistance is much too great for extremely rapid action, and causes great risk on shaking the camera: the less friction of every kind in such mechanism the better. There should also be a check to keep it from opening the smallest portion beyond what is absolutely necessary.

I may mention that the collodion I used in obtaining the whole of the results submitted for your inspection this evening was kindly furnished to me by one of our members, Mr. John Stuart, photographer, Buchanan Street, who is at all times willing to aid a brother in distress. The paper of the positives before you I obtained from Mr. John Spencer, St. Enoch's Square, and is decidedly the best in every respect I have yet used; indeed, after the paper troubles I have come through lately, it is quite a treat to work with it—easily toned, and yields very little to the hypo in fixing. Any points I may have omitted, or not clearly expressed, I shall be most happy to answer.

N.B.—Time of exposure of glass positives of landscapes, $^{1}$th part of a second; of portraits, $\frac{1}{9}$th part of a second.

[We have before called the attention of our readers to Mr. Kibble's instantaneous pictures, which are amongst the finest and largest we have seen produced.—Ed.]

## BATH FOR TONING ALBUMENIZED PRINTS.

BY COL. PIKE.*

Take of

| | |
|---|---|
| Nitrate of silver | 2 ounces. |
| Distilled water | 16 ,, |

Dissolve the silver in the water by stirring with a glass rod; when all is dissolved, take two liquid ounces from the sixteen, and make it into ammonio-nitrate of silver, in the same manner as though you were to use it to silver your paper with. Take this two ounces of ammonio-nitrate and mix it with the fourteen remaining ounces. The solution becomes turbid, and is cleared by dropping drop by drop of nitric acid, stirring with a glass rod until it is clear. Test with litmus paper, as the solution should be perfectly neutral. Great care must be taken not to get too much acid in the solution; this is the floating bath. Albumenized paper may be floated on this bath about three minutes. Remove and hang up to dry in a perfectly dark room, as it is very sensitive to light. Paper thus prepared will print in much less time than that floated on plain silver solution twice the strength of this bath. The proofs must be printed a little deeper than usual, and thoroughly washed in running water for two hours. They should then be removed and placed in a bath made of one grain of common salt to each ounce of water; let them remain in this bath for one minute, then remove; and, lastly, wash them in clean water, and they are ready for the toning bath, which is made in the following manner:—

Take of

No. 1.

| | |
|---|---|
| Acetate of soda | 75 grains. |
| Phosphate of soda | 75 ,, |
| Distilled water | 32 ounces. |

No. 2.

| | |
|---|---|
| Pure chloride of gold | 15 grains. |
| Distilled water | 3 ounces. |

Neutralize with bi-carbonate of soda.

No. 3.

| | |
|---|---|
| Nitrate of uranium | 15 grains. |
| Distilled water | 3 ounces. |

Neutralize with bi-carbonate of soda.

When all is ready, mix by adding the gold solution first, and then the nitrate of uranium to the acetate and phosphate of soda solution. Shake so as to incorporate them well together, filter, and the bath is ready for use.

The prints, when placed in this bath, should be kept in motion all the time during the process, and carefully watched, as it is very active. After they are sufficiently toned they are fixed in a saturated solution of hyposulphite of soda and water; the hyposulphite should never be used a second time for this purpose, for it is certain to make the high lights of the prints yellow, and cause them to fade rapidly.

When this bath is carefully made according to directions, it will produce beautiful purple sepia tones, with all the middle tints preserved, as well as the pure whites which all amateurs and professional photographers desire.

* From *Humphrey's Journal.*

## A SHORT LESSON IN PHOTOGRAPHY.—No. 5.*

As in sun-printing, so also in the printing by development, we have two different sorts of results, exhibiting, respectively, *positives* and *negatives*. These different results are merely differences of intensity, coupled with the fact that one of them, the so-called positive or ambrotype, is viewed by reflected light, whilst the other, the so-called negative, is viewed by transmitted light. Both positives and negatives may be produced by the intervention of the same materials, although a preference is given in either case, for special purposes, to special materials. These will be enumerated by-and-by. Furthermore, both collodion positives and negatives are laterally inverted; hence the ambrotype and melianotype are inverted pictures, both exhibiting the sword, the pen, the whip, and the hammer in the left hand, which is unnatural or abnormal presentation. The positive print which is taken from the collodion negative is not inverted; that is, every part is presented in its natural position.

The absolute difference between a collodion positive and negative is a difference of amount in the intensity of the chemical reductions in the plate or in the collodion film. A less degree of intensity, or, in fact, a less amount of reduction of the salts of silver, produces the ambrotype or melainotype (the positive); a greater degree, within certain limits, produces the negative. The reduction just alluded to, and its intensity, are effectuated by a two-fold action: first, the physico-chemical action of light operates some change in the silver salts on and in the collodion film, which is quite invisible to the naked eye, even when aided by the most effectual microscope; secondly, the invisible change thus instituted in the film is promoted, exalted, and completed by the application of a chemical reducing agent. The salts of silver contained in the collodion, when placed in the plate-holder, are the iodide, the bromide, and the nitrate; other salts are also present, being the result of double decomposition, such as the nitrate of ammonia, of cadmium, potassium, etc., depending upon the iodides that were used in the collodion. By physical and chemical action the iodide and bromide of silver are reduced to *pure silver*, of greater or less intensity of deposition; and the intensity of this deposition depends upon the *light* and the *reducer*. Where the light, reflected from the object, whose picture we are photographing, is brilliant or intense, the chemical reduction will always be in proportion great; and the silver deposit will be thick, and, in proportion, impervious to light. The various gradations of reflected light upon the collodion film yield films of reduced silver of various degrees of thickness or intensity; some are quite opaque, others less so, whilst others again are so thin as to be almost transparent; and finally, those parts of the collodion surface which received no rays of light are quite transparent. Now, white objects reflect much light, whilst dark and black objects reflect very little or no light: the first of these reflections produce, induce, or command a reduction of silver, which is afterwards completed by the developer or reducing agent; the second give rise to very little reduction, or even sometimes to none at all. But reduced silver is white; the picture, therefore, has the white appearance of the light-coloured or white object photographed. The transparent parts of the collodion film, however, will reflect the colour of the background beneath it; so that, if the background be black, the reflection of light will be reduced to a minimum, and the transparent parts will appear also black. By this means we obtain the natural contrast of light and shade in the different thicknesses of the silver film.

In the preparation of positive collodion pictures, that is, of ambrotypes and melainotypes, it must be the aim of the photographer to obtain the silver deposit as pure, and, consequently, as white as possible; whilst the transparent and partially transparent parts must be as clean as possible. Whereas, in the production of negatives, the aim is to obtain the relative degrees of opacity in the reduced silver irrespective of whiteness of surface; in fact, the white reduction of the positive has, in the case of the negative, sometimes a yellow, sometimes a brown, reddish brown, black, or blue-black appearance, both by reflected as well as by transmitted light, that is, either by looking *upon* it or *through* it.

I will now show an experiment. These glasses are cleaned and prepared as recommended in the last lesson; I will now flow them with the iodized collodion and introduce them into the sensitizing bath. In two minutes or more, recording circumstances which I will afterwards explain, I take them out (this operation must always be performed in the dark-room). One of these glasses thus sensitized I expose for a single moment to the ordinary diffused light of day, whilst the other remains in the dark-room. You may now regard these two plates by means of a lighted candle or a fluid lamp, no difference is perceptible in the films, either by reflected or transmitted light; in fact, you cannot say which has been exposed to the light, and which has not. I will now make use of what is called a reducing agent, and pour a quantity of a solution of such an agent upon either plate. You observe that one of the plates undergoes no change, whilst the film of the other darkens and becomes opaque. The darkening effect must, therefore, be attributed to the action of light. How it has been produced I cannot explain. There are various surmises on the subject. Some philosophers suppose that light produces a different arrangement of the ultimate atoms of the silver salts from that where the light has not acted: others regard the phenomenon as attributable to the decomposition of the natural electricity residing in the film, produced by light, and either with or without any molecular change; others, again, suppose that light just starts an action which is continued and completed by the reducing agent. All such attempts at explanation are at present quite futile, because we are obliged to confess our utter ignorance of all about the ultimate cause of this most wonderful phenomenon. It is true we may adopt any of these hypotheses to assist in explanation of the result, without any respect to the prime cause. The phenomenon may be compared to a boy's hoop lying on a declivity. This hoop represents the sensitized collodion surface in the dark room before it has been exposed to the light. Now comes the boy with his stick; he raises the hoop, strikes it, guides it, and follows it to the bottom of the inclined plane. The raising of the hoop from the ground is comparable to the action of light on the film when exposed; this light raises places, arranges the molecules of the silver salts in such a way as to make them ready for action, to run, as soon as an agent is brought to give them a jerk and to guide them. The agent in question is the developer or reducer; but the reducer would act, or would cause the molecules to act, as the hoop would act if allowed to run its career alone down the precipice. The stick in the boy's hand checks the hoop, prevents it going too much either to the right or to the left, or of falling precipitously to the bottom of the declivity. The reducing salt contains an agent in itself homologous to the boy's stick, in the form of an acid, that moderates the all too energetic, precipitous action of the developer. To sum up: Light *commences* the action of reduction, the developer *continues* and *completes* it, the acid *moderates* it.

I will now complete this lesson, by giving you the formulæ for the preparation of the *sensitizing bath* for the wet collodion process, and of the *developer* or *reducer*.

SENSITIZING BATH.

2 ounces of crystallized nitrate of silver;
24 ounces of distilled or rain water.

Dissolve 10 grains of the nitrate of silver in one drachm of water; add one drop of ammonia to the solution: if a precipitate is produced, the nitrate of silver is good for the purpose; if no precipitate is produced, carry the silver back to the dealer of whom you purchased the article, for it contains free acid, or other materials which you do not want. We will suppose the nitrate is in a good condition. Now add to the 10-grain solution iodide of potassium, drop by

* From *Humphrey's Journal.*

drop, as long as a yellow precipitate is formed. Pour off the liquid and wash the sediment several times; this sediment is iodide of silver. Next dissolve the two ounces of silver in 12 ounces of the water, and add the iodide of silver, afterwards the remaining 12 ounces of water, and filter. Now add a few drops of nitric acid, if required, to prevent fogging. It is now ready for use.

DEVELOPER.

80 grains of the sulphate of protoxide of iron;
4 ounces of rain water;
2 drachms of acetic acid.
1 drachm of alcohol.

The sulphate of iron must contain no free acid; it is best for the purpose when crystallized in alcohol. The salt is first dissolved in the water, the other ingredients are then added and intimately shaken together.

## THE ACARI IN THE NITRATE OF SILVER BATH USED FOR PHOTOGRAPHIC PURPOSES.

BY COL. NICHOLAS PIKE.*

In the month of August last, I had occasion to make a series of examinations of the structure of the collodion films, with the microscope, and for this purpose a nitrate of silver bath was prepared in the usual manner, employing one ounce nitrate of silver and eight ounces distilled water. Twelve hours after it was made, one drachm of alcohol was added, the whole filtered and put into a clean glass bottle, and placed on a shelf in my operating room ready for use. Two days afterwards I took from this bottle one ounce by measure, which I placed in a small glass test tube, and tightly corked it, so that no dust or floating matter should enter it. This remained on my operating table for ten days before I had occasion to use it, as my samples of collodion were not ready until that time. I then prepared a small glass microscopic slide, which I coated with a single drop of collodion, and placed it in the nitrate of silver solution in the test tube. In two or three minutes the slide was removed and placed on the stage of a microscope, and to my surprise little animals were observed darting across the field in every direction. I at once concluded that they were species of acari, introduced into the room with some specimens of natural history, which had recently been placed on the table near this bath, and they being so minute had accidentally got into the liquid. Upon further examination, however, I found the surface of the bath covered with them. I immediately secured as many specimens on glass slides as I wanted, and then carefully filtered the solution, washing the test tube perfectly clean, placing the filtered solution in the test tube, and corking it tightly as before, using a new cork for the purpose, so as to be sure that nothing from the outside should enter the liquid. After this was completed, I examined the solution with a powerful eye-glass, and was satisfied that it was free from all foreign substance, being bright and clear as spring water. I then placed it on a shelf where it remained two weeks without being disturbed. At the expiration of that time, I carefully took it from the shelf, and removed the cork, and to my astonishment the surface was nearly covered with them. They appeared to huddle together in the centre and on the surface of the liquid, and on my attempting to remove specimens to a glass slide with a minute pointed instrument, they scattered in every direction, moving to the edge of the glass tube, and some of them going under the surface of the liquid. Their movements over the surface were very similar to the Natantes, or water spiders; very quick, darting from one place to another when disturbed. They are also very pugnacious. I observed that when confined together in a microscopic glass well, they were always fighting, often times killing each other.

A general description of these little animals, perhaps, would be interesting. The body is very minute, oval, depressed, tapering towards the head, with antennæ one-third as long as the body. Legs eight in number, the two front ones the longest, and all covered with long slender spines or hairs. Eyes two, rather prominent, situated on the side of the head. The sides and back of the body are also covered with numerous spines or hairs, two very long ones being prominent on the anterior part of the body. Legs appear to consist of several joints terminating in minute objects, antennæ also jointed; general colour reddish brown.

The genus to which this species belong, are diffused throughout all parts of the world, and in all probability there are many species remaining yet undescribed. Their minuteness is extraordinary, many being scarcely visible without close inspection, and easily escaping the notice of the common observer. It is a remarkable phenomenon that any living animals can sustain life in a solution of nitrate of silver, and still more remarkable that these minute animals should generate and live in it. It is a question for the naturalist to solve, and I hope some one who is interested in the subject will investigate it more fully than I have done. Specimens are still living in the original bath, which I should be most happy to show any gentleman who wishes to see them.

*Brooklyn, N. Y., November 10th,* 1862.

[Our readers will remember a similar discovery by Dr. Maddox, recorded in our pages a few months ago.—ED.]

* Read before the American Photographical Society, November 10, 1862.

## Proceedings of Societies.

### LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this society was held on the evening of Tuesday, December 2, at King's College, Mr. PETER LE NEVE FOSTER in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were proposed and elected members of the society: Messrs. F. W. Hart, Henry Cooper, jun., Ernest Edwards, Warden, Boscher, W. Bishop, C. Newcombe, G. Hare, Callaghan, Lucas, and Baron Jasmond.

In calling attention to some fine pictures by Mr. Hughes, of Osborne and Whippingham Church, 7 by 6, and $7\frac{3}{4}$ by $4\frac{1}{2}$, by the No. 1 triple lens, the Chairman mentioned the importance of a communication being in all cases made to the Secretary of the particulars to be made known regarding such contributions, as otherwise the meeting was often left in ignorance.

The CHAIRMAN said, in accordance with Bye-Law VII., which he read, the Secretary would now mention the names of the retiring members of the Council, and also the gentlemen nominated by the Council to supply their places. Any member of the society who had other names to propose, must do so at the next meeting in January; and all the names proposed would be hung up for a month before the election at the annual meeting in February.

The retiring members were: Messrs. Major, Maskelyne, Fenton, De la Rue, and Kater. The gentlemen nominated as their successors were: Lieut.-Col. Stuart Wortley, and Messrs. Henry Pollock, Cole, Hennah, and Lord Henry Lennox. Mr. Forster retired from the Vice-Presidency to the Council, and Mr. Glaisher was proposed as Vice-President. The Lord Chief Baron was proposed for re-election as President.

Mr. MALONE, on being called for a paper on the

COMPOSITION OF THE PHOTOGRAPHIC IMAGE,

said that he was not prepared with any paper, as he had not contemplated filling the principal position, but rather supplementing any other subject, by a detail of some experiments he had during the last few months been engaged upon in connection with the subject. He thought the subject should be treated now experimentally; time enough had been spent in conjectural statements, which led to nothing. He would now, therefore, briefly describe his experiments and conclusions. He had, during the summer, had occasion to prepare some paper with ammonia-nitrate of silver, the washings of which, containing ammonia-nitrate with the soluble organic matter, which might be removed with water, he had placed in a large bottle. This bottle was allowed to stand in sun-light and frequently shaken, the first action of light was to produce a dark substance, similar to the positive image, diffused through the water in a light flocculent state, which gradually became black, like chloride of silver, in contact with organic matter. By long exposure it passed into an ash grey, and was no longer light and flocculent, but fell heavily through the liquid, to the bottom of the bottle; it had evidently changed its physical character as well as its aspect. Collected by filtration, it appears a dark mass, like charcoal, with nothing of a metallic appearance, as metals were ordinarily understood.

But by burnishing, a metallic lustre was obtained. This seemed to confirm Mr. Spiller's idea, whose analysis showed that chloride of silver was reduced into the metallic state by light. Still, they must go further to disprove the sub-chloride theory. Many persons took objection to experiments performed in water, they insisted that with paper, a different result followed, that a sub-oxide was formed, combined with the organic matter of the paper, and that this went to form the image. Those who hold that view must hold that he had produced this sub-oxide of silver. But chemists were not agreed as to the existence of the sub-oxide. Its existence had been first suggested, he believed, in 1822, by Farraday, but Berzelius had remarked that the subject required re-investigation. The difficulty presented itself, that if they said it was a sub-oxide, they really did not know that such a thing had an existence; if they said it was an oxide, they did not know its properties. Oxide of silver was dissolved by acids, but they could treat the photographic image with acids, without destroying the image. After some further remarks on the analogy to and difference from oxide of silver, he proceeded to substantiate the view which decided that the sole action of light upon photographic materials, whether in the production of negatives or prints, was simply the reduction of the silver to its metallic state, and that a difference in its physical condition, gave rise to different results. Pure silver beaten very thin, and examined by transmitted light, was of a dove colour, analogous to that of the silver reduced by the method of Liebig. He proceeded to refer to various samples of silver flashed glass, which by reflected light, presents a blue metallic appearance, and by transmission were yellow. Some persons had held that the colour was oxide of silver, but Farraday had shaken that idea by showing that the colour in ruby glass, was simply finely divided gold. The so-called natural colours which had been occasionally produced in negatives, was, he thought, analogous. After a careful examination of all the facts, he thought there was presumptive proof that the image consisted of finely divided metallic particles. Regarding the reproduction of natural colours, he was not sure that even M. Becquerel's results would stand a searching examination, and that, perhaps, Mr. Hunt was right when he said he feared it would be that it was not the true action of light, giving colour for colour, but was due to the iridescence arising from differences of thickness in the film. He proceeded to enforce the fact that the same substances, in different physical conditions, presented various colours without indicating any change of constitution, adducing allatropic phosphorus as a striking example. But having arrived at the conclusion that the image was reduced metal, they must not assume its imperishability. It was true it would resist acids; he had submitted a photograph to a mixture of one part of nitric acid to three of water without injury. Oxide of silver would not stand that, nor would sub-oxide. But although the print would stand this, and would, to some extent, stand caustic potash, they must not be misled by that. The image would not resist certain compounds of sulphur, especially certain compounds of sulphur and ammonia, which dissolved silver without difficulty, the same as did cyanide of potassium. This was especially the case in the presence of the air. Farraday had shown that the gold dissolved ten or twelve times less rapidly when immersed in the solution than when also exposed to the air. Hyposulphite of soda would doubtless much more readily dissolve the image in the presence of the air. Faraday had suggested that this was probably due to electric action, the air completing the voltaic circle. He then adverted to the importance of removing not only all fixing salts from the print, but also those of common water. Regarding the albumen it contained sulphur, so long as there was no decomposition the sulphur and silver might remain in contact without danger; but if any decomposition of the organic matter took place, amongst the products would be ammonia, and sulphuretted hydrogen, these forming sulphide of ammonium, and this, in contact with the finely-divided metallic silver, would cause it to disappear entirely. So long as a print was kept dry it might remain safe, but rapidly faded when subjected to the conditions of decay. Referring to the recent investigations of Mr. Graham, in dialysis, he remarked that white of egg was a colloid body, and that colloid bodies retained salts very tenaciously, and thence argued the importance of keeping the prints horizontally suspended in the washing water, and not allow them to lay in a heap at the bottom, where the salts dissolved out were accumulating. Dr. Diamond had shown him a print which had faded underneath the mat placed over it, whilst the part exposed to light had retained its vigour. This, he thought, agreed with his view that light and warmth would help to preserve the picture. He had some further experiments, but would reserve them for a future occasion.

Mr. Mayall was quite prepared to bear out Mr. Malone's views as to the constitution of the image. He believed it consisted of metallic silver, and that gradation and colour were produced by its state of subdivision. It appeared to him that in order to come to a satisfactory conclusion as to the nature of the image it was important to inquire into the manner of its production. There were two things went to the production of the photographic image; first the light, and next the haloid salt of silver, whether a compound of chlorine, iodine, or bromine with the metal. The purer the haloid salts of silver the purer the resulting image. But then there was another element, the light itself, or the blue part of the spectrum, with which it was well known the image was produced, and this ray was, magnetically speaking, in an electro-negative condition. This came into contact with the electro-negative portion of the haloid salt, and when two electro-negatives met one was pushed out of its feeble combination, a fretwork was left precisely equivalent to the quantity of light acting on the film on which the image was produced. In illustration of this, if an excited collodion plate were placed near a stationary magnet, and then developed, a distinct line would be produced. This showed that other forces besides light would produce an image. He then referred to the views of Mr. Johnson, of Birmingham, on this subject, who was a very old experimentalist and had given the subject much attention. Mr. Johnson believed the film to be in an electro-magnetic state of tension the moment light impinged upon it; and that if the plate were taken into the dark and submitted to the action of steam no image could be developed, as the steam had the power of restoring the equilibrium of tension, and that the moment the magnetic tension was destroyed you destroyed the image itself. The production of the latent image was thus an electrical action, and only became a chemical one when the developing solution was applied. He had tried to get Mr. Johnson to write his views, but failed, but he (Mr. Mayall) would promise to bring the subject more fully and clearly before the meeting on an early occasion.

Mr. Sebastian Davis thought, whilst agreeing with Mr. Malone that the final action of light upon a salt of silver, in connection with organic matter, was to reduce it to a metallic state, there was evidence to show that there was an intermediate state, before light had acted so long as the experiment of Mr. Malone. In the lengthened exposure of excited paper it was possible to obtain all the appearances of metallic silver, but there was an intermediate state in which no such reduction was observed. With a negative also the ruby effect was got by prolonged exposure, as in the case of an over-exposed sky; but when exposure was less prolonged they obtained an intermediate tint of violet.

Mr. John Williams mentioned that gold was soluble, not only in acids and in cyanides of potassium, as shown, but in ioduretted iodide of ammonium. In this it dissolved as freely as sugar in water, and crystallized in a beautiful manner.

Mr. Mayall expressed a wish for Mr. Malone to throw some more light upon the nature of the haloid salts.

Mr. Malone said chlorine was generally described as a greenish gas, indeed its name was derived from a Greek word meaning green. Now in the sealed tube he produced, containing chlorine in a liquid state, it would be seen that it was of a beautiful yellow colour by transmitted light. Silver might also be yellow. Both might be in the same physical condition, and that might have some relation to the mode in which they were acted on by the undulations of light, both being antagonistic to the higher end of the spectrum. Then with regard to the colour of bromine, it was variously described as a reddish brown, red, and black. Now on careful examination by reflected light, he had come to the conclusion that it was indigo blue, and red by transmitted light, in which it had an analogy to iodine, which was a kind of blue by reflected light, and a yellowish brown by transmitted light when in solution. It might be that, having a surface antagonistic to the blue rays, compounds containing them were decomposed. It had been said that pure iodide of silver was insensitive to light, but nothing was more difficult than to say what was pure iodide of silver, as it was capable of forming double salts with other bodies. With iodide of potassium it was capable of forming a second compound, but whether chemical or mechanical he would not say. The same difficulty occurred with nitrate of silver;

so that it was uncertain with excess of either. If it were formed by the direct union of silver and iodine, it might contain excess of free iodine. His own impression was, that in that way chemically pure iodide of silver was obtained. If so, what was the action of light on that body. Claudet had shown that it was to split it up into iodine and metallic silver, and that in the camera, without the long direct action of light to which Mr. Davis had referred. The same fact occurred with Becquerel's plates with chloride of silver, in which a bright metallic spot representing jewelry was reproduced by bright metallic silver. Regarding the magnetic theory held by Mr. Johnson, to which Mr. Mayall had referred, he thought it was purely a conjectural matter, and not based upon evidence. Mr. Grove had made some experiments with the galvanometer, but nothing conclusive had been effected. Besides, an eminent German held the opinion, that magnets emit light; and the action of the magnet, according to that theory, would still be that of light. Men might hold many fancies, but they proved nothing. M. Niepce held the fancy that he could bottle light. He (Mr. Malone) thought it more probable that it was bottled heat. Regarding the action of light upon chloride of silver, &c., the question arose what was a pure haloid salt? Dr. Percy had formed chloride of silver by means of chlorine gas and silver foil, and it no longer blackened in the light. There might be two explanations for this; it might be that it was in a different physical condition, like the horn silver, and light had not the same power over it; or it might be the presence of more chlorine. After some further observations, M. Malone concluded by placing ignited phosphorous in a jar of oxygen, and exhibiting some negatives with the sky yellow by transmitted light, a metallic blue by reflected light, analogous to certain samples of silver flashed glass.

Mr. MAYALL stated that he had taken a bottle of silver prepared by Dr. Percy's method, and covered it all up but a certain slit. After exposure to light, without apparent change, he applied gallic acid, when the exposed part blackened.

Mr. DAVIS asked if this sample was exposed in the presence of chlorine.

Mr. MAYALL: Yes.

The CHAIRMAN announced that Mr. Highley would read a paper on "Photography applied to Educational Purposes," at the January meeting. At the February meeting, Col. Stuart Wortley would read a paper on "Obtaining Instantaneous Pictures on Large Plates;" and at the March meeting they might hope for Mr. Mayall's promised paper.

### MARSEILLES PHOTOGRAPHIC SOCIETY.

AT a meeting of the 8th ult., the President, M. Gabriel, expressed the thanks of the society to the *Union des Arts*, for having graciously accorded to it a temporary hospitality, by which the existence of the society will be secured, and the elements of its prosperity increased.

M. Poitevin, the indefatigable experimentalist, communicated to the Society a remarkable notice of his new process with gelatine, which he employs as a vehicle for iodide of silver.*

A note was received from Dr. Mitchel, of Ile de la Reunion, testifying to the excellent results obtained by the addition of tannin to plates prepared by the Taupenot process, according to to the modification suggested by M. Vidal. He considered this mode of preparation invaluable in hot climates. M. Tissot's instantaneous diaphragm stop possesses so much merit that the committee decided to congratulate the inventor upon his solution of a very interesting problem. His invention is calculated to render great service to photography. The instantaneous stops in use, hitherto, although very ingenious, left much to be desired. Very little is required in order to render M. Tissot's apparatus perfect.

M. Megnier presented a specimen of a salt, which he calls *sulphocyanhydrate of ammonium*, which he has recently applied to photography, for fixing positives and negatives on paper and glass. This salt possesses the valuable property of dissolving all the haloid salts of silver (chlorides, bromides, iodides, &c.) without possessing poisonous qualities. It possesses another advantage in not weakening the half tones, or of altering the texture of the collodion. Lastly, it is preferable to hyposulphite of soda, because it does not, like that salt, precipitate sulphide of silver from the nitrate, nor sulphur by the action of any acid whatever, so that if the proofs to be fixed contain traces of nitrate of silver, or any acid remains in the substance of the paper, there is no risk of sulphurization. The fixed proofs are washed in the usual manner, as when the other fixing agents are employed, but there is no speciality in this particular.

The PRESIDENT, after thanking M. Megnier for his communication, observed, that if experience confirmed the results claimed for this new salt, he will have conferred a great boon upon photography, for he will have contributed to the preservation of works, the sole defect of which consists in the uncertainty of their duration.

A committee was appointed to examine the *sulphocyanhydrate of ammonium*.

M. VIDAL, the Secretary, then proceeded to the examination of the publications of the month. He specially directed attention to the excellent ideas emitted by M. Claudet on the subject of enlarging proofs, and on the theory of the action of light upon iodide of silver, announced by Mr. Thomas Sutton. A very interesting discussion ensued between the Secretary and M. Jaquemont, upon a phenomenon observed by the latter in the tannin collodion process.

* See p. 581.

## Correspondence.

### THE NON-COAGULATION OF DRIED ALBUMEN, AND MR. DAWSON.

DEAR SIR,—As being, I believe, the first person who drew attention to the erroneous opinion prevalent amongst photographers, respecting the coagulation of dried albumen, allow me to make a few remarks on a sentence in a paper entitled, "On Some of the Chief Causes of Fading of Photographs, by George Dawson, M.A., Lecturer on Photography, at King's College London," read at the North London Photographic Society, October 22nd, and published in the *British Journal*, Nov. 1st.

At p. 403, I find the following:—"According to my experiments, completed so far, albumen, coagulated by heat, before treatment with nitrate of silver (but not exposed to light), contains, after fixing and washing, more silver than when merely dried, and moist albumen less than either." Now, I am old-fashioned enough to think, that he who takes upon himself the office of "teacher" and "lecturer," should so write, that the reader should never be in doubt as to what he means; but the passage I have quoted is so obscurely worded, as to be wholly unintelligible to those who, like myself, do not know beforehand. what meaning Mr. Dawson intends to convey. What do the words, "not exposed to light," refer to? to the albumen, *whilst being coagulated?* or, to it, during and after sensitizing? Again, what is meant by "*albumen* coagulated by heat?" albumen in its normal state of white of egg, or, in its dried state, as existing on a sheet of albumenized paper; also, what is meant by "moist albumen?"

As experiments in a test tube upon coagulated albumen can afford no information respecting the "causes of fading of photographs," I cannot but suppose that Mr. Dawson's "experiments completed so far," refer to albumen as it is found on a sheet of albumenized paper, *viz.*, in its *dried* state. If this supposition be correct, we have him assuming a fallacy to be a fact, and promulgating it as such; this is, in fact, tantamount to his assertion, in broad terms, that there is no fallacy in his assumption; and thus, he is *mis*-teaching the rising generation of photographers.

Before proceeding further, I will quote a few words from Mr. Dawson's "Lesson for the Learned," as published in the *British Journal* for September 15th, p. 351:—"A photographic teacher would find too much to do, were he to fight with, and overcome all the dragons and chimeras, in the shape of false doctrines and misconceptions, which are continually besetting his path in this photographic world of ours. However, I need no apology for doing battle with, and, I trust, conquering one of these monsters, which put in an appearance lately in the pages of your contemporary." After quoting what he considers to be a "false doctrine," he proceeds thus :—"The matter quoted, I consider a good sample of those not uncommon *fallacies* in photographic chemistry, which, arising from imperfect knowledge, having been once announced, are passed from mouth to mouth, till they begin to be regarded as established facts."

Now, sir, I ask—Who that reads these words would expect to find that the writer of them, before many weeks had passed, would himself be promulgating one of the very strangest "fallacies in photographic chemistry?" Yet, such we see is the case; the possibility of coagulating dried albumen is such an extraordinary and unaccountable fallacy, that I am at a loss to conceive how it could ever have originated; since common sense, without any chemical knowledge, will teach us the contrary. I unhesitatingly say, that if Mr. Dawson's chemistry teaches him that he can coagulate dried albumen by heat, his chemistry, in this particular case, is at variance with fact, as it cannot, in that state, be *coagulated* by any means whatever. I believe Mr. Dawson draws a false inference respecting his so-called "coagulated," "merely dried," and "moist albumen," retaining different quantities of silver. Suppose we divide a sheet of albumenized paper into three equal portions; from No. 1 we will expel all the moisture, either by drying it before a fire, or, what is better still, by ironing it with a hot iron; No. 2 we will leave as it is; and No. 3 we will submit to the influence of a damp atmosphere; thus giving us what Mr. Dawson calls "albumen coagulated by heat," albumen "merely dried," and "moist albumen." According to his assertion, the *albumen* on each piece of paper will contain different quantities of silver, No. 1 containing the most, and No. 3 the least. Notwithstanding it is Mr. Dawson who states this, I venture to dispute its truth. The drier the albumen can be rendered at the time of sensitizing, the sooner does the nitrate bath render it insoluble, and the sooner it be rendered so, the less of it will be dissolved off the paper. As No. 1 *is completely desiccated*, very little albumen will be dissolved; No. 2, from not being so, will have *more* of it dissolved; and No. 3, from being in a damp state, will have *a considerable portion of it* dissolved off; thus, each piece of paper, after sensitizing, will contain *different quantities of albumen*, and must, therefore, necessarily retain different quantities of silver: Mr. Dawson infers that the difference in amount of the retained silver, is due *to the different state of the albumen*; whereas, I believe it is due *to the different quantity of it*, and that *equal* quantities of albumen, will, in each case, retain *equal* amounts of silver; by the by, his inference involves a rather startling theory, viz., that the atomic weight of albumen varies according to its more or less desiccation.

As Mr. Dawson's promulgation of the possibility of coagulating dried albumen by heat, can only have arisen from "imperfect knowledge," in consequence of not having investigated the subject—I trust that when he has done so, and is thus better informed, he will have the candour to acknowledge he has been in error in giving credence to such a fallacy; for I am sure he needs not to be told, that where "dragons and chimeras in the shape of false doctrines and misconceptions" are concerned, *the suppression of truth by "a photographic teacher," is equivalent to the dissemination of error.*

Those who are desirous of reading what has been already written on the subject, are referred to my letters signed G. P., and the answers they elicited from Mr. Sebastian Davis, which will be found in your 5th vol., pages 33, 47, 59, and 129.—I remain, dear sir, yours truly, George Price.

## MORPHINE DRY PROCESS.

Dear Sir,—Having read with interest Mr. Hislop's paper on his plan of preparation of dry plates, and as the present moment seems an opportune one for a few more remarks on the preparation of simply washed and dried plates (which is supposed impracticable by most photographers), I have sent you a few stereo prints from negatives taken in November of this year, on plates simply excited, washed, and dried, to endeavour to help to dispel the idea that a preservative is necessary. You will, doubtless, remember the disfavour my morphine process encountered in the commencement of this year, one said, "That I proposed to do what every sane photographer strived to avoid!" "The bath *must*, inevitably, be spoilt!" So I resolved to let time settle the question. I made my bath with the morphine in it last January, and have used it occasionally ever since; the plates (prints from which I have sent) were excited in it, and it is as good as ever for wet or dry plates. Hardwich lays down this theory (which is by this process proved to be strictly correct), that if a plate is to retain its sensitiveness and developing qualities after simple excitation, washing, and drying, "it must be in contact with organic matter during its sojourn in the bath," and this I accomplish by adding a fractional part of nitrate of morphine; nitrate of quinine, or strychnine, or any alkaloid, will, doubtless, have the same effect.

You can form your own opinion as to their sensitiveness, from the particulars at the backs of the prints, and, when I add, that my collodion was purchased by me nine months ago, and the plates exposed in cold, dull, and damp weather, I think you will say that it was a pretty severe test.

The advantages of this formula are, to me, so palpably evident, that I cannot adopt any other; it is more economical, easier of manipulation, requires no extra solutions, is always ready, can be used with any bromo-iodized collodion, is very sensitive, develops beautifully and quickly with iron, and keeps well: my opinion may seem extravagant to some, but, I think, in all essential requisites, it surpasses all other plans. I have not tried hot-water development, but they are eligible for it, and if their sensitiveness is increased in the same ratio as with tannin plates, they must be extra sensitive; in conclusion (with an apology for this "dry" letter), if your readers would like to have my plan of manipulation and development, I shall be happy to furnish it in your columns.—I am, dear sir, yours faithfully,

*Farnham, Surrey, Dec. 2, 1862.* Wm. Bartholomew.

[This letter was accompanied by several very pleasing stereographs, fully bearing out our correspondent's position. —Ed.]

## PRINTING DIFFICULTIES.

Sir,—From the tenor of Mr. Eliot's last, *more comprehensively composed letter*, I perceive his views on alkaline toning in every point, save one, go to support the theory I have advanced and explained in my letters on "Printing Difficulties." The point in which we differ, although admitting of many arguments *pro* and *con*, its importance is of too limited a character to occupy your valuable space by a lengthened discussion. I have recently entered on a series of experiments which promise results much to be desired, *viz.*, entire immunity from mealiness. When I have brought the matter into something like a manageable form, I shall not fail in placing the details at your disposal. Fearing that I have troubled you too frequently of late, the remarks I intended offering on practical toning must stand over for the present.—Yours respectfully, A Photo's Assistant.

P.S.—Having long, and I may add daily, practised the "strabonic manœuvre," described in your last number, I can bear testimony that the eyesight is not at all injured by the exercise. A very little practice will enable any one to produce the stereoscopic super-imposition instantaneously, without the slightest straining effort.

## CHEAP VIGNETTING GLASSES.

Dear Sir,—If the following is worth a place in the News, you may make a note of it.

Paint an oval or other figure, having the edges softened a little, in black or bright yellow on a white card. A negative taken from it, having the image very much out of focus, will make a capital vignetting glass, which might be made still better, by moving the lens backwards and forwards while taking the negative. Of course, it is evident that any *size* vignetting negative may be taken from the same card.—I am, dear sir, yours truly, J. W. Fall.

*Ironbrige, Salop.*

## Talk in the Studio.

The Collodion Processes, Wet and Dry.—Mr. Sutton's new work on the Collodion Processes, Wet and Dry, is just out, price three shillings. It is, as it could not fail to be, from Mr. Sutton's pen, a valuable and interesting book, and exceedingly well written. We shall endeavour to review it at length in our next.

Mr. Fenton's Photographic Effects.—At the recent sale by auction, of the photographic effects of Mr. Fenton, a singular discrepancy of appreciation was manifested in the valuation of the means and the end. The lenses, in most cases, realized their full value, and, in some instances, we believe, were sold for considerably beyond their original price. The negatives, on the other hand, in many instances, realized very small prices indeed. In some cases, three 10 × 8 negatives and a print of each sold for eight or ten shillings. The reason for this was, probably, the fact that many of the negatives were in bad condition with blistered and cracked varnish. The cameras and other appliances, had the neglected dirty appearance of having long been out of use, and did not produce high prices. The photographic carriage, of which much had been said, was a very convenient, but somewhat clumsy and omnibus-like vehicle. We did not hear the price it realized.

Photographic Proverbial Philosophy.—A celebrated photographer, who is not ambitious of literary fame, and modestly declines to allow us to publish his name, has been beguiling the time during November fogs, by preparing a volume of Photographic Proverbial Philosophy, which promises to out-Tupper Tupper. We submit one or two examples for the benefit of our readers, who will, doubtless, at once bespeak a large edition :—

"Hear, oh! disciples of the sun, the voice of your prophet, albeit he is not a Tupper; to be that man, entereth not into his desires.

"Let thy light so shine that it produceth relief, a flat picture is tame and unprofitable.

"Dash not thy buttons if thou failest, but try again.

"Lend not thyself to the infringement of copyright, piracy is but a black-art profession.

"It is the early birds that pick up the worms, but the skilful photographer is up to the time of day.

"Half-tint is a thing of beauty, be not too heavy with thy developer.

"Be not hasty over thy work, but keep thy head cool, and thy operating-room at 60°.

"Wouldst thou command a mastery over thy art, study deeply; a photograph is not always a picture.

"A negative image will come at the bidding of a fool, but wisdom is necessary to produce a positive impression on the imagination.

"Then study, oh! my son, to obtain wisdom.

"A negative should appear through the glass darkly, but not 'as black as your hat, sir!'

"Avoid the expression of thy wrath when thy tent blows over; evil passions will not pick up the fragments."

Mr. Hill's Pictures.—The photographs exhibited by Mr. Hill at the last North London, were by Dallmeyer's triple lens, No. 1, not No. 3, as stated in our Report. The No. 1 triple has an equivalent focus of between seven and eight inches.

## To Correspondents.

H. B. Y.—Transparencies for the magic lantern should not be dense, but somewhat thin and full of detail. The tannin process yields excellent pictures for the purpose; your difficulty of not being able to get them sufficiently intense is not a usual one with tannin plates, as it is generally easy to obtain a great deal of intensity. Another sample of collodion, somewhat older, may help you, or you may increase the strength of your tannin solution, and that will give you greater intensity

Johannes.—We have not tried the recipe, but gave it just as Mr. Dawson stated it. If you followed the instructions exactly, we see no reason why you should fail to clear the solution without adding much nitric acid. Try again.

A. G. Grant.—We believe Condy's fluid may be had of many chemists. Mr. Condy's establishment is at Battersea, but we do not remember the exact address.

An M.P.—Our forthcoming Photographic News Almanac and Year Book of Photography will contain an epitomized formulæ and manipulations of the principle of dry processes at the present time practised. There is a work by Major Russell, on the tannin process only, of which a new edition is promised shortly. Mr Sutton's book is just out, and contains some good information on the subject.

J. W.—Report on your glass in our next.

T. H. M. A.—Spots in the negative may proceed from many causes, such as a turbid bath, dust in the camera or operating room, super-saturation of the bath with iodide, or the condition of the collodion. An article on the latter subject is in type, and will appear in our next.

A Subscriber (Derby).—Negatives intensified with bichloride of mercury, and iodide of potassium, if properly managed, bear varnishing well enough. It is possible that you get an image which is too feeble to begin with; or, it is not improbable, that you continue the action of the mercury too long, so that when the iodide is applied the negative turns a canary colour, in which case it would, probably, be much reduced by varnishing. The final colour should be greenish drab, or greenish gray, or an olive tint; the mercury should be applied for a very short time only, and then a 1-grain solution of iodide potassium poured on and off until sufficient intensity is gained. The negatives we describe will bear varnishing.

Subscriber (Torquay).—We find, on enquiry, that there will be facilities for exhibiting transparencies at the forthcoming Exhibition, if they are properly fitted up for the purpose.

Matthew Anderson.—In Mr. Osborne's original manipulations, he used albumenized paper as a basis, coating it with gelatine and bichromate of potash. He has since found it desirable to apply the albumen at the same time as the gelatine and bichromate. An account of his original process appeared in our fourth volume.

I. H J.—The oxyhydrogen light is the best for exhibiting photographic transparencies with the magic lantern. If you have facilities, and it is probable you will have, for procuring a supply of carburetted hydrogen by attaching a flexible tube to an ordinary gas-pipe, it will answer nearly as well as pure hydrogen, and will involve much less trouble. The oxy-calcium light (using the flame of a spirit-lamp and lime in connexion with oxygen) gives a good light, but not so good as the other. You will find instructions for making the gases and managing the apparatus in some articles on the lime light in the early part of our fifth volume. Or you will be able to obtain the necessary apparatus and a pamphlet of instructions from most dealers in philosophical instruments. We may mention Bland and Co , Horne and Thornthwaite, and Negretti and Zambra, who each we believe, not only supply apparatus and material, but have some pamphlet or printed instructions.

De Jay.—Spectroscopic examination was meant, as the context showed.

Charles Scarfe.—If you can wait for about a week you will find in our Year Book of Photography for 1863, now in the press. more detailed information on glass-rooms and lighting than we can give here. In a glass-room 36 feet long you ought to have much more glass than you propose. If it be placed in the proper place to light the sitter from a proper angle, it would do for bright weather, but you would find a lack of light in dull weather. If your room stand east and west, let the sitter face the east. Do not use ground-glass, it obstructs more than half the light. If it be necessary to stop out direct sunlight the corrugated light will diffuse it, and obstruct much less than ground-glass.

M. Wynter.—We cannot tell you of any establishment where you will be quite certain of obtaining non-actinic yellow glass; but wherever you get it, ascertain that is silver flashed glass, which obstructs actinic rays better than any other.

Wm. Roberts.—The defect is a well known one, and may proceed from many causes. If you use 1 grain of citric acid to each grain of pyro in your intensifier it will probably disappear. You will find the causes fully considered, and remedies stated in the first article of the Photographic News, August 1st of this year.

An Old Subscriber.—You are right; the No. 1 triple was meant.

Justitia.—The white or grey precipitate obtained at the first solution of the gold is chloride of silver. Having thrown down your gold with protosulphate of iron, and redissolved it, you should have no further precipitate, unless decomposition from evaporating it at too high a temperature, which, by driving off chlorine, brings the terchloride to a protochloride, which is insoluble in water. This has probably been your error, the use of a temperature slightly too high. When you obtain crystals soluble in water it is not probable that anything is present which will interfere with toning. 24 grains of pure gold will yield about 37 of the terchloride. 2. We cannot, of course, say whether the yellow colour of your crystals of nitrate of silver may not be due to some accidental contamination which would not materially affect its action in the bath The foggy stains may proceed from that, but we cannot say they do. Add a little carbonate of soda to the bath, sun it, and then try it. A yellow tinge does sometimes indicate an impurity almost irradicable, namely, the presence of a trace of palladium. This would cause fog, &c., and infused nitrate of silver is made manifest by its yellow tint.

Carte de Visite.—A little observation will help you better than instructions given without examining the place. Build up the south wall sufficiently high to prevent direct sun-light troubling you, and place the back-ground next it. Have about six feet of canopy overhead. We don't know any material better than wood, or a wooden frame-work with slates or asphalte felt covered over it. A platform to raise the whole a few feet would be an advantage.

Tyro.—Your chloride of barium and ammonium, are very sparingly soluble in spirits of wine, and will, therefore, serve but little purpose by their presence. Iodides, also, are not reduced by direct sun-printing, and are of little use except in the presence of a developer The thin *Rive* sample is the best picture. We think the results will repay you for proceeding.

Zeno.—The silk prints must be carried much further in the printing frame than paper prints, or they will be too pale. They do not lose tone in the hypo like paper.

Wm. Bartholomew.—Your first letter and slides were received. The insertion was simply delayed for want of space. Your second now supersedes it. We are always glad to hear from you.

Exeter.—The custom of the profession vests the ownership of a negative in the photographer who takes it. Any deviation from this arrangement is the subject of special arrangement and extra payment.

Several Correspondents in our next

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32, Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 223.—*December* 12, 1862.

## CRYSTALLINE DEPOSIT ON THE NEGATIVE.

Most operators are familiar with a certain trouble, which usually occurs towards the close of a heavy day's work, when a large number of negatives have been taken in one bath. The plate, on removal from the bath, appears to be covered with a gritty, sandy deposit. Sometimes it is not observed until the developer is applied. In some cases the negative does not suffer much when finished, but in others, after fixation, it appears covered with pin-holes. This sandy-looking deposit, on examination, is found to consist of fine needle-like crystals. At times the negative is working perfectly well in other respects, but at other times the appearance of these crystals is accompanied by a tendency to the production of a thin fogged image.

The most usual explanation of this defect has been the supersaturation of the nitrate bath with iodide of silver. When this is the case, the gradual weakening of the bath, or a fall in the temperature, would cause the iodo-nitrate of silver to crystallize out of the solution, on to the plate, on to the dipper, and on to the sides of the bath. These crystals give a rough, sandy appearance to the film, and generally end by causing pin-holes where they have been. The remedy, in this case has always been found very simple.* It was simply to dilute the bath with distilled water, to precipitate the excess of iodide, filter out the precipitate, and add sufficient fresh silver to make the bath the proper strength.

But this explanation and this remedy do not always meet the case. We have occasionally met with the defect where excess of iodide would not account for its presence. And we have recently had several cases brought under our attention where the circumstances were altogether different from those present in supersaturation with iodide or iodo-nitrate. In these cases this sandy or crystalline deposit would appear, in a comparatively new bath, not at all exhausted. Instead of appearing when the temperature had fallen, they appeared in the middle of a summer afternoon, when the bath had been working well during the morning; and would, probably, next morning, after the bath had rested for a few hours. These cases were puzzling; but a history of two or three cases helped us to what we believe to be a solution of the difficulty.

If we are right in our information, the latter form of this defect generally occurs with collodion which has been made some time, and which has been made with pyroxyline produced at a high temperature. Not having had any of the silver bath in the condition to yield the results in question, we cannot speak with absolute certainty, but from the details mentioned in different accounts which reached us, we have come to the conclusion that these crystals consist of *oxalate of silver*, to the characteristics of which they answer. Old collodion, or moderately new if made from pyroxyline obtained at a high temperature, have frequently, on analysis, been found to contain oxalates, and have yielded oxalic acid in considerable quantities on being treated with the proper re-agents.

It may be within the recollection of some of our readers, that three or four years ago, Mr. J. Williams stated at a meeting of the Photographic Society, that from twenty Winchester quarts of old collodion residues, he obtained oxalic acid sufficient to form upwards of twenty ounces of oxalate of lime. M. De La Haye, had also stated previously, in a foreign journal, that various samples of collodion, when treated with potassa, yielded oxalate of potassa; and we believe it has since been confirmed, that one of the products of decomposition in collodion, especially where the pyroxyline was obtained at a high temperature, is oxalic acid.

The immersion of one or two plates coated with collodion, containing oxalic acid in infinitesimal proportions, might not produce any perceptible effect, but the result of continued exciting of such plates for a few hours, would be a gradual accumulation of the oxalate of silver, which would produce a tendency to fog, and to the deposit on the plate of needle-like crystals, giving the sandy effect described. If the solution were examined at this time, it would, probably, present a turbid appearance. On standing a few hours, the infinitesimal particles of oxalate of silver, which is insoluble, would gradually precipitate; and thus the bath be found, after a night's rest, to work well again.

As a hasty method of testing this view in the absence of the defective materials for examination, we essayed to produce the result intentionally. A single drop of a solution of oxalic acid was added to a bath in good condition. A general turbidity was the result, and a plate immersed at once showed a sandy deposit, like that described. On fixing a picture obtained on such a plate, the image showed a strong tendency to dissolve on the application of cyanide, the film having a somewhat green appearance where it was attacked by the cyanide, an effect we remember to have noticed before, when using old and decomposed collodion. On examining the bath shortly afterwards, a white precipitate of oxalate of silver was found thrown down, and then the solution worked well again.

If this view be correct, this defect is due to a certain condition of the collodion, and not the nitrate bath, as has been generally supposed. It will be found to occur when using some samples, and not with others, unless they be used at once in the same bath. The source of the defect thus traced it will be easily avoided.

* See p. 597.

## AMMONIA DEVELOPMENT.

The use of ammonia for developig dry plates is one of the few new things in photography, and may prove to be as valuable and important as it is novel. Until the conditions of its successful application are better understood, we fear that some disappointment may attend its use, as it appears capricious and uncertain. In the meantime, we may note the gradual steps by which even a decidedly new application is discovered. American photographers discover—we believe Mr. H. S. Anthony was the first to do so—that submitting tannin plates to the fumes of ammonia before exposure, considerably increased the sensitiveness. It was next found that the ammonia fumes need not be applied before exposure at all; if done just before development it answered the same purpose. At this point, for some time, the matter rested.

The first announcement of the use of ammonia as a developing agent is due to Mr. T. M. Leahy, of Dublin, who, in a letter dated October 23rd, published in the Photographic News of November 7th, describes his experiment. Having found the fuming successful in permittin; short exposure, it occurred to him that a solution of ammonia might answer the same end. On trying a very dilute solution prior to the application of pyrogallic acid, he found the image at once began to appear, and gradually became developed without any application of pyro whatever, and after washing well, it gradually acquired intensity on the application of pyro and silver in the usual manner.

Major Russell next communicated the results of some experiments in a contemporary, published on the 15th of November. He has used ammonia in combination with pyro with very satisfactory results, one drop of strong ammonia, added to three or four ounces of pyrogallic acid developer, without either silver or acid, yielding a good image with a short exposure, which readily intensifies with pyro and citro-nitrate. In a letter received from Major Russell a few weeks ago, there are some interesting particulars. He says:—

"I have been working in this way ever since some time in September; but cannot even yet say how much is gained in shortening the exposure, as there has been some discrepancy in different comparative trials, and I have not yet been able to discover the reason. There appears, however, always to be some gain; and a rather under-exposed picture is much less liable to loose deposit than when acid and silver are employed from the first. A different mode of treating the development by ammonia will produce the most brilliant negatives I have ever seen, apparently entirely free from *all* deposit on the transparent parts, and from all loose superficial deposit on the blacks, though a great amount of intensity is easily produced. Unless the exposure has been somewhat prolonged, the half-tones are lost; but for this very reason I have hoped that this method may be of use in copying prints. I do not yet publish it, as I have only tried a few plates in this way, and once failed entirely. The development by ammonia and pyrogallic, whatever may be its practical value, is interesting, as throwing light on the nature of the developing action. From the great similarity of the appearance of the image in both cases, I suspect that the nitrate of silver has no other concern in the early stage than that of decomposing the pyrogallic; and it must be accompanied by acid, which has a retarding effect; hence the gain by using ammonia. From the results of recent trials, I am not quite so sanguine as I was some time ago as to the amount of this gain."

So far as we glean from Major Russell's letter, he has not met with any of the failures of which we have heard from other correspondents. On this point he observes:—

"The great points to be observed are, not to use too much ammonia—one drop of the strongest in from one to four ounces of water; and to wash thoroughly afterwards before redeveloping with acid silver. The ammonia developer may be left on the plate for any length of time, even twenty-four hours, when it will be nearly black, without any deposit or other injurious action; but nothing appears to be gained, except a trifle more intensity, after a short time."

In some cases, however, very singular results have followed. Two or three accounts have reached us of utter failure; one or two of fog and irregular action. Mr. Hurst, of Mirfield, who is one of the most successful tannin manipulators we know, has recently favoured us with an inspection of some of his results. A stereoscopic negative, now before us, which received an instantaneous exposure in November, is on one half a good negative, clean and perfect, except perhaps a slight tendency to fog in the deep shadows; the other half is covered with granulated opaque spots, has the effect of being much under-exposed and fogged. Some other plates, treated the same way in all respects, having been prepared at the same time, exposed at the same time, and developed at the same time, turned out irregular transparent positives, apparently on a similar principle to that propounded by Dr. Sabatier. The quality of the successful negative is just what Major Russell describes, the image perfectly in the film; and in this respect very unlike the usual results of forced development, which gives generally a piled-up superficial image.

As to the mode in which the ammonia acts, we do not at present offer any suggestion. We are scarcely satisfied with Major Russell's idea, that development is due to the decomposition of the pyro whether by the presence of silver or ammonia. In Mr. Seahy's case no pyro was present; in other cases warm water alone has developed an image; in others, an image has been apparent after exposure before any treatment at all. In each of these cases, it is probable the tannin acts as a developer without any decomposition. We have, moreover, developed almost all kinds of dry plates with pyro alone without either ammonia or silver. We believe that wherever there are two salts of silver present, pyro alone is generally sufficient to develop an image. Mr. Hurst states a conviction that the ammonia simply helps to render the film readily permeable to the developing agent proper. More experiments will be required, however, before any satisfactory theory can be deduced.

Mr. Hurst's instantaneous views on tannin plates, to which we have alluded in former numbers, are also due to development, but in an entirely different direction. From the negatives we have seen the process appear attended with much fewer difficulties than the use of ammonia. We hope to have Mr. Hurst's permission to announce details shortly.

## SOLAR CAMERA PICTURES.

We have recently been favoured by Mr. Stuart, of Glasgow, with an opportunity of examining some enlarged prints produced by the solar camera, which have at once surprized and delighted us. We had not believed that it was possible to produce in this country, and by the means employed, amplified prints at all approaching these in delicacy, brilliancy, exquisite definition and modelling, and general perfectness. In examining the results of photography in the International Exhibition, we were compelled, however unwillingly, to award the palm for enlarged pictures to Continental artists. Half-a-dozen Continental photographers—Ghemar of Brussels, Disderi of Paris, Albert of Munich, Wothly of Aix-la-chapelle, and some others; all seemed to take precedence of those in our own department. M. Claudet, Smyth and Blanchard, and Owen Angel, all exhibited good enlarged pictures; but, grudgingly and unwillingly, we felt compelled to admit that their productions did not quite equal those of their foreign compeers; and we felt satisfied that it was the fault of our climate: the conditions of light, &c., were unfavourable in this country.

But the enlarged pictures by Mr. Stuart, we consider to be the best we have seen. Equal in all respects to the best of the Continental pictures, they are superior in some points; and had these been exhibited, we should unhesitatingly have claimed the palm for the British department. And yet it is probable that Glasgow is the smokiest town in the United Kingdom. Development printing has been regarded in this country as almost imperative in solar camera operations; but these are by direct sun-printing, and four pictures all equally good were obtained in the day's work which produced those before us. It has been affirmed—we believe we have ourselves endorsed the statement—that perfect definition with direct sun-printing would be impossible without a heliostat; but in this case the mirror was moved entirely by hand.

To what, then, it will naturally be asked, is the great superiority due? We must confess that we cannot fix upon any especial point as the source of this excellence. On another page we give Mr. Stuart's lucid account of his mode of operating. From this and some letters we have had from him on the subject, there does not appear to be anything very unusual in the process or mode of operating. An intelligent use of the solar camera, good formulæ, and careful manipulation appear to have been the sole appliances. The solar camera is placed vertically, instead of horizontally as is customary, and it is fixed in a small room erected for the purpose in a garden in such a position as to secure direct sun-light for as many consecutive hours as possible; and especial pains is taken to secure the camera from shaking. The enlarging lens here was a quarter plate Voightlander. Albumenized paper, excited on a 100-grain silver bath is used, the exposure being from two to three hours; the prints are toned in bath of acetate of soda and gold, and fixed and washed as usual.

The mirror is moved from time to time as soon as any indication of displacement of the image is perceived. To aid in observing, a number of drawing pins are placed at the outset, on the yellow ring forming part of the chromatic fringe of the disc of light, so that any change in the position of the disc is easily seen. By means of a heliostat the mirror might be made to follow the sun with rigid accuracy; but by careful watching, Mr. Stuart has obtained perfect results without this expensive instrument.

We believe that in the pictures before us very much is due to the quality of the negative, which appears to have been perfect for the purpose. Perfect lightning, perfect materials, and perfect manipulation, are imperatively necessary to perfect results, inasmuch as everything is practically examined under a microscope, and defects imperceptible in a small picture are here magnified into monstrous blemishes. Mr. Stuart makes his own collodion, and takes care that for this purpose it yields a perfect, textureless film. It is bromoiodized, and developed with iron; and for this purpose is not intensified in any way. A perfectly sharp small image with a lens of long focus is obtained so as to secure depth of definition; the lens used for the negatives of which we are speaking was a half plate Ross's portrait lens. The image to be enlarged was about 3¼ inches by 2¼ inches, full of detail, and perfectly sharp all over. The lighting appears to have been a combination of side and top light, front light being carefully avoided.

The two prints before us are both busts of gentlemen, one life size, the aperture of the mount being about 21 inches by 16 inches. The other is about two-thirds of life-size, the aperture of mount about 17 inches by 14 inches. Every part of each image is well defined, and wonderfully round well modelled; the texture of the skin is rendered without rigosity, every hair in the beard sharp without wiriness. The figure is well relieved from the background, which is clean, pure, and atmospheric. The tone of the prints is a rich deep neutral tint, or purple black, giving great brilliancy and boldness. The pictures are perfectly untouched, and quite spotless.

We have spoken in terms of unqualified admiration of these pictures, and it affords us much pleasure therefore to add that we have obtained Mr. Stuart's permission to send them to the forthcoming exhibition of the Photographic Society, where many of our readers will have an opportunity of seeing them. We feel certain that our praise will not be considered as undeserved or exaggerated.

Mr. Stuart has been engaged in the construction of an improved solar camera, by which he hopes to be enabled to produce double the number of good prints it is possible to do now in one day. Our readers are promised a description of it as soon as it has been satisfactorily tested.

## PATENT ALBUMENIZED PAPER.

Mr. Sutton has just patented a method of preparing albumenized paper which promises to give very successful results. If the patent had been for a method of dispensing with the use of albumen we should have liked it better; but, as for many purposes, such as stereoscopic and card pictures, requiring the finest possible surface, albumenized paper will continue to be used at present, it is important to be able to secure the hard, fine surface in the greatest perfection, and Mr. Sutton's process gives every hope of the highest success in this direction.

Complaints have been loud and frequent of late years as to the bad quality of much of the photographic paper in the market. Mr. Sutton's process will go far to render the results largely independent of the quality of the paper, inasmuch as he purposes to insulate it, or render it impervious to aqueous solutions, and thus prevent it from having much influence on the character of the print. The paper is to be saturated, previous to albumenizing, with a solution of india-rubber: so that, practically, the image will be formed from chloride of silver and albuminate of silver without the organic matter of the paper playing much part in the matter. We will now allow Mr. Sutton to speak for himself, and quote some extracts from an article in the *Notes*, on this subject:

Everyone who has printed upon albumenized paper, prepared in various ways, and obtained from different manufacturers, will have observed not only a great difference in the amount of glaze obtained with the same albumen upon different kinds of paper, but also a great difference in the vigour and brilliancy of the prints; for according as the albumen sinks more into the paper, so the prints lose in brilliancy and those other good qualities which albumen confers. If, for instance, you use albumen containing no water, you obtain an amount of glaze upon the paper, and vigour in the prints, which is greatest with the Papier Rive, and least with unsized paper. It appears, therefore, that according to the nature of the sizing employed, so the albumen either lies upon the surface of the paper and yields a high glaze and brilliant prints, or sinks into the paper and gives very little glaze and flat inferior prints.

Everyone is agreed as to the truth of these statements, and it is evident that if we wish to manufacture albumenized paper with the highest possible glaze, and to obtain upon it the most vigorous and brilliant prints, we must size the paper with some substance which will prevent the albumen from sinking into it. Our patent consists in employing for this purpose a solution of india-rubber in mineral naphtha; or any other similar waterproofing solution. The mineral naphtha is re-rectified in order to purify it, which renders it absolutely colourless; and the papers are dipped into this solution and hung up to dry. They dry in about five minutes and do not then show any visible trace of the operation to which they have been submitted, their purity of colour and smoothness of surface remaining the same as before, but they have a slight smell, resembling waterproof Mackintosh garments. This smell, however, goes off entirely in the subsequent operations of printing, and the finished print has no smell whatever. As soon as the papers are dry they can be albumenized in the usual way, and rolled; and are then ready for the printer. We have arranged with Messrs. Ordish and Lampray, of 21, Paternoster Row, to manufacture the patent albumenized papers for us, with pure undiluted albumen, and to roll them and send them out with the highest possible finish; and in this state they offer a highly satisfactory and superior appearance. We hope with the next number of this journal to enclose a small sample of our patent paper, in order that every reader may judge for himself, and print upon it if he chooses.

Mr. Sutton then proceeds to describe the method of printing on this paper, which does not materially differ from that generally employed and we need not reproduce it. We will quote one paragraph, however, for the purpose of making a passing comment:

On the morning of the day on which you wish to print, excite the papers by floating them for two minutes upon a 100-grain bath of nitrate of silver, having an acid reaction. Do not excite the papers until the day on which you use them; do not use a weaker bath than 100 grains to the ounce; do not leave the papers more than two minutes upon the bath; and do not use an alkaline bath, or an ammonia-nitrate bath. The reasons are these:—1st. A mixture of albumen and nitrate of silver undergoes gradual decomposition, even in the dark, and papers so prepared and kept long in a sensitive state never yield such fresh, clean prints as those which are used at once, but are liable to discoloured lights and a brown deposit within the fibre of the paper. 2nd. A weak bath is certain to yield inferior prints, because it does not properly coagulate the albumen and fix the albuminate and chloride of silver upon the paper. 3rd. If you float the paper too long upon the bath the paper becomes softened and porous, and some of the chloride of silver is dissolved out. 4th. When the nitrate bath is alkaline, the papers become very quickly discoloured, and turn brown in hot weather, even before they are dry; besides which an alkaline nitrate bath does not coagulate the albumen so well as an acid bath, because alkalies dissolve albumen.

We pass over the use of the term *coagulate*, in reference to the film of dried albumen, in the sense in which it has been generally used by photographers, to describe the formation of the insoluble albuminate of silver; but we should like to know if Mr. Sutton has ascertained by definite experiment that a weak or alkaline bath do not properly form this compound. The fact that a strong bath gives better prints than a weak one is well known, but the reason why is not by any means satisfactorily ascertained. Free nitrate of silver is necessary to the production of good prints; but how much free nitrate, and what is its especial use, is not well understood. In the case of the paper in question the proportion of salt is not stated; but suppose for a moment that ten grains of chloride of sodium to each ounce of albumen be used—and that is a larger proportion than is employed in most commercial samples—speaking in round numbers, a 30-grain bath would be required to convert the chlorine into chloride of silver. The proportion required to combine with the albumen is so inconsiderable as to scarcely affect the calculations: so that we have a bath with an excess of nearly seventy grains per ounce. That a large portion of this is not used in the print will be rendered evident by the quantity which is obtained in washing the print. Then what is the part it plays? We have the conviction that its chief use has been to form the insoluble albuminate of silver rapidly, without soaking the paper much, and so keep the image on the surface and secure brilliancy. The more rapidly an insoluble pellicle of albuminate of silver enclosing or combined with chloride of silver could be formed, and the shorter the necessary time of floating on an aqueous solution the more completely the conditions of brilliancy would be secured. But with Mr. Sutton's patented paper, the image would be kept on the surface, we apprehend, independent of this; and we should have conceived, *à priori*, that one of its chief advantages would probably have been found in the fact that a much weaker silver bath might be used without the sacrifice of any of the advantages usually appertaining to a strong one. We commend this part of the subject to Mr. Sutton's further attention. We now add a few more words from the *Notes:*

We will now point out some of the important advantages which arise from the preliminary treatment of the paper with the india-rubber solution.

In the first place, this treatment renders you independent of of the eccentricities of the paper maker, as regards the mode of sizing which he employs. If the paper is well made and free from spots, it matters but little how it is sized. The sizing which you add yourself would be sufficient even for blotting-paper If for instance, you dip a piece of blotting-paper into the solution of rubber,you can afterwards write upon it exactly as upon common paper, and it takes the albumen beautifully. A great deal has been said about the manufacture of paper and the sizing which should be employed, and it is because the English paper makers do not use the proper sizing that photographers are forced to send to France for their paper, and pay four times as much for an article which is inferior in some other respects. But with the rubber solution, any clean, well-made paper, of close gain and fine surface, will do, provided it does not contain that abominable contamination, ANTI-CHLOR, which ruins everything. We have tried a large number of samples of English paper by different makers, and regret to say that the majority of them are rendered unfit for photographic purposes by the presence of anti-chlor. This shows its baneful effects at once, for the paper containing it turns yellow even before it goes into the pressure frame. Messrs. Hollingworth's paper is free from this contamination, and gives fine prints, but the surface is rather too rough. For the present we shall use the Rive paper made by M. M. Blanchet & Kleber, but hope before long to meet with a better sample of English paper at one-fourth the price.

Another important advantage of the new paper is that it gives finer tones and more vigorous prints than the common paper. Vigour and beauty of colour in an albumenized print depend upon the albuminate of silver and not upon the reduced chloride. If you were to spread the salted albumen upon a glass plate, and when dry excite and print upon it, the colour would at first be a fine rich ruby-red, and this would turn in the toning bath to a superb chesnut-black. So it is with our new paper. The print when taken from the pressure-frame is a rich ruby-red, and it turns to a rich chesnut-black when toned and dried.

## Scientific Gossip.

The Violet Flame of Chlorides—The Action of various Solutions on the Spectrum—Examination of Coloured Glass in the Spectroscope.

Experimentalists who have been in the habit of examining various compounds of metals in the spectroscope, have doubtless employed, when they wish to briug out the coloured bands with greater vividness, the very simple expedient of moistening with hydrochloric acid, the bead left on the platinum loop after ignition. In this manner the strontium and calcium spectra, which are somewhat difficult to obtain well, are brought out with remarkable vividness; and many other spectra are likewise obtained in this manner much more readily than by the ordinary method. It will be as well to warn those of our readers who may have been in the habit of employing this artifice, that the results are sometimes liable to be very anomalous; frequently, a series of other lines, having no connection whatever with the metal under examination, make their appearance. The cause of these is not thoroughly known, although it is certain that they depend in some way on the presence of chlorine. They have been lately investigated by Dr. Gladstone, who has published some very interesting, but at the same time, far from exhaustive notes upon this subject. The violet flame produced by many chlorides, when thrown into a fire, has long been noticed. Nothing, perhaps, in this branch of physical optics, is better known than the fact that common salt produces, under ordinary circumstances, a homogeneous yellow light showing as one, fine, double line in the spectroscope; yet, it is an oft-noticed fact that common salt thrown into the fire gives a blue flame; Dr. Gladstone says that the same thing may be beautifully seen when old ship-timber is burnt. When analysed in the spectroscope this violet light is found to consist of a series of well-defined green, blue, and violet liues arranged in three groups—the first being green, and extending to the fixed line *b;* the second, bluish green, and blue lying on either side of F; and the third, violet stretching from midway between F and G to a little beyond G. It is evident, from what is stated by Dr. Gladstone, that many of the blue lines ascribed to copper, when the chloride is introduced into a flame, are these lines, the origin of which is doubtful, but which are common to many chlorides. Thus the chlorides of copper, platinum, or of gold, if put into a spirit flame, give a violet light resolvable into these bands. Chloride of mercury in the gas flame from a Bunsen's burner, gives this light also. A hydrogen flame is capable of producing it from the chlorides of nickel and cobalt; but it requires the heat of a good fire to obtain it from chemically pure chloride of sodium, potassium, barium, zinc, or iron. Chloride of silver gives doubtful results, and the colour is not obtained from either chloride of calcium, lead, or manganese. The question naturally arises to what is this violet flame due? "Is it," asks Dr. Gladstone, "the chloride itself, in the gaseous form, that emits these rays when heated up to a certain temperature, which differs according to the metal with which the chlorine is combined? or is it the peculiar flame produced by chlorine, when the chloride is decomposed by heat? or does it depend on the combination of the chlorine with the carbon or hydrogen of the combustible?" The latter supposition is negatived by the fact that anhydrous chloride of copper emits these rays equally, whether it be placed in a flame of hydrogen or of pure bisulphide of carbon. It is difficult to accept the second supposition; for though chloride of copper or gold is certainly decomposed in the spirit-lamp flame, chloride of nickel or iron is so likewise, and chloride of mercury is reduced to the subchloride, and yet these last do not exhibit the coloured flame at that temperature. Besides, a stream of chlorine or of hydrochloric acid passed into a flame, never gives the violet light, nor do chlorinated liquids mixed with alcohol and burnt in a spirit lamp. It appears, therefore, most probable that the violet light is caused by the incandescent chloride itself, but there are difficulties in the way of such a supposition. The subject evidently requires further elucidation, which we have no doubt it will soon receive in the hands of the able experimentalist to whom these notes are due.

The action of various coloured bodies on the spectrum has been a subject of examination by many experimenters. In the last number of the *Philosophical Magazine*, Sir David Brewster has published a large number of observations on this subject, which have been noted by him from time to time during many years past. He likewise gives the nomenclature of the 354 lines observed by Fraunhofer, which, in many respects, will be found more useful than the spectrum itself. Glancing over the different liquids which Sir David has examined, several liquids are seen to be applicable to photographic purposes, serving as perfect screens when inclosed in a glass cell, and let into a window; thus an alcoholic solution of alkanet in some thickness, absorbs all the rays more refrangible than D; the same takes place with cochineal. Chromate of ammonia, when tolerably thick, commences to attach the spectrum at the violet end, and advances almost simultaneously over the blue, and gradually up to the yellow; this would, therefore, form an admirable screen. Bichromate of potash, although of an intense yellow colour, is not nearly so good an absorbing medium as chromate of ammonia, as it only attacks the spectrum up to *b*, a line in the green; it is, however, quite available for photographic purposes, as rays far higher than this line are without action on the photographic plate. One of the most remarkable salts is the oxalate of chromium and potash, this has a specific action upon a red ray between A and B, cutting out a sharp and narrow black band, forming a fixed line in all artificial lights, and of great practical value in many optical experiments.

Several pieces of glass have been forwarded to us by correspondents for examination in the spectroscope. J. G. L. forwards three specimens, Nos. 1 and 2, being technically known as dark amber *pot metal*, and No. 3, light ruby flashed glass. No. 1 cuts off from the centre of the blue upwards, and No. 2 obliterates very nearly the same extent of spectrum, but leaves the yellow and red end considerably darker than No. 1. Either of these glasses would answer for the window of a dark room. No. 3 is a beautiful glass in the spectroscope, being perfectly transparent to the rays below D, and cutting off the higher ones very sharply. Were this action perfect, nothing would be superior to this glass for the dark room. Unfortunately, however, it lets a little white light through, which is rendered evident by a very faint continuous spectrum extending right up into the violet. It is more than probable that with two thicknesses of this glass this imperfection would be obviated. A specimen of glass sent by J. W. is of no value whatever, the chemically acting rays passing through it, with only slightly diminished intensity.

## THE LUMINOUS IMPRESSION.

BY J. JACQUEMET, CO-SECRETARY OF THE MARSEILLES PHOTOGRAPHIC SOCIETY.

At the last meeting of the Marseilles Photographic Society, an incident occurred of a very interesting character, which is calculated to throw a new light upon the still mysterious origin of the luminous impression. The following are the circumstances of the case:—I presented to the meeting several negatives taken by the dry collodion process with tannin; some of these had been developed a short time (twenty-four hours) after exposure in the camera, the others after a lapse of about twenty days. The first presented a very remarkable intensity of tone, with very strong contrasts, perhaps somewhat exaggerated: the second, on the contrary, presented only an excessively weak and flat image, in which the portions that ought to have come black—the sky, for example—assumed, after every attempt to strengthen them, only a very pale gray hue, quite unavailable for taking positives from. All the plates having been prepared and exposed under identically similar conditions, there was reason to conclude that the faculty of development in the tannin process becomes weaker by time, and that, consequently, the development ought not to be delayed beyond three or four days; and that it is even more prudent to do it the same day. I remembered, however, that M. Vidal, in his first trials of Major Russell's process, had experienced an opposite result; and he himself, at one of our meetings, developed some tannin plates, which, three months after exposure in the camera, gave very vigorous negatives.

Immediately after my communication was made to the meeting, M. Vidal gave an explanation of this apparent anomaly, which, in the highest degree, excited the attention of the audience. It was as follows:—

"Everything leads to the belief, that the operation of the luminous impression belongs to the class of physical phenomena, and not to that of the chemical; and the experiments, the results of which I now proceed to detail, are a proof of this fact, for if there were a combination or a reduction, even rudimentary, of the iodide of silver, this state would persist, even if it did not increase with time. Now, we perceive that the contrary takes place, and must, therefore, seek another cause. We may, not without some justice, suppose that there is a certain molecular change produced in the parts acted upon by light: still, I rather incline to admit that a certain portion of the actinic rays is absorbed by the film of iodide of silver, which becomes their temporary receptacle.

"Either of these two hypothesis permit an explanation of the fact in question: in the first, the iodide of silver, obeying a general physical law, tends to return to its anterior molecular state, just as forged iron returns, after a time, from its fibrous texture to the granular, or lamelar texture it originally possessed. And in the second hypothesis, the luminous fluid imprisoned, *stored up* in the pores of the collodion, gradually escapes, just as a heated body, if left to itself, gradually loses its caloric.

"This change of condition, or loss, occurs with more or less rapidity, according as the collodion film is more or less protected. Thus a vitreous substance, a varnish more or less dense, guarantees it within certain limits. The plates which became weak after the lapse of twenty days, were preserved only by a feeble quantity of tannin (the ordinary solution of 3 per cent.); mine, on the contrary, which kept well for three months, were covered with a thicker (saturated) solution; such is the reason which explains the assumed contradiction between the two experiments."

It follows, then, from these explanations, that unless, by the aid of certain means, which we have neglected to study, the faculty of development can be retained for a longer or shorter period of time, it must some day disappear completely; and it will be one of the most curious experiments, to place anew in the camera a plate which has already been exposed. I am convinced, by intuition, that the sensibility will not be found altered, and that the second image will appear alone in a very clear and perfect manner. This fact will, therefore, corroborate the opinion now given in the origin of the luminous impression.

## PHOTOGRAPHIC STUDIES.

BY DR. SCHNAUSS.*

### *Examination of Various Formulæ.*

We now proceed to the examination of the processes employed for strengthening negatives. We shall confine ourselves to the study of two out of the numberless suggestions which have been made to effect this object; viz. strengthening negatives by the solution of *bichloride of mercury*, and the superficial change in the negative by

* Continued from p. 392.

*iodide* of silver, with re-development by pyrogallic acid and nitrate of silver.

These two processes of strengthening are not always successful; they sometimes even destroy the negative; but, to be just, we must not always attribute this accident to the process, as we shall see by what follows. The intensifying is not successful, if the negative be not sufficiently vigourous, on account of an unfavourable light, or of a deteriorated collodion, or of an exhausted nitrate of silver bath; but it will yield a good result, if the lack of vigour arises from the collodion, or the bath being too new, or contain too much bromide, or if the developer be too old, and does not possess sufficient strength to completely develop the negative.

The bichloride of mercury acts very differently upon the negative at two different periods. The negative must at least possess sufficient strength, so as not to become white immediately upon the action of the solution of bichloride; otherwise, it will be impossible to obtain sufficient power by the subsequent reaction of the ammonia.

The first reaction of the bichloride upon the negative is a blue-black colouration; if this colour appears to give sufficient vigour, the negative is well washed, and only requires to be dried and varnished. It will become more intense in drying. If there be a trace of hyposulphite of soda on or beneath the collodion film, it is decomposed by the bichloride, and forms an irregular deposit of brown sulphide of mercury, which destroys the picture. The iodide of silver contained in the film will be converted into orange or red iodide of mercury, but always, even after complete washing, the action of the solution of the sublimate is combined with a partial change of the chloride into sub-chloride, which is white and insoluble in water. It must be removed by careful washing. A certain quantity always penetrates the collodion, and injures the lights. By causing it to react a much longer time the black image entirely disappears, being converted partly into chloride of silver, and partly into sub-chloride of mercury. However, the negative is not lost, but it acquires very great strength if perfectly washed, and a dilute solution of hydrosulphate of ammonium be poured on. The black sulphide of mercury formed gives a very dense film, and yields very vigorous copies.

The superficial change of a negative weak in iodide of silver is made with a solution of iodine in the aqueous solution of iodide of potassium. Iodine is too little soluble in water, and its alcoholic solution reacts disadvantageously upon the collodion film. After fixing and *complete* washing, the solution of iodine is poured on and allowed to remain on the proof until the superficial change into iodide of silver is remarked. This operation may be performed in daylight, washing and exposing the negative to the light, so that the newly formed iodide of silver may be acted upon by it. After that we can further strengthen the negative by means of pyrogallic acid with nitrate of silver; this last operation is made in the dark room.

One of the most important questions of the day has been raised by the rage for *carte de visite* portraits; namely, a good gold toning bath for proofs on albumenized paper, which will keep several days at the least. The ordinary gold bath consisting of a solution of *sel d'or*, a combination of hyposulphite of soda with the double chloride of gold and sodium, answers perfectly for copies on ordinary paper, if it be employed before fixing and after the proofs are completely washed; but it is almost without action upon proofs upon albumenized paper, if they are not left in it a very long time. Now we must find a bath, which, beside active chloride of gold, contains another salt which will moderate its rapid action, and yield blue-black tones, for this tone is a happy medium; a bath acting too slowly yields *red-brown* tones; a bath which acts too rapidly, yields *grey* tones. The printing of the positives has also its influence upon these tones; a feeble print from a given negative will acquire a grey tone in the gold bath, while a strong impression will yield the finest blue-black tones.*

The salts usually added to the chloride of gold are the phosphate, citrate, carbonate, and acetate of soda. As to the chloride of gold, we may employ either the double chloride of gold and potassium, or of sodium, if they are *conscientiously* prepared. Some chlorides of gold met with in commerce contain a very large proportion of chloride of sodium; nothing can be done with these. The alkaline gold bath, which contains carbonate of soda, will not keep. The citrate of soda promises well; it is prepared, by adding a little citric acid to the preceding bath. It appears to me that the bath, prepared with *acetate of soda* is the best, as it will keep good from eight to ten days, while it gives constant results, and can be renewed by adding fresh chloride of gold. But it must be left to repose at least a day after it is prepared, else it will act too promptly. The best proportions are,

| | |
|---|---|
| Double chloride of gold and sodium... | 1 part |
| Acetate of soda... ... ... ... | 15 parts |
| Distilled water ... ... ... ... | 480 parts. |

—*Le Moniteur de la Photographie.*

## ON PICTURES BY WOODWARD'S SOLAR CAMERA, AND HOW TO TAKE THEM.

BY J. STUART.*

I assure you that it gives me great pleasure to acquiesce in the request made on the last night of meeting. The solar camera pictures are now before you, and if you give me your indulgence for a short time I will endeavour to fulfil the other part of the request. The four pictures now before you are not shown as all that can be done or desired, but merely as one day's work with that instrument.

Having, in the course of this season, made a tour to London and the provinces for the special purpose of seeing what progress had been made in the production of enlarged pictures, the conclusion I came to was that pictures by development were, seemingly, the only satisfactory kind that could be produced (in this country at least); and I must say that, to my end, they were not quite agreeable, but if touched up with chalk, or some other medium, they are passable.

For a considerable time previous to this I had a solar camera, which was obtained from Mr. Atkinson, of Liverpool, and, as Mr. Mactear stated to you in his paper, had it placed in working trim, but with a focussing-board with as many joints as a "Blondin." In this state it lay for a considerable time, and from what I had seen on my tour I almost despaired of ever being able to produce prints by the direct action of light. Nevertheless, as it was, I thought that a trial on my part was the best way to proceed in the matter, and that by a little perseverance I might overcome some of the difficulties that lay in the way. The window at which I had the solar camera then placed had a south-west exposure—the best for the purpose I could obtain. In this situation I could only get the sun for five or six hours a day, and that on the longest days in summer. However, the experiments I made convinced me that direct prints could be produced with ease and certainty, but that I should be tied up to a few hours' use of the sun per day did not at all meet my ideas on the subject. Think how provoking it was to have him (the Sun) blazing away all morning and not able to make use of him; and about the time he should be round a cloud to cover him from your view the rest of the day, thus ending a whole morning's work of preparation.

Allowing you to be so fortunate as to have the sun, the most that could be done would be two prints, although by this method I never succeeded in getting more than one. I saw plainly that a window was not the place. Something else must be done: the camera must be placed so as to get the sun at all hours of the day (if he shone at all); and how this was to be done best and cheapest caused me no small

* It should be observed that in Germany, blue-black tones are generally preferred to the brown tones, even for portraits.

* Read before a meeting of the Glasgow Photographic Association, on the 6th ult.

amount of thought. For the mirror thus to catch the sun the camera must be placed on end like a "bear looking for buns." At last I succeeded in patching up a house for it in one corner of the garden, so that there was nothing to intercept the sun ray's from morning till night.

The accompanying photograph, from a window of my dwelling-house, will give the outward appearance; and a drawing of the inside, showing camera and arrangements for the focussing-screen, will give you an idea of the apparatus by which the four photographs now on the walls were taken.

I will give you as briefly as possible the *modus operandi*; and if any gentleman, when I have finished, does not quite understand it, I shall be most happy to answer any question on the subject. For the benefit of those who have not seen the solar camera I have brought it here with me to-night, so that any explanation regarding its construction will be unnecessary on my part. It is my opinion that thirty or forty shillings more night be well laid out upon it to render it more efficient.

To produce the negative, make up a new silver bath of pure nitrate of silver, 30 grains to the ounce. See that you have collodion giving you clear pictures without crapy lines, as defects in the collodion will show in the large pictures: spots not visible before will show like buttons, which might do very well in the right place, but not on the face. Everything in the dark room must be in the best order. Look to the camera and dark slide, and see that they are clean, as, if everything does not work well, you will be sure to raise dust. In short, do everything in your power to avoid raising dust; for, if you do, your faults will be magnified a hundred-fold.

The glass must be of the best colourless patent plate, and as thin as possible. Do not give the plates to a boy to clean, but do it yourself. As they are much softer than other glass, they should not be cleaned in the dark room; only wipe them with a wash-leather, coat, and sensitize in the usual manner. Do not blow on the plate before coating, and after coating do not hold the face up till it sets: blowing gives little transparent spots, and holding the collodion side up attracts dust, which transforms itself into comets.

The lens should be what is termed a full-plate (nine or ten inches focus), with as small a top as possible, without making the sitting too long. The lens used by me for this purpose was a Ross's half-plate. The model should be placed in a good light, so that he may stand out round and bold.

Having thus arranged your model, place your camera at such a distance as will take in all that you want, on a space of, say, $3\frac{1}{4}$ by $2\frac{1}{4}$ inches: have it sharp all over, and give it such an exposure as will bring out all the detail. Over-exposure tends to reduce the high-lights of nose and brow, which, in a life-size, should never be wanting. I cannot help thinking a common error with photographers is supposing that *over-exposure gives density*. The proper timing of the negative is a very nice matter.

The developing may now be done with sulphate of iron 15 grains, spirits of wine 15 drops, glacial acetic acid 15 drops. Pour over the plate in the usual manner till all the details are up, wash, fix, and wash, and the negative is complete. Dry at once, to prevent dust adhering to the plate. The negative must not be varnished.

Now dust out your solar camera, polish up the mirror, rub up the condenser and the enlarging lens, which should be the best $4\frac{1}{2}$-inch focal lens you can get: the one I use is a Voigtlander's. You are now ready to place the negative in the groove prepared for it in the camera. Before preparing the paper, we will arrange the focussing-screen, which must be placed in such a position as will give the image the size wanted. Having moved it up and down, and decided on the place, we will say that we have obtained the rough focus (till we get the paper ready there is no need of doing more). The mode of preparing the paper, and the paper itself, are just the same as used for all my prints.

Sensitising Bath.

| | |
|---|---|
| Nitrate of silver ... ... ... | 100 grains |
| Pump water ... ... ... ... | 1 ounce. |

Make the bath slightly alkaline with ammonia: keep it always so, as it makes the paper more sensitive, giving at the same time a richer tone to the prints. Some are quite astonished when I tell them that my bath always keeps as clear as spring water, and that too with every kind of paper.

Having floated the paper—say, if Saxe, three, and if Rive, five minutes—on the above silver bath, pit it up to dry above a hot-water pan, covered of course, allowing it afterwards to cool: it will then be ready for pinning down on the stretching board—drawing-pins will do for this purpose. Having stretched it (the paper), cover it over with a sheet of blotting-paper, and then with a board. I presume, here, that your solar camera and sensitizing house are two distinct places.

If the sun be now shining take it to the camera, place the board on the focussing-screen, in such a position that the enlarged image will fall in its right place. This being done, you will require to get the mirror in such a position as will bring its focus right on the centre of the enlarging lens. Having done so, you will see on the focussing screen a coloured disc formed by the condenser: stick, without loss of time, some drawing pins, here and there, all round the yellow ring, and in this way you will have a guide for the shifting of the mirror.

You must now have a piece of orange-coloured glass the size of the negative, which place over the negative in the camera. Having done so, lift off the board and blotting-paper, leaving the sensitized sheet exposed to the image.

Now, with the rack-work of the camera, focus the image very nicely on the paper. When you have obtained the best focus, fix up the negative and frame which holds it, so that it will not move in the least, as the wind on the mirror is very apt to make it do, and which it might do just when the picture is all but finished. Make up your mind, if you wish a good picture, to be now a prisoner for two or three hours.

Take the yellow glass off the negative, watch the yellow disc, to keep it right on the drawing pins, and, if all goes well, in two hours and a-half you will have a beautiful enlarged print, far exceeding those now on the wall before you. I may mention that the depth of printing is just about the same as if it were a print from a negative by contact. The print is now washed and toned in the usual manner with acetate of soda.

Toning Bath.

| | |
|---|---|
| Acetate of soda ... . ... | 7 ounces |
| Water (distilled)... ... ... | 80 ,, |
| Chloride of gold ... ... ... | 15 grains. |

One hour before using add 80 ounces more water and $7\frac{1}{2}$ grains more chloride of gold.

Fixing Bath.

| | |
|---|---|
| Hyposulphite of soda ... ... | 6 ounces |
| Water ... ... ... ... | 20 ,, |

With regard to the apparatus I feel satisfied with it, and I think that something cheaper and better may yet be obtained; in fact, for such an end I have been labouring for some time past, and, with your leave, at no far distant day will introduce to your notice "Stuart's solar camera," which is already a fact—not an idea.

## TONING WITHOUT GOLD.

BY H. SCHNATZ.*

The toning of albumen prints has been performed up to the present time by the alkaline gold bath alone. The great expense of gold induced me to commence a course of experiments with such salts of which the effects are similar to those of the gold salts. From among the numerous salts which I have consequently examined, a solution of chloride

* From the *Photographische Archiv.*

of platinum in connection with acetate of soda is the only one which has yielded results of a superior nature. The tones which have been produced by such a mixture, are scarcely to be distinguished from prints toned with gold. Chloride of platinum is two-thirds cheaper than chloride of gold; so that for those who have to tone a large quantity of albumen prints this circumstance will be worthy of some consideration. The composition of the bath is as follows:—2 parts of pure acetate of soda; 64 parts of distilled water; 1 part of a strong solution of chloride of platinum (such as is sold as a chemical reagent by the dealers in pure chemicals). The bath can be used as soon as the acetate of soda is dissolved.

The effect of toning is altogether similar to that produced by the gold bath.

The pictures have to be printed until the shadows begin to be bronzed. Before the prints are introduced into the platinum bath they must be thoroughly washed in water in order to remove the undecomposed nitrate of silver. They are left in the platinum until they have assumed a deep blue-black tone; and, before they are fixed, they are allowed to remain in pure water from half an hour to an hour. The fixing bath consists of

1 part of carbonate of soda,
8 parts of hyposulphite of soda, and
80 parts of rain water.

The prints are kept in this bath until they have become quite clear and transparent, a circumstance which will take place in about a quarter of an hour; they are then carefully washed in frequent changes of water. This bath must not be used many times in succession.

## A SHORT LESSON IN CHEMISTRY.—No. 5.*

THE property, which all bodies possess, of combining chemically in certain definite proportions or weights, being universal—without exception—it is denominated the *law of chemical equivalents*. In addition to this beautiful law we have another similar one, and equally beautiful in reference to the volume of those bodies, which either exist in the gaseous state, or may be converted into it. The relation that exists between the combining volumes of gases is of the simplest nature, being in the proportion of volume to volume, or of multiples of a volume of one substance, to a single volume of another. There is a connection, too, between the combining weight of a gas and its specific gravity, as also between the combining volume. Thus an atom, or one combining proportion of chlorine, is 35½ times heavier than an atom, etc., of hydrogen; in like manner, a volume of chlorine is found to be equal to a volume of hydrogen. Thus then, these two bodies combine in the ratio of pint to pint, quart to quart, etc., so as to form gaseous hydro-chloric acid. Again, an atom, or one combining proportion of oxygen, is sixteen times heavier than hydrogen, so that in the combination of atoms, two volumes of hydrogen combine with one volume of oxygen in the formation of the vapour of water. An atom of nitrogen is 14 times heavier than an atom of hydrogen, hence their combining volumes are equal; but since two volumes of hydrogen are found to combine with one volume of oxygen, it is inferred that both chlorine and nitrogen will combine with oxygen in the same ratio of double volumes.

Hypochlorous acid and protoxide of nitrogen, therefore, consist by weight respectively of equal atoms; but by volume of two volumes of chlorine to one of oxygen, to form the former, and of two volumes of nitrogen and one volume of oxygen to form the latter. And since this is so, that is, since the combining proportion of chlorine is in double volumes, and the combining proportion of hydrogen is also in double volumes, then hydrochloric acid will be formed of two volumes of chlorine and two volumes of hydrogen; the specific gravity, therefore, of the resulting compound, will indicate its combining volume; for in the latter case, if the specific gravity of the resulting gas be one-fourth of the sum of the four specific gravities combined, the combining proportion will be four volumes; if it be one-third, it will be three volumes; if one half, it will be two volumes. Since the specific gravity of the compound can never be greater than the sum of the components engaged, the combination by volume can never be greater than the sum of the volumes; it is, however, very frequently less.

*Chemical Notation.*—In order to facilitate the preparation of formulas, or the analyses of formulas, a system of notation has been adopted by chemists. The capital letters of the Roman type, representing the initials of the names of each elementary substance, are used for this purpose as far as they extend; after they become exhausted the first two letters are adopted. The symbols for compounds are the combination of the component symbols either by the sign +, by a comma, or simply by the apposition of the characteristics. The multiples of elements may be placed either before the symbol or after it, as - 3 O, or $O^3$, which signifies in either case three equivalents of oxygen. The latter form is preferable, and may be read in the formulas O sub 2, by which means the expression is quite distinguished from $O^2$, which is a mathematical form and read O to the second (power). Such compounds as nitrate of potassa may be written and expressed either $KO+NO^5$ or $KO, NO^5$. Acetic acid is written; $C^4 H^3 O^3$, and acetate of soda is therefore, $NaO, C^4H^3O^3$. The following table exhibits the combining proportions by weight and by volume, the specific gravity, and the symbols of the elementary bodies now in use, both in this country and in Europe.

| Elementary bodies. | Symbols | Chemical Equivalents. | Specific gravity Standard—Hydrogen. | Combining Proportion by Volume. |
|---|---|---|---|---|
| *Metalloids.* | | | | |
| Hydrogen ......... | H | 1 | 1 | 2 |
| Oxygen ............ | O | 8 | 16 | 1 |
| Nitrogen ......... | N | 14 | 14 | 2 |
| Sulphur............ | S | 16 | 96 | 3 |
| Phosphorus ... . | P | 32 | 64 | 1 |
| Carbon ............ | C | 6 | 6 | 2 |
| Iodine ............ | I | 127 | 127 | 2 |
| Bromine ......... | Br | 78·26 | 78 | 2 |
| Chlorine ......... | Cl | 35·5 | 35·5 | 2 |
| Fluorine ......... | F | 19 | | |
| | | | Water—Standard | |
| Boron ............ | Bo | 10·9 | 2·68 | |
| Silicon ............ | Si | 21·3 | 2·49 | |
| Selenium ......... | Se | 39·5 | 4·3 | |
| *Metals.* | | | | |
| Silver ............ | Ag | 108 | 10·47 | |
| Gold ............... | Au | 98 | 19·26 | |
| Iron ............... | Fe | 28 | 7·79 | |
| Cadmium ......... | Cd | 56 | 8·60 | |
| Potassium......... | K | 39 | 0·865 | |
| Sodium............ | Na | 23 | 0·972 | |
| Lithium ......... | L | 6·43 | 0·593 | |
| Calcium ......... | Ca | 20 | 1·5778 | |
| Uranium ......... | U | 60 | 9·00 | |
| Magnesium ...... | Mg | 12 | 1·75 | |
| Barium ............ | Ba | 68·64 | | |
| Zinc ............... | Zn | 32·52 | 7·86 | |
| Lead ............... | Pb | 103·7 | 11·35 | |
| Mercury ......... | Hg | 100 | 13·57 | 2 |
| Platinum ......... | Pt | 98·7 | 20·98 | |
| Tin ............... | Sn | 58 | 7·29 | |
| Arsenic. .......... | As | 75 | 5·88 | 1 |
| Copper ............ | Cu | 31·7 | 8·89 | |
| Antimony......... | Sb | 120·24 | 6·70 | |
| Chromium ...... | Cr | 26·7 | 5·9 | |
| Cobalt ............ | Co | 29·5 | 8·54 | |
| Nickel .. ......... | Ni | 29·6 | 8·28 | |
| Bismuth ......... | Bi | 213 | 9·82 | |
| Manganese ... .. | Mn | 27·6 | 6·85 | |
| Molybdenum ... | Mo | 47·88 | 7·40 | |
| Aluminium ...... | Al | 13·7 | 2·56 | |
| Palladium......... | Pd | 53·3 | 11·30 | |
| Cerium ............ | Ce | 47·26 | | |
| Strontium ......... | Sr | 43·84 | | |

* From *Humphrey's Journal.*

## IODO-NITRATE OF SILVER.—PIN-HOLES CAUSED BY IT.

BY CHAS. WALDACK.*

Photographers all know that if a collodionized plate is put into a simple solution of nitrate of silver in water, the iodide of silver which is formed in the film will, in a few minutes, be all dissolved. It is for this reason that a bath has to be iodized before being used, and this is done by adding to it a few grains of iodide of potassium previously dissolved in a little water.

By dissolving iodide of silver in a solution of nitrate of silver, a new compound or double salt is formed which is called iodo-nitrate of silver. This salt is soluble in a solution of nitrate of silver, and its solubility is in proportion to the strength of the nitrate of silver solution and its temperature. It is insoluble in water by which when in solution it is decomposed in nitrate of silver and iodide of silver, which last compound is precipitated.

Iodo-nitrate of silver can be obtained in crystalline needles. For this, dissolve in a warm or boiling 160-grain nitrate of silver solution as much freshly precipitated iodide of silver as it will take up; let the excess of iodide settle for a few minutes, and pour the clear liquid into a porcelain dish. In cooling a small quantity of iodo-nitrate of silver will crystallize.

Another way to illustrate the crystallization of iodo-nitrate of silver is, to sensitize a collodion plate and allow it to dry. The nitrate of silver on the surface, concentrating by evaporation, will dissolve all the iodide of silver which is in the film. Iodo-nitrate of silver is thus formed, which will crystallize. These crystals will stand a washing with distilled water, and will only be decomposed on the surface, which will be covered with yellow iodide of silver.

Iodo-nitrate of silver may crystallize out of an ordinary silver solution which is saturated with it. This happens:

1. When, by continued use, the solution loses its strength and, consequently, its power, retaining the same amount of iodo-nitrate of silver in solution.

2. By a reduction in the temperature.

In both cases the salt crystallizes in needles on the sides of the bath and on the plate while it is being coated. When this happens the plate, after fixing, will be found full of holes. The remedy for such a bath is very simple:—Decompose a part of the iodo-nitrate by the addition of a few ounces of water; then filter, to separate the precipitated iodide of silver, and to the clear liquid add a quantity of nitrate of silver corresponding to the quantity of water added previously. For instance, if the bath be 40 grains to the ounce, and you have added 4 ounces of water to it, you will have to add 4 times 40 grains, or 160 grains of nitrate of silver to the filtered solution.

If you only perceive the condition of your bath during the business of the day, and you have no leisure to apply the remedy given above, you can avoid the pin-holes by keeping your plate in motion while it is being coated.

## HOW TO MAKE THE NITRATE BATH.

BY CHARLES A. SEELY, M.A.†

Nature teaches us in all her operations that the easiest way to do anything is always the best way. The more we study natural phenomena, the more we are impressed with the simplicity of the relations of causes and effects.

Also in the operations of the arts the easiest way is the best. Our progress in arts consists mainly in eliminating our first redundancies of false motions and other crudities. Witness the labour of the tyro artist who grasps his pencil, or his violin bow, as if it were a crowbar, and the grace of the adept, who without an effort enchants the eye or the ear. Witness the booby photographer in fearful struggle at the dirt on a glass plate, and our friend Kuhns who touches the plate so gently, and at once presents it clean to the most fastidious. Photographers, believe me, it is the living truth that you are wasting much of the precious vitality of soul and body in useless labour. The shortest road between two points is a straight line. If you have an object in view, the quickest, surest, safest, best way, is to go right straight towards it. Of course I know that to determine the straight road requires intelligence, but I also know that most men have enough of that for ordinary emergencies, if they will only use it—there's the rub.

Our art is full of illustrations of the above sentiments. I take only one, viz., the making of the nitrate bath.

There are two ways of making the nitrate bath; these I will designate as the process of Tippette, and the process of Grosskoff.

*Tippette's Process.*—Tippette is a neat, polite, precise little gent, whose ancestors lived in France. He does all things elegantly, with precision and a grand flourish. He measures water to the fraction of a drop, a grain of silver in variance from his formula (which he purchased by the way from the celebrated Reynard of Paris) would extinguish all hopes of success. This is the formula:—

| | |
|---|---|
| Distilled water ... ... ... | $10\frac{1}{4}$ ozs. |
| Nitrate of silver ... ... ... | 1 oz. 3 grs. |
| Alcohol ... ... ... | 2 drops |
| Iodide of silver ... ... ... | 3 grs. |

Where Tippette prides himself is in the preparation of the iodide of silver. I have often pumped him on the subject, and succeeded in eliciting the fact that he gets his iodide out of iodide of calcium, and uses a quart of water in washing every grain; but although thus much is very important, he still holds back his grand secret. I am persuaded, however, that it pertains to the manner and amount of exposure to light of his purified iodide of silver before he dissolves in the bath, and a certain manipulation by which there shall be finally no excess or deficiency of iodide in the bath. Also the quality of the alcohol is of the greatest moment; it is made expressly for him, and is always tested before use. The alcohol is distilled from the fermented juice of the Sorgho. But, I regret to say, he is unwilling to let its strength be known; he only asserts it is not 95. I am unable to give Tippette's process in all its details for lack of information, and I confess it if I understood it as perfectly as he does himself, I doubt if I could spare time and space enough to do it full justice. The public are, however, able from the hasty outline to form some notion of the nature and intent of the process. I only add that friend Tippette is not invariably successful. He has trouble in procuring the suitable materials, and he sometimes fails in their compounding. Thus he has told me he has been in a fog a whole day, suspecting his iodide of silver, before he discovered that his alcohol varied three per cent. from his standard. My friend is an enthusiast, and says he is content if he produces one *chef d'œuvre* in a year.

*Grosskoff's Process.*—The other process is that of Mr. Grosskoff. of philosophical German ancestry, the original German element under our bracing climate has assumed a practical cast. Grosskoff is not greatly esteemed among strangers, for to them he appears somewhat careless and lazy; he seems to do nothing with head or hand. Yet those who know him say he accomplishes a great deal by virtue of taking short roads to his destination, never wasting time in false motions, the grand flourish, &c. To make a two quart nitrate bath he proceeds thus:—He puts his two quart bottle under the tap and nearly fills it with the pure croton. He places the bottle of water on the table, and then chucks in three ounces of silver. Then he takes a little pinch of iodide of ammonium, or cadmium, or pulverized iodide of potassium, whichever is most convenient, and pops that in. He gets his filter paper, funnel and bottle, convenient on the table, now and then giving his silver solution a little tip or turn around (not a shake) so as to get the crystals dis-

* From *Humphrey's Journal*, p. 174.
† *American Journal of Photography.*

solved at the bottom of the water. When the filter apparatus is ready, he corks up the silver bottle, and gives it a good shake up and down, and then the contents go through the filter, and the bath is ready for use. All this he would do about as fast as I have been writing it. I have talked with Grosskoff about his harum scarum way of working, and I find he defends every movement he makes, giving reasons which he thinks are scientific. His reasons are ingenious to say the least; for example, he says that in the concentrated solution of silver quietly formed at the bottom of the water the iodide of silver at once dissolves, and on shaking, the silver solution is so diluted with the water above that the excess of iodide precipitates, *carrying with it all the impurity of the water and of the silver, &c.*; he believes he could make a good working bath out of dish water.

## A SHORT LESSON IN PHOTOGRAPHY.—No. 6.*

The fixing of a photographic picture on collodion, or on any other transparent medium suffused on glass, consists in removing the undecomposed iodide and bromide of silver together with the free nitrate of silver, the nitrate of cadmium, of potassium, of sodium, of ammonium, &c., from the film, before it is exposed to the light; for if these were not removed they would, when so exposed, be acted upon uniformly, and become gradually and uniformly decomposed and blackened.

Fortunately means have been discovered of dissolving the yellow of cream-coloured iodide and bromide of silver, whilst, at the same time, no injury is done to the picture, that is, to those iodized and bromized parts that have undergone the actinic influence and the consequent reductions on the actinized film. The remaining salts, in or on the film, can be removed afterwards with the dissolved iodide and bromide by a thorough washing. The solvents of the iodide and bromide of silver are *cyanide of potassium* and *hyposulphite of soda*. These are not the only solvents of the salts of silver; but they are those which photographers invariably employ. Both of them in a concentrated form act partially upon the actinized and reduced parts, and especially so whilst these parts are still fresh, moist, and just developed; and they would no doubt in a short time totally destroy the picture, if they were not in like manner removed by washing with the rest of the unnecessary salts. Hence you see the necessity of *fixing just enough*, that is, of removing all the yellow or cream-coloured substance from the collodion and no more, then of *washing the collodionized surface immediately and thoroughly*. As soon as this operation is performed, the picture can be examined by the diffused light of day, and will be designated either a negative or a positive according to the characteristics which it possesses. If, when placed on a piece of black velvet or black cloth, it exhibits a pleasing, bright, distinct—although inverted—picture of the original with a proper gradation from white to black, and hence, as we say, endowed with the natural middle tones as well as the high lights and shades, all in their places, the picture is then called a *positive*, an ambrotype if on glass, a melainotype if on prepared plates of iron. On the contrary, if, when so viewed through a film of mica or of semi-transparent glass, or of a hazy atmosphere; or, if viewed by looking through the glass, it exhibits deep blacks where the lights ought to be, transparent parts where the blacks ought to be, and grey or foggy parts for the intermediate tints; such a picture will be pronounced a *negative*.

*Positives on glass.*—Besides the positive just mentioned, viewed by reflected light, we have another form of positive, in which there is no lateral inversion of the objects, and which exhibits in every sense of the word a true picture of the reality. Such a positive is recognised in the transparent glass stereographs. These two kinds of positives I will now teach you how to take; and firstly, let us commence with the melainotype, which is the simplest and easiest picture in photography; and let our aim be to take a portrait, and furthermore to take a portrait that shall be an *agreeable picture*. Now all our senses are gratified with contrast; meat without salt, fish without sauce, coffee without sugar, are insipid—*disagreeable;* the gnawing of a mouse, the picking of the teeth with a quill, the croaking of a bull-frog, the waste stream-jets from a flour mill during the livelong night, and the smacking of the lips by lady gum-chewers—these are *disagreeable* operations, discordant sounds, offensive to the sensorum—because there is no contrast; brick houses built in contiguity, without the vine or the trellised rose, are the dull habitations of moles—a cloudless sky, a treeless farm, and a dreadfully plain quakeress, are not to my fancy—there is too much sameness about them—too little contrast. Feed a rabbit with cabbage, a horse with oats, brother Jonathan with pumpkin pie, or brother John with beef steak for three continuous weeks—they will all die for want of contrast. What has all this to do with a photograph? you ask; a great deal, I say. To be brief, a photographic portrait must be endowed with a proper and tempered degree of light and shade between the different parts of the subject itself and between the subject and its surroundings; and this difference between the lights and shades depends upon the material and colour of the dress and background and their artistic arrangement among themselves, as well as on the appropriate admission of light. Whilst, on the one hand, it is offensive to the sight to make too much uniformity in, or too little difference between the lights and shades, it is, on the other hand, equally shocking to a cultivated taste to make too great a contrast, and especially in photography, where we have only two colours, so to speak, that is, black and white, to deal with Here comes a soldier; let him be the subject of our lesson. His uniform is blue, his cap is blue, and he looks rather blue! In this case it will not look well in the photograph to have a blue background—the picture will be altogether too monotonous, too uniform, in fact, *too blue*. Take away, then, the background, and substitute in its place a white one. Besides this, our soldier is made up of uniform, mathematical lines—his legs are two parallel lines—his arms ditto—from hip to hip and from shoulder to shoulder, two lines intersecting the former at right angles—whilst the head and neck is a ninepin superposed on the latter line—there is no contrast here between these lines and the liny background—it is one flat uniform, liny surface. But, what's to be done? Why, make something crooked; put into the view the poker, tongs, fire-shovel, a skeleton, a panther, a dismantled cannon, the quartermaster's gridiron, or a lady's hoop, and twist up your subject into some contorted shape, by which nature may be better represented, and art and taste satisfied. But this is not all—your materials, the paraphernalia of attire, of accessories, of background, may all be arranged in accordance with a cultivated mind and the requirements of art, and yet you will fail to obtain a good photograph if your light is not admitted in conformity with optical principles and with a due regard to the position of light and shade; in addition to these observances, the light itself must not be too vivid, in order to avoid a too intense contrast of light and shade.

Thus, then, we have two important points to observe, to attain to, in reference to light: To introduce the light on the sitter in the right direction, and to introduce this light so softened or diminished in intensity as to render the transition from the illumined parts to the shaded parts almost imperceptible. If light be admitted perpendicular to any surface, as, for instance, on the moon, or on the face, the photograph of such an object will be flat, monotonous, and devoid of contrast—mount Tycho in one case and a respectably prominent nose in the other will be flattened down into a ring and radiating lines in the former, and a figure of eight suspended on a wire in the latter photograph.

Furthermore, when the light falls from above, perpendicular to the head, the shadows beneath the eyebrows, the nose, the chin, or any other protuberance, will become

* From *Humphrey's Journal.*

distinct and offensive; a similar phenomenon will occur if the light is entirely on one side; that side will be illumined, the other will be dark. It is very evident that a single light, that is, light in one direction will, if intense, always produce intense shadows; a single light, therefore, is not suitable for taking a good photograph. By a proper arrangement, however, of screens, reflections may be obtained, by which the deep shadows can be avoided.

I find this lesson is growing somewhat lengthy, and will consequently resume the subject in my next lesson.

## Correspondence.

### MR. ASSER'S PROCESS OF PHOTOGRAPHY.

Mr. Editor,—Having seen some of the recent numbers of your esteemed journal, I read therein with interest several articles respecting Photolithography or Photoziucography, and am much pleased to observe that the parties engaged in that discussion all agree in admitting the priority of my invention of the transfer-process therein alluded to; a fact which is incontestable, as not only the catalogues of the Paris Exhibition in the year 1859 (published in the middle of April of that year), containing the words quoted in your Journal; but it is also proved beyond doubt, by my having taken out patents, both in France and Belgium, in the month of January, 1859.

The priority of my invention being thus generally acknowledged, there would be no occasion for me to interfere in the controversy now going on, were it not that the following assertion occurs in your number 219 (14th Nov., 1862):

"Mr. Asser patented his process in this country, in the year 1860, but we have not heard that it has ever been brought into extensive practical use,"

—which induces me to appeal against the inaccuracy of this representation, for I can assure you most positively that I have never up to the present time, discontinued my experiments, which had been commenced long before I gave publicity to my invention; but I can also inform you that my said process has long since been successfully applied to every description of photographic objects, by the eminent lithographic printers Messrs. Simonau et Toovey, of Brussels, the present patentees under my Belgian privilege. In addition to which I may state that at the last "Exposition des arts industrielles," held at Brussels in the year 1861, the jury awarded a medal to my process *(vide Le Moniteur Belge*, 5 Jan., 1862, No. 5). Besides which medal, another *(medaille d'excellence)* was adjudged to the production of Messrs. Simonau and Toovey, both in chromo and photolithographies *(pour leurs impressions chromo et photolithographiques)*.

In consequence of the said Exhibition, the Directors of the Edinburgh Museum of Industry by a very flattering letter, requested to have copies of photolithographic productions for their establishment, which request was accordingly complied with. Consequently I have never, for a moment entertained the idea of renouncing my right to avail, at the proper season, of my British patent; and seems by the articles referred to, that the results of my said process are not generally known in the United Kingdom; it is my intention shortly to afford to those who take an interest in the matter, an opportunity of becoming acquainted with some of the results obtained by my said process.

By inserting the present letter in an early number of your esteemed journal, you will confer an obligation on your obedient servant, E. T. Asser.

*Amsterdam, 7th Dec.*, 1862.

[It affords us much pleasure to learn that Mr. Asser's process is successfully worked on the continent; our remarks had chief reference to this country. We believe his priority in applying the principal of the transfer has never been denied, but we fear that the date of his patent in this country would be too late to secure him any exclusive rights; as, if we remember rightly, both the processes of Col. James and Mr. Osborne were published in this country before the date of his patent. It will give us pleasure to see some of his results, and we take this opportunity of inviting him to send some to the forthcoming Photographic Exhibition in connection with the Photographic Society.—Ed.]

### CALCIO-CHLORIDE OF GOLD.

Sir,—Having heard a good account of the results from toning with calcio-chloride of gold, as manufactured by Messrs. Bailey and Son, of Wolverhampton, it would, no doubt, be interesting to many of your readers beside myself, who are not practical chemists, to know the effects that chloride of calcium and hypo-chloride of lime have on the ordinary solution of gold. If the solution of calcio-chloride really is permanent after having been used for toning paper prints, it will be a great boon to amateurs who only print a little now and then. I have for some time acted on the inventor's advice of making my own collodion, but cannot see any reason why I should not make my own gold toning solution also. Even granting that it can be bought as cheap, there is a charm about making it oneself—there is a secret satisfaction of knowing it is genuine; you take no other person's word for it, but know exactly how many grains of pure gold your solution contains. I have, for some time, been in the habit of dissolving standard gold in *aqua regia*, and just neutralizing a small quantity with carbonate of soda as required, of course using up each time as closely as possible; succeeding tolerably well beyond the inconvenience of being obliged to have as many prints as would take up the gold, or waste any that might spare; nor is it very evident to any amateur photographer that, if these promises can be realized, it will be both a great saving and convenience; and as there are doubtless many besides the writer who prefer to be independent and make their own, I have made free to ask you to explain the *rationale* of the process, and what precautions are to be used in preparing it. Of course a *very* acid solution of gold like mine must be, in a great measure, neutralised before adding the calcium and lime; which is the best method for so doing? Is the chloride of calcium alkaline, or the hypochlorite, or both? What would be the effect of adding too much or too little of either ingredient? Can you refer me to any full description of the properties of each substance? And lastly, can you recommend a photographer to a good "common-place book" for notes? Yours, &c. Carbon.

[The double salt of gold and calcium has received but little attention; but some curious and interesting facts, in reference to thiscombination as a toning agent, have transpired within this last year or two, the rationale of which are not well understood. The hypochlorite of lime has a decidedly alkaline reaction; but a solution of chloride of gold and hypochlorite of lime, quite neutral to test paper, retains its toning properties for months. In the process of Mr. Lacy, which we published a short time ago, it was necessary to keep, the solution some weeks to get the best results. We shall publish, in our next, a process of preparing a toning solution of this kind from metallic gold, which we have recently received from a photographer in France, from whom we learn that it is almost universally used by Parisian photographers. There is no need, however, for amateurs to waste their toning solutions. We keep ours in hand for months, as we recently explained, readily reviving its toning powers when they become inactive. For a common-place book, some of those issued by Letts will probably be most useful—Ed.]

## Photographic Notes and Queries.

### The Morphine Dry Process.

Dear Sir,—Since writing to you last week, I have carried out an experiment which I have had in view some little time, and as it appears to me to be worthy of note, I have sent you this.

I have noticed that I never got an over-exposed plate by the morphine dry process, and this led me to expose one half of a dry stereo plate 1¼ minutes, and the other half 30 minutes, same size stops, to the same view at the same time, viz 3 o'clock p.m., sunshine, I developed it without any fog or solarization into two good printing negatives, although they of course would not match to mount together, the one being denser than the other, but marked by *no* fog. I have to-day done the same with another dry plate with the *same* result. This is, I believe, a curious and most important feature in this process, and even at the extreme exposure I tried, the limitation of time was not reached.—I am, dear sir, yours faithfully,

W. Bartholomew.

## Talk in the Studio.

Diorama and Photography.—At the last meeting of the Glasgow Photographic Association, held on the 4th, a number of transparent photographs were exhibited in combination with the marvellous changes and beautiful natural effects obtained in exhibiting dioramic scenery. Dr. Taylor, to whom, in conjunction with Mr. McNab, this application of the art is due, read an interesting paper descriptive of the arrangements and of the principle upon which the effects were produced, which we hope shortly to place before our readers. In January a tea party and conversazione will be held in place of the usual monthly meeting for business.

"Spirit Photographs."—A correspondent sends us the following clipping from a provincial paper. We presume it is a *canard*, founded on the fact that the ghost of a former image has been developed in company with the portrait of a sitter. "Our American friends, who claim to be a-head of us in many things, have certainly distanced us completely in the practice of spiritualism and photography. The good people of Boston can not only call up the spirits of their departed friends, and hold conversation with them—through a suitable 'medium,' of course—but they can *take the portraits of the spirits!* The operation requires to be performed by a medium who combines a spiritual nature with a competent knowledge of photography, and Mr. William H. Mumler, of the city of Boston, seems to be the only person possessing those qualities in the necessary degree, who has yet become known to the fame. This lucky individual, who seems to be in a fair way to make a fortune out of the spirits, gives the following account of his discovery:—'A few Sundays since, he being alone in the photographic saloon of Mrs. Stuart, 251, Washington Street, trying some new chemicals, and amusing himself by taking a picture of himself, which, when produced, to his great astonishment and wonder, there was on the plate, not alone a picture of himself, as he supposed, but also a picture of a young woman sitting in a chair that stood by his side. He said that, while standing for his picture, he felt a peculiar sensation and a tremulous motion in his right arm, and afterwards felt very much exhausted. This was all he experienced that was unusual. While looking upon the strange phenomenon—the picture of two persons upon the plate instead of one—the thought and conviction flashed upon his mind, *this is the picture of a spirit!* and in it he recognised the likeness of his deceased cousin, which is also said to be correct by all those who knew her.' Since this discovery has been made, a great many bereaved relatives have been furnished with pictures of the dead, taken in groups with those of living sitters, 'the picture of the spirit being fainter and less distinct than that of the one who sits.' The Boston paper, from which we take the above extract, assures us that the most searching investigations have been made, with the view of finding out any deception, but without success! After this, the claims of the Boston folks to be considered an 'advanced people' will hardly be disputed."

Photography in America.—A letter recently received from Professor E. Emerson, who was suddenly recalled to the States by a severe domestic bereavement, puts us in possession of some items of American photographic intelligence. In the first place, we are desired to place on record that it is to Mr. Henry T. Anthony, of the well known firm of E. & H. T. Anthony, photographers are indebted for the discovery of the value of ammonia fumes in printing on albumenized paper. We willingly make this announcement in deference to the wish, and means of information, of Professor Emerson, who communicated the process to us in confidence. We believe, however, that there are other claimants in America for the originating of the idea. We learn also that much interest was felt by the American Photographic Society in various illustrations of British photography Professor Emerson took back with him. Amongst these were some fine panoramic prints by Sutton's panoramic lens; a small model of the lens, &c., which was presented by Mr. Ross to the Society and was an object of much interest and curiosity; several fine views by Mr. Mayland, of Cambridge, illustrating the working of Dallmeyer's triple achromatic lens; several of Rejlander's charming studies; and by Ross's Card lens, No. 3, were also exhibited and admired. We further learn with pleasure that steps are in progress for establishing a Photographic society in Philadelphia.

## To Correspondents.

Pip.—A knowledge of chemistry will aid you very considerably in your photographic operations. The only distinct work which treats of the chemistry of photography is "Hardwich's Manual." You will find a mass of chemical information bearing upon photography scattered through the pages of the Photographic News, from the commencement to the present time. An elementary work on chemistry generally will be useful to you. "Wilson's Chemistry," published in "Chamber's Educational Course," is a good book for beginners. But for general photographic chemistry, you cannot do better than get the volumes of the News, or, at least, such of them as are in print.

Old Subscriber.—We do not know of any mordant that will fix Indian ink, and make it washable. There are, however, many modes of obtaining a fast colour by using other materials. You will find full information on such subjects in "O'Neill's Dictionary of Dyeing and Calico Printing." We cannot tell you the prices of yellow glass; we believe it varies from about one shilling to two shillings a square foot.

S. C.—We see no advantage of any kind in the use of blue glass for the studio. White glass admits just as much actinic light as blue glass, without the disagreeable effect and sensation of gloominess present when blue glass is used. You will find an article on the "Glass Room" in our Year Book, now in the press.

J. H. W.—We have not much faith in any method of reviving faded photographs. We fear there is no method of efficiently getting rid of the colour on your slides tinted with sulphate of copper.

Gillard.—We believe most of the makers of first-class cameras, &c., such as Meagher, Hare, and many others, make table-camera stands. You will find something more about Mr. Bartholomew's process in the present number.

A Novice.—The best aspect for the sitter to face is the north, because it is the most steady light, having the least variability. In a well-arranged glass room you may vary the position somewhat to suit circumstances; a little inclination to north-east or north-west will not do any harm, but unless you happen to have an open space of light from one of those quarters, we don't see any advantage to be gained from either. See an article on the subject in our Year Book for 1863.

G. F. L.—Pure gutta-percha may be used for the silver bath without risk. The chief difficulty is to know when you have got pure gutta-percha. For that reason many photographers avoid its use for silver solutions; for washing-trays, hyposulphite solutions, &c., it may be used without any disadvantage.

S. M.—We believe there is no especial difficulty as to the admission of photographic apparatus into Holland. The quaint old architecture of many of the towns is effective in photographs; the months of January and February are not very propitious for photography, but this is of less consequence in reference to architectural photographs than to any other subject.

Perplexed.—We have not seen any of the very highly glazed portraits of the Princess Alexandra to which you refer, we cannot, therefore, tell you how they are done. Talc or mica can only be applied to the card when fitted into some case or frame, as it could not easily be attached to the card itself. It is possible they may be varnished, as there are several kinds of varnish occasionally used for such purposes. Possibly it is a kind of French polish sold for the purpose, consisting of two applicatiins; first, a solution of gelatine, as a sizing preparation, and then a solution of white lac in alcohol, applied after the usual method in French polishing.

A Constant Reader.—Chloride of gold may be kept in a strong solution with advantage. A toning solution of chloride of gold and acetate of soda will generally keep for months; with carbonate of soda, however, it often becomes useless in a few hours, especially if added in any excess.

W. Ball.—Temperature materially affects the operation of toning. Many operators warm the solution in winter. The paper may be a little in fault, but longer time in the toning solution, or a little more gold, or a little elevation of temperature, will probably help you. Your print is a little too brown, but the tone is not very bad.

F. Vincent.—One of the great difficulties of development printing on large sheets of paper, is the tendency to tear in washing, &c. If you wish to use very large sheets, you will probably have to use drawing paper, or good cartridge paper. Some of Whatman's drawing papers will probably answer the purpose best. 2. Large sheets of paper may be prepared with the resinizing solution, with a glass triangle, as you propose, taking care that the paper be well saturated.

Charles Derby.—We shall be glad to see a description of your photometer.

Coagulated Albumen.—We have received a letter on this subject, from Plymouth, without any signature. Will the writer kindly forward his signature.

F. M.—A much stronger iron developing solution may be used, with more advantage in winter than in summer; you may use 30 grains to the ounce with advantage. A 5-grain solution is too weak at any time for a bromo-iodized collodion, for which a somewhat stronger solution of iron is desirable than for a simply iodized collodion.

Resinized Paper.—In an advertisement in our last, announcing that this paper is prepared by Messrs. Francis and Co., of Islington, the price should have been 12s. per quire, not 2s., as appeared in consequence of a printer's error.

Several correspondents in our next.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 224.—December 19, 1862.

## JURORS' REPORT ON PHOTOGRAPHY AT THE EXHIBITION.

The Report of the Jurors, in Class XIV., has just been issued. It is a somewhat lengthy document, of about seventeen closely printed imperial octavo pages. It contains a brief history of photography from the period of its discovery to the Exhibition of 1851; from that period to the present time its progress is more definitely traced, both as regards its processes and applications. The contributions to the recent International Exhibition, both in apparatus and pictures, are then fully reviewed with much discrimination; the tone of the Report, in many instances, compensating for the injustice in the awards of prizes. As the subject is one of great interest to photographers generally—and it is important to preserve a record of such a Report—we shall, by permission, reprint the bulk of it in our pages. We must defer this, however, for another week, so as to commence it in our new volume.

## RESINIZED PAPER.

A recent number of the *American Journal of Photography* has some remarks on resinized paper, which are scarcely just, and display some misapprehensions on the subject. The editor says:—

"The English journals are full of the discussion of a new (?) process of preparing paper with resins, as a substitute for albumen. The resins (with a suitable quantity of chloride) are dissolved in alcohol, and into this bath the paper is immersed; after drying, the silvering and printing go on as usual. The editor of the News, with some others, were quite enthusiastic at first—albumen had had its day; but later, on trial and on sober reflection, it appears that there is nothing in it. The gum becomes dark, the surface does not preserve its integrity, the details of shadows are no better than on plain paper, and so on.

"We introduce the matter here chiefly in order to make a proper occasion to suggest to our neighbours, before they proclaim a discovery, that it would be well to find out if the discovery be of recent or ancient date. Such an inquiry conscientiously made concerning resinized paper might have saved our good neighbours from the awkward predicament in which we now find them.

"About two years ago, Mr. Snelling, our late esteemed brother editor, talked much about resinized paper, and showed prints on it, and imagined advantages; others did not see the advantages, and the subject was buried in oblivion till its resurrection by Mr. Cooper, of London. We do not charge Mr. Cooper with plagiarism; indeed we cannot, for his process is greatly less perfect than Mr. Snelling's. Mr. Snelling used gum dammar, which is less changed by light than any other gum, while Mr. Cooper seems to have used the gums which darken most promptly. Mr. Snelling used chloride of ammonium, while Mr. Cooper recommends the deliquescent chloride of cadmium."

We must correct our American *confrère* on one or two points. On trial and sober reflection we remain fully convinced of the value of resinized paper, and feel certain that for many purposes it is better than any other. We have seen some most charming prints upon it, which were, to our taste, decidedly more artistic in effect than albumenized prints, and richer and more delicate than most plain prints. We never believed that for small pictures, such as card portraits and stereoscopic slides, albumenized paper would be discarded; but, for larger pictures, we hope to see resinized paper largely take its place.

Regarding the originality of the process, we have no disposition whatever to deny to our American friends any credit which may be due to them, and always readily concede to them both ingenuity and manipulative skill. But we certainly do not remember the intimation of the use of resin referred to, and we feel perfectly assured that Mr. Cooper had not seen or heard of such a thing. Indeed Mr. Cooper is, in the paragraph quoted, acquitted of plagiarism, but for a reason to which we must demur. We must here insist also upon a principle we have often maintained—namely, that he is best entitled to the credit of invention who works out a process to a practical and successful issue. That Mr. Snelling failed in establishing the use of resinized paper we can well conceive, from the outline of the process given. He used, it is said, gum dammar as the resin, and chloride of ammonium as the salt. Now, gum dammar is very sparingly soluble in alcohol, although quite soluble in benzole or turpentine, which solvents, however, would not dissolve the chlorides. Then chloride of ammonium is still less soluble than dammar in alcohol, scarcely a trace being taken up. Mr. Snelling's paper would contain but little resin, and scarcely any chloride at all. It is not surprising, therefore, that he did not succeed in convincing others of the excellence of his prints, or in establishing his process.

## PHOTOGRAPHIC CHEMICALS:

### Their Manufacture, Adulteration and Analysis.

*Iodide of Magnesium.*—This salt is sometimes used as an iodizer for collodion; it is, however, not a very good one for that purpose. It may be prepared by neutralizing hydriodic acid with pure carbonate of magnesia, employing the latter in very slight excess. When all the acid reaction has disappeared, filter, from the undissolved carbonate, and evaporate over a water bath. The solution will dry up to a difficult crystallizable salt, very deliquescent and easily decomposing by exposure to the atmosphere, with separation of iodine. Upon exposure to heat hydriodic acid is given off, and pure magnesia remains behind. According to Gay Lussac, when magnesia and iodine are brought together under water, reddish brown plates are deposited, and a small quantity of iodate and hydriodate of magnesia are found in solution; these, on evaporating the water, are likewise changed into brownish insoluble flakes. This brown compound is resolved by heat into magnesia and vapour of iodine. Boiled with a large quantity of water, it is converted into iodate of magnesia and iodide of magnesium, which dissolve, and magnesia, which remains as a white precipitate. The anhydrous iodide of magnesium has not been much examined yet.

*Bromide of Magnesium* possesses some interest, as being the salt which exists in sea water, and from which most of the bromine of commerce is obtained. The hydrated salt is prepared in a similar way to the iodide just mentioned. The solution, upon evaporation to a syrup consistency, deposits the hydrated bromide of magnesium in crystals; they are very deliquescent in the air, and prone to decomposition. The last portions of water should be removed by being placed under a bell-jar, the air of which is artificially dried by sulphuric acid. The anhydrous bromide of magnesium is formed by passing vapour of bromine over a mixture of magnesia and charcoal, at a red heat, a white mass of crystalline aspect, not fusible below a red heat, and with difficulty volatile, is produced and carried forward by the carbonic acid gas away from the magnesia and charcoal. This is anhydrous bromide of magnesium; it dissolves in water, with evolution of considerable heat, hissing like a hot iron, and then forms a solution of bromide of magnesium similar to the one above described. The elements of water are retained by this salt, as part of its constitution, and, when once united with it, they cannot be driven off without causing the whole to decompose: the anhydrous salt is a compound of bromine and magnesium in equal equivalents, but when once it has come in contact with water it seems to be converted, by the assimilation of oxygen and hydrogen, into a compound of hydrobromic acid and magnesia, which, when dried and heated, splits up into these two bodies. When dry bromide of magnesium, or a very concentrated solution, is mixed with oil of vitriol, bromine is evolved. A dilute solution, on the contrary, upon addition of sulphuric acid, evolves the whole of the bromine in the form of hydrobromic acid. Bromine added to magnesia forms a hypobromite of magnesia analagous to bleaching powder, and containing hypobromous acid, the compound discovered by Mr. Spiller some years ago. Upon shaking bromine and magnesia together with water, and filtering, a yellowish liquid is produced, which first turns reddened litmus blue, and then bleaches it; bromine is evolved on the addition of even the weakest acids. Light, heat, excess of bromine, or even evaporation in vacuo, decompose this compound into bromate and hydrobromate of magnesia.

*Chloride of Magnesium* is used in the preparation of metallic magnesium. It is best prepared in the following manner:—Divide a certain quantity of hydrochloric acid into two equal parts, saturate one of these with magnesia and the other with ammonia, then mix the two solutions together and evaporate to dryness, a salt will be left behind consisting of the double chloride of magnesium and ammonium. This must be thoroughly dried and projected in small quantities at a time into a red-hot platinum crucible; continue the heat until all the chloride of ammonium is expelled, and the mass enters into tranquil fusion. Anhydrous chloride of magnesium, as prepared in this manner, forms a white translucent mass, consisting of large flexible crystalline plates with a pearly lustre. It fuses upon gentle ignition, forming a clear liquid; when perfectly dry it may be heated to redness without decomposition, but when water is present it undergoes a similar decomposition to the bromide, evolving the acid and leaving magnesia. Exposed to a moist atmosphere chloride of magnesium deliquesces, forming an aqueous solution, which may be supposed to contain hydrochlorate of magnesia. This compound may be much more readily prepared by dissolving magnesia, or its carbonate, in dilute hydrochloric acid, and, evaporating the solution, it crystallizes with difficulty in needles and prisms, and has a sharp bitter taste: it is very soluble in water, dissolving in about half its weight; it is, also, tolerably soluble in alcohol. When chlorine gas is passed through water in which magnesia is diffused a liquid is obtained which has powerful bleaching properties, not destroyed after a quarter of an hour's boiling. This is a mixture of hypochlorite with hydrochlorate of magnesia, similar in composition to chloride of lime: if the magnesia be in excess it is decomposed by evaporation, whilst, if the chlorine has been passed through to saturation, the solution is likewise gradually and spontaneously decomposed.

*Nitrate of Magnesia* was much used formerly for the preservation of sensitive photographic plates, and possesses some interest, as being the first practical suggestion which was made for that purpose: it is prepared by dissolving magnesia in nitric acid, and concentrating by evaporation. It crystallizes, on cooling, into rhombic prisms and needles, which have a sharp bitter taste, and deliquesce rapidly in the air, dissolving in half their weight of cold water, but being almost insoluble in absolute alcohol. The salt was utilized in photography, by coating the washed collodion plate with a solution of a certain strength of nitrate of magnesia containing a little nitrate of silver. The deliquescent character of the film of nitrate of magnesia, with which the plate was thus coated, retained the sensitive surface in a moist condition, admirably adapted for receiving the luminous impression. With carefully prepared nitrate of magnesia and suitable collodion nothing could exceed the beauty or certainty of the process, even after the plates had been kept for some weeks. The tendency of nitrate of magnesia to form basic compounds, and the difficulty which experimenters had, in consequence, in obtaining a salt of a uniform composition, has caused this process to be now but rarely employed.

## INSTANTANEOUS PHOTOGRAPHY.

BY VALENTINE BLANCHARD.*

I purpose this evening, with your kind permission, to describe the method I adopt in the production of the pictures before you, and to point out some of the many difficulties which perpetually cross the path of the operator who adopts the wet process for out-door operations, but the more especially when aiming for instantaneous effects; but, before proceeding to the details, I will, if you will permit me, glance, by way of preface, at the labours of the veteran photographers, who may be fairly considered the pioneers who have cleared the way, and who have, by their bold achievements, made safe the path to the timid who follow slowly in their footsteps.

The productions of Le Grey are familiar to most of you. All must remember the burst of admiration which greeted the appearance of his first cloud effects; and the opinion at that time was freely expressed, that a new era had commenced for photography. Tried by the present standard, these productions may not be considered remarkable; but to those who may be disposed to be hyper-critical, let it be said that he may justly be considered the first to indicate the direction in which to work; and when we take into account the size of the pictures, and consequent difficulties in procuring a lens of long focus capable of working quickly, and also of obtaining a film of sufficient sensitiveness, we must say that all honour is due to him for his labours.

Immediately following in his steps, but working in somewhat a different direction, came Wilson, whose pictures, tried by no matter what standard, have never yet been surpassed. I shall not readily forget my impressions on seeing, for the first time, his wonderful sunset and sunrise effects. The boldness of the idea which prompted him to turn the daring gaze of his lens at the sun—and coming suddenly, too, upon our old notions about the necessity of keeping the sun *out* of the lens—almost took my breath away.

On glancing at the immense number of pictures Wilson has produced, and the wide range of effects introduced into them—the life and vitality apparent in all of them—it must be admitted, by those most chary of praise, that photographers are all much indebted to him for having produced the greatest number of really beautiful pictures that have yet been secured by photography. The statement that Breese had really produced moonlight effects was, for a long time, considered quite mythical; and many will remember the amusing incredulity of some of the French journals; but after an inspection of his charming studies in the International Exhibition, I think the most sceptical must have been convinced of the reality of the fact.

I was much amused the other day, in taking up a journal containing an extract from the Birmingham paper, giving a glowing description of his instantaneous pictures of the opening of Aston Park. As that is now some five years gone, I think to Breese is due the honour of having first produced instantaneous street pictures. I am not, however, sure on this point. In our list of worthies, we must not omit that of England, whose American pictures, especially those

* Read before the South London Photographic Society, Dec 11th, 1862.

of Niagara, were considered so wonderful, but who has since obtained undoubtedly the best series of street views (of the finest city in the world) yet produced.

The question is repeatedly asked by the uninitiated, who see instantaneous pictures for the first time, to what wonderful discovery are these results due? and they stare with incredulity when informed that most of the wonderful effects of Wilson are produced by nothing more startling, in the shape of an instantaneous shutter, than a Scotch cap dexterously placed over the lens.

Now, in describing my plan of working, I need scarcely say that I have nothing new to announce; but I trust that something profitable will come of the discussion, to repay you for the tedium of listening to much that is commonplace. All the pictures before you are produced by iron development. I find in practice that, by using a bromo-iodized collodion, I can employ a bath much stronger than is ordinarily used, and can also use the iron solution in a very concentrated form.

The most instantaneous results I have yet obtained, have been secured by using fused nitrate of silver for the bath; but, unfortunately, it is so uncertain in action that I cannot recommend it. I will begin by describing the bath. It is made 40 grains to the ounce, and is saturated with iodide and bromide of silver. I find in practice that the immersing a plate is not sufficient; and that, when that method of saturation is employed, the plates sensitized in a bath so pre-prepared—especially if kept a short time before they are developed—will be covered with myriads of microscopic pinholes.

For instantaneous operations, the re-crystallized silver is necessary. The commercial article will frequently answer, but is not to be absolutely relied on. The best plan is to assume that it is acid, and drop in a few drops of moist oxide of silver; and then, after filtration, to add three or four drops of very weak nitric acid—say one part of acid to one hundred parts water. It will be found that a bath so prepared will be in its most sensitive condition.

The bath very rapidly deteriorates, and soon looses sensitiveness, and is, therefore, unfit for operations when very rapid effect are desired; but it will be found to be in splendid condition for ordinary work.

I always use bromo-iodized collodion; for though, under some conditions, iodized collodion will give very rapid results, still, as a rule, the negative, though denser than that produced by bromo-iodized collodion, will be found to be too strongly marked in the contrasts, and that the delicate shadows will be buried long before the high lights are well printed. In some cases, where the subject to be photographed presents strong contrasts, I have used equal parts of bromide and iodide with great advantage.

For development, the iron solution is generally 30 grains to the ounce, and frequently 50. I am particular to employ glacial acid that is really pure, for much of the acid sold is not fit for photographic purposes, as it causes the silver to be reduced irregularly upon the plate, with a coarse metallic reduction in the shadows.

The dark box I employ I consider very portable, for it does not take up more room than a portmanteau when packed. I prefer to work through sleeves, for I have a strong objection to tents. A photographer working for instantaneous results should be very cool and collected—a state not easily obtainable with the thermometer at 90° in the shade, and the unhappy operator not only boiling over with perspiration, and made game of by the boys, but *bagged* as well. But the greatest objection to tents is the difficulty of keeping dust under subjection. We know that malevolent spirits love to abide in inanimate objects, otherwise how is it that the handles of jugs will come off—that bottles will tumble off shelves, and glass measures butt at each other until one or both are smashed? I presume this supposition is the only way of accounting for the large amount of spite found to animate a small atom of dust. Most certainly dust is always present in large or small force, watching the operations of the photographer; and when his back is turned, darts down into the most conspicuous spot in the negative, which is regarded by these mischief-making spirits as the post of honour. This is no isolated experience. I appeal to all present, if, in portraits, the nose is not always selected for the final abode of these very small atoms of dust?

I have found great difficulty in procuring yellow glass that is really nonactinic. I have, too, thicknesses of glass pronounced by the shopman to be absolutely impervious to chemical light, having been tested by the spectroscope; but I am compelled, when the light is very bright, to hang a piece of yellow calico over the window.

Too much attention cannot be paid to this matter, for one of the chief sources of annoyance is caused by faith in the obstructive power of the glass. When a plate shows a tendency to fog, it is so easy to blame the bath, the developer, the collodion—in fact, anything but the real cause, which is above suspicion.

I like to finish the negatives on the spot, when possible; but when working for rapidly-changing cloud effects, a great loss of valuable time would result. I, therefore, after fixing, coat the plates with diluted glycerine, and put them aside in the plate box, to be finished at leisure.

If the negative be tolerably dense, to begin with, the plate may be dried; and after well wetting it again, a saturated solution of bi-chloride of mercury, in cold water, should be rapidly poured over; and as soon as the film is of a uniform grey, the plate should be washed, and a solution of iodide potassium (about one grain of iodide potassium to one ounce of water) may be applied. This should be poured on and off once or twice, until a greenish slate colour is seen. There should be no indication of the greenish colour on the wrong side of the plate, for it would be a proof that too much had been done to the negative.

The instantaneous apparatus on the table, is that employed by me in the production of my pictures during the past summer. You will see it is constructed to give a longer exposure to the foreground than to the sky. The shutter is placed immediately behind the back lens, and is closed by pressure on a rod that comes through the top of the camera. As the rod can be pressed down slowly or quickly, it will be seen that the exposure can be varied at will. The apparatus is manufactured for sale by Mr. C. E. Elliott, and is the invention of a workman in his employ. I consider it a most valuable contrivance; for while the most rapid exposure can be given, if necessary, yet, should the light suddenly fail, as is frequently the case, the rate of exposure can at once be moderated to suit the new requirements.

I have to thank you for your kind attention to a paper hastily prepared; and should I have omitted any detail of importance, I shall gladly answer any question on the subject.

## DIORAMIC EFFECTS PRODUCED ON PHOTOGRAPHIC PICTURES.

BY JOHN TAYLOR, M.D.*

In common pictures a certain definite arrangement of light, shade, and colour are chosen; and by these the *effect*, as it is called, is produced and rendered *permanent* under all varieties of light and position. No change takes place in the aspect of the picture, whether the light by which it is seen is strong or feeble.

The well known inventor of photography, M. Daguerre, many years ago devised a method of executing paintings which could change their effect according to the manner in which they were lighted. Thus, for instance, a landscape first seen as if in the full luxuriance of summer, with foliaged trees and browsing cattle, or groups of figures, would change by insensible degrees into the desolation of winter, with the same objects as previously seen now covered with snow, the

* Read at a meeting of the Glasgow Photographic Association, Dec. 4th, 1862.

figures entirely gone, and no sign of life visible but, perhaps, the glimmer of the fire-light from some cottage window. Those only who have seen such pictures, when well executed and properly managed, can conceive the surprise and gratification produced by these transitions of effect.

In common with every one who has seen these dioramic productions of Daguerre, I have frequently longed to possess some of them, and many years ago even tried my hand at their execution, with sufficient success to enable me to understand the methods of this art, and also to perceive the great labour as well as care necessary to produce the full effect.

These pictures required great skill in execution, with most accurate drawing; and were, consequently, so expensive as to be beyond the reach of ordinary purchase, except for public exhibition.

When the transparent photographs on glass came out, with all their truthfulness and precision, it occurred to me that here again was a chance for the diorama. New trials were set about, and the results are exhibited in the apparatus now before the Society. They are on a comparatively small scale, and their chief defect is, that they can be viewed by only a very limited number of spectators at a time.

If large pictures on glass could be executed with the force and detail of the new art, such an exhibition as never before was possible might be got up on a scale that would render it visible at once to a large assembly of spectators, each of whom, instead of looking through a cosmoramic glass, might be provided with a binocular opera-glass, for the purpose of bringing out the minute details of the pictures.

The apparatus, as at present constructed, consists of—first, the cosmoramic box in which the picture is contained; second, the colour cylinder, by which the picture is illuminated; third, the twisted string and viscid liquid, by which the motion of the colour cylinder is maintained and regulated.

The cosmoramic box is a rectangular box, three feet in length, by two feet deep and two feet broad. In the one side of this there is an opening of about the same size as the picture. A sliding frame, having two apertures capable of containing two pictures, is so arranged that it can bring either of the two pictures to be viewed through the opening in the box. The use of the frame is to allow one of the pictures to be changed while the other is being seen by the spectators. This is simply, however, a matter of convenience, and has nothing to do with the effects of the apparatus. In the side of the box, opposite the picture, four lenses, each about twenty-two inches in focal length, and about four and a half inches in diameter, are placed—a part of the frame in which they are fixed being made curved, to allow of those at the sides being presented more directly at the picture. The interior of the box is blackened, and in it are placed some small pieces of natural foliage, so as to come, to some extent, between the eye and the picture, to afford variety of form, and to increase the illusion as to distance.

The pictures should be as large as possible; in the present instance they are fourteen inches by twelve inches. They are prepared by carefully dimming the glass, on the opposite side from that of the photograph, with a small portion of fine white-lead paint, applied by means of a pad of satin over cotton wadding. Careful manipulation is necessary to apply this, so as to make it look like finely and very slightly ground glass. The sky and all the parts of the picture should be similarly dimmed; but over hills, buildings, and other opaque objects, the film of paint must be made thicker, so as to obstruct the distinct vision of objects through them. A little practice easily enables the operator to judge of the degree of opacity required. The picture might now be put into the apparatus; but a better effect is produced by applying thin films of appropriate colour, by means of the dabber, over the white lead. Delicate bluish tints over parts of the sky and distance, and of warmer colours on the near parts, increased in strength on prominent objects, such as figures, will add strength and contrast.

The colour cylinder consists of a light cross of wood, with a wire encircling its outer border, so as to form a hoop of about six feet in diameter. To this is fastened the upper edge of about eighteen feet of white cotton cloth, in such a manner as to form a cylinder about three feet deep. The lower edge is kept stretched by a hoop of wire without any cross-bars in it. The outside of the cylinder is painted with oblique bands and irregular cloud-shaped patches of colour and darkness alternating with light. The colour of the lights round the cylinder varies from white through yellow, then orange, and ultimately red and deep crimson, so as to represent the transitions from daylight, through the evening colours, to darkness. The inside of the cylinder is also painted, but each portion of a different hue from the corresponding part without. This cylinder, being made of collapsable material, can be flattened into a disc for packing or putting aside when out of use. When in use, it is suspended, at the centre of the cross, from the roof, by a string four or five feet in length, made of about twelve strong threads. This string, when twisted, communicates, in unwinding itself, a rotatory motion to the cylinder. To regulate this motion, a rod or thick wire passes down from the centre of the cross for a distance of about three feet, and has attached to its lower end four vanes of tinned iron, which dip into some viscid liquid, such as molasses, placed in a dish at the proper height. It is easy, by raising this dish, or by lowering the cylinder, to produce as slow and steady a motion as may be desired. When it is requisite, more twist can be given to the string by pulling a thread which has previously been wound round a bobbin, which runs on a small axis attached to the cross. This apparatus is exceedingly simple and efficient in its action, though, without a diagram, rather tedious to describe.

To afford the requisite light, a row of four or five gas-burners is placed along the front of the cosmoramic box, immediately above the pictures, but so arranged that no portion of direct light falls on the picture. The colour cylinder is placed at a distance of about ten inches from the gas jets, and a white surface, such as white-painted tinned iron, is put behind the gas jets, to throw forward the light to the cylinder, which would otherwise pass backward toward the eyes of the spectators. Another light, consisting of two or three gas jets, is placed inside the cylinder, at a distance of six or seven inches from the side next the picture. Both of these lights, the external and internal, are controlled by stopcocks, to enable the operator to vary the effect at pleasure, by lessening or increasing them alternately.

The only remaining portion of the apparatus consists of a means by which the appearance of a moon or sun can be introduced into a picture, or by which one picture can be made apparently to dissolve into another; or a summer effect may gradually seem to deaden down into winter, with a covering of snow, &c. The means by which this is accomplished—though it occurred to me without having seen anything of a previous invention—I now find has been in use in what is called the dissolving stereoscope. I have not seen this instrument, but am told that the method is the same. A plate of thin glass, nearly as large as the box will hold, is placed in its interior, at an angle of about 45 degrees with the horizon, the lowest edge being nearest the spectator, and the highest nearly close to the upper edge of the aperture in front for the pictures. In the roof of the box another aperture is made, and another picture is laid on it. The result is that, when a white reflector is put above this picture, the latter is seen by reflection in the glass plate, and appears to occupy a position in front similar to the ordinary picture. By shutting off the light from the painted cylinder, the first picture vanishes, and the second vividly takes its place, or by illuminating both they are seen overlapping each other. If a sky, covered with clouds, and having a transparent portion to represent the sun or moon left in it, is put on the upper opening, the ordinary picture in the front aperture may be made to appear as if the clouds were clearing away, and the moon bursting forth in the sky. So also a photograph of a summer landscape being placed in the front aperture, and the same scene taken in winter placed on the roof, the one can be made insensibly to change into the other.

A peculiarity of these pictures, exhibited in the manner described, is the apparent depth of their atmosphere. The clouds seem, as in nature, to lie far beyond the buildings, and behind each other.

These appearances are due to the actual difference of distances from the eye to the pictures of the buildings, &c., and to the colour cylinder on which the clouds are moving requiring a different focal adjustment of the eyes, and a corresponding perception of difference of distance. This effect is heightened by the presence of the lens through which the spectator is looking. The apparent motion among the clouds themselves, by which one set seems to move faster than the other, in close imitation of nature, is owing to a different cause, which may be shortly described as follows:—The colour cylinder, on which the clouds are depicted, is illuminated by two different lights—one shining on it in front, the other from within—and therefore casting transmitted light and colour on the picture. The clouds on the outside are seen through the sky of the picture, and move with the common velocity of the surface of the revolving cylinder. The clouds depicted on the outside are shown only as shadows cast on the picture from the internal light, and appear to move as much faster than the real cloud or portion of the surface of the cylinder on which it is depicted, as the picture on which it falls is further from the internal light than the surface of the cylinder. So by using at the same time an internal and an external light, and by placing the internal light more or less near the surface of the cylinder, we can have any required degree of apparent relative motion between the different masses of cloud.

A remark has sometimes been made by those who have not seen the effects produced by the dioramic apparatus of which we are now speaking, but have only heard a description of it, that as the bands of colour on the revolving cylinder pass successively behind all the solid objects represented in the picture, such as mountains, buildings, &c., as well as behind the sky portion, these objects must become tinted with the same hues as the sky, the water, &c., and thus a degree of monotony of colour will be produced, which would not be in keeping with the variety seen in nature. In reply to this, it is sufficient to observe that in the preparation of the photograph for use in the instrument, the different parts of the picture are themselves tinted on the glass with different colours—not strongly, yet sufficiently to distinguish them from each other, and to modify any hue which may afterwards be transmitted through them from the colour cylinder. For instance, the sky and distance may be tinted of a bluish or cool neutral grey; while near buildings, banks, roads, &c., have varying tints of red, yellow, or brown.

The effect of this is, that though a piece of flat colour were put behind them all, they would each retain partly its own shade, while partaking of the general hue of the background. Those who are familiar with ordinary pictures, the production of the artists's hand, know how rare it is to see a work well varied in colour, yet possessing a glow as of real light. They also know that this latter quality is got, not by the mere brightness or whiteness of the colour, but by the prevalence of a certain *unity* of hue through the whole picture, giving it what is called *tone*—a quality eagerly sought after by artists in the finishing up of their works. It is often given by a thin wash or glaze, as it is called, of one colour over the whole picture. The effect of this glaze, if properly managed, is, though dark in itself, to make the picture look brighter or more luminous than before.

In nature we constantly observe this tendency of light, when brilliant, to imbue all the objects seen by it with its own hue. In a sunset, for instance, if the light be dim, we see the light of the sky of a yellow or red tinge, while the objects seen against it, such as mountains, spires, &c., seem of a cold grey, or even of a blue colour. But let the light become intense, as in a vivid sunset, the whole of the intervening atmosphere partakes of its hue—the distant mountains, as well as the nearer masses of foliage and buildings, lose, in a great degree, their local colour, and take on the tint of the light. Hence the expressions—"a yellow radiance filling all the vale;" the whole landscape was "steeped" in sunshine. The term "bathed in light," and many others of a similar import, refer to the same "toning" effect of bright illumination. The philosophy of the origin of this effect of tone would be a subject for long discussion; but it may be briefly stated that the chief causes of it are—the illumination of the atmosphere, the effect of reflected lights, and a physiological action of light on the eye itself, producing what is called "irradiation."

This quality of tone, proceeding from one prevailing hue, is essential to every picture which is to represent brilliant illumination. It is a chief source of beauty in landscape, and it fortunately happens that it can be got in those transparent glass photographs when subjected to the dioramic apparatus more perfectly than in any other species of picture; hence their aptitude for representing the brilliancy of noonday sunshine, or the splendours of tone of dawn or sunset.

To judge of the capabilities of this dioramic apparatus, it is necessary to watch for a considerable time the succession of changes which appear, and also to witness them on several pictures and in favourable circumstances. On an occasion like the present, this, I fear, will not be easily accomplished; but I must only assure those who may not succeed in seeing any effect which comes up to their expectations, that it is, in some degree at least, the fault of the circumstances.

I have thus described the simplest form of the dioramic apparatus and the mode of exhibiting some of its effects, and have only time to allude to other modifications of construction by which greater efficiency can be produced. 1. By a sliding frame in the roof aperture of the cosmoramic box, various skies can be successively introduced, as moonlight or sunset effects, &c., the same picture all the while remaining stationary in the front aperture. 2. By a little skilfully-applied tinting with the brush on the side of the picture which is to be placed next the spectator, and by the introduction of a light on it from the interior of the cosmoramic box—while the illumination of the colour cylinder is kept low—it is easy to produce on the same picture many changes, such as the vanishing of figures, &c., as in Daguerre's dioramas—the figures, &c., re-appearing when the front light is lowered, and the back light from the colour cylinder again made to traverse the photograph.

## A SHORT LESSON IN PHOTOGRAPHY.—No. 7.*

### HOW TO TAKE A MELAINOTYPE.†

*Light.*—A single ray of light produces too great a contrast of light and shade.

A brilliant light, as the direct light from the sun, is very unmanageable, and under all circumstances with solid objects produces too great a contrast of light and shade.

Two equally brilliant lights produce on the eyes of the sitter two illuminated circles on either side which are not artistic; and the effect of two such lights fails to produce a proper degree of contrast.

The mild light from a cloud, or a clouded sky, is the easiest to be managed, and produces effects that are agreeable and soft in contrast.

A single light, from whatever direction it may proceed, can be converted by reflectors into any number of lights, and may be made to take any direction whatever.

Therefore it is in our power to arrange our lights according to circumstances.

To avoid the direct rays of the sun we choose a skylight facing the polar star; and, if possible, place our model in front of the inclination. The skylight is furnished exter-

* From *Humphrey's Journal.*

† A melainotype is the American name for a collodion positive on an enamelled iron plate.

nally—that is, on the roof—with vertical projections on the east, west, and south sides, in order to exclude the rays of the sun more effectually. The same end can be attained by making the panes all translucent by paint, or by interposing a curtain. The light that thus enters is the diffused light from the sky, or the reflected light from the clouds; which light may be made to fall perpendicularly or at any angle between 90 degrees and about 45 degrees. The side lights, which are intended to soften the shadows produced or left by the skylight, can be obtained either directly from side windows, or by white screens which admit of being arranged at any angle whatever in the neighbourhood of the sitter. The latter must not be placed immediately beneath the perpendicular light, otherwise the head will receive the most light, and will produce by contrast white reflections. It is very difficult to tell you how to arrange the moveable screens for every special occasion; although it would be an easy task to show you how if the case were present.

I will tell you a few general principles. Place your sitter not beneath the skylight, but about one foot farther back, and fronting the north pole as before observed. In this position the face is equally illuminated, and the shadows are equally dense and similarly placed; these shadows are offensive; you will find them beneath the eyes-brows, the cheek-bones, the nose, and the chin. All these can be softened down by placing a white screen in front of your sitter and inclined at an angle of 45 degrees or less with the floor of the room. But by this proceeding we have two inconveniences; the one is that, when the screen is so placed, you cannot see the model in front, unless you have a hole in the screen to allow the light to pass to the camera; the other is, that your picture will be quite flat, because the face is equally illuminated and free from shadow, and consequently devoid of contrast.

Both these inconveniences can be obviated at the same time by placing the screen either to the right or left of the camera facing the sitter, so that the whole figure can be seen. If you place the screen either exactly east or west of your model, one side will be in the shade, whilst the other is well illuminated. This must be avoided. Side lights can be used so as to produce the same relief of shadow on either side by means of curtains. Your success as a photographer depends very much on the happy arrangement of your lights. It is a very curious fact, that you may frequently experience, as a beginner, that of having the whole figure and face of your sitter suffused with much light, and yet you will have great difficulty in obtaining clear and bright definition on the ground glass; whereas, with much less light, the picture on the glass is clear and distinct. With the latter condition you will easily take a photographic impression; with the former you will not succeed. Therefore, let this always be your criterion: if your picture is not clear, not easy to see, not sufficiently contrasted with objects around on the ground glass, make no attempt at photography; on the contrary, arrange your lights otherwise; soften or contrast them by curtains; by means of screens contrast light and shade so that they may exist as required or desired, until your picture stands out as it were in perfect relief and definition; then proceed and sensitize your plate.

*Sensitizing Bath.*—Dissolve one ounce of nitrate of silver in twelve ounces of rain water; add to this a grain or two of well-washed iodide of silver; shake well; let it stand some time (for instance over night), then filter and use; for, if the nitrate of silver has been properly prepared, the bath is ready for use. Now try a picture. Brush off all dust from the surface of the plate with a broad camel-hair pencil, and float it with collodion in the manner already described in one of my previous lessons. As soon as it is covered, and the collodion has all run off from one corner, hold the plate horizontally, until the whole surface is perfectly free from ridges; otherwise your picture will exhibit these ridges when it is finished. Now introduce it into the bath, and let it remain for a couple of minutes until the collodionized surface has assumed a uniform cream colour; move it slightly up and down in the bath to remove the apparent streaks of oil, arising from the ether and alcohol in the collodion. Now place the plate in the plateholder, and expose it in the camera before your model. The time required will vary with the season of the year and the time of the day. Experience alone can guide you, as soon as you know the general principles connected with the subject. Try, on the present occasion, six seconds. We will now test two things: firstly, whether the time is right; and, secondly, whether the bath is in a right condition.

*Developer.*—The developing solution consists of two drachms of protosulphate of iron in four ounces of water, to which add from four to five drachms of acetic acid; that is, five drachms in summer, and four in winter, and two drachms of alcohol. Pulverize the iron, dissolve and filter. Float the plate in the dark-room with this solution. We will suppose the picture begins to appear immediately; but the dark dress, that is, the blue dress of the soldier, remains perfectly white; it does not change in the slightest degree; the time is too short; try, therefore, two seconds more, and even more than this if required, until the collodion-film of the dress begins to exhibit gradations of shade in the folds. When this is attained, you have got the right time of exposure. But now you have to get the right time of development. This is not a difficult task. Observe well the change of tone as soon as the development commences; it will proceed until the bright lights have all darkened; the darkening then stops all at once; the contrast already manifest between the lights and shades begins to be impaired; a retrograde action sets in, and the whole surface soon becomes fogged or covered with a veil. The line of demarcation between the two actions is quite visible to an experienced photographer; you have to learn to distinguish it. The moment the bright lights cease to darken, or the retrogade action of fogging commences, then stop all further action of development by washing the surface well with water; then fix with a solution of cyanide of potassium. For the present we will suppose you have made a successful melainotype. In the next lesson I will suppose the contrary, and expatiate on the subject.

## PHOTOGRAPHIC PIRACY OF ENGRAVINGS.

Mr. Gambart is proceeding against photographic piracy of his engravings in the superior courts, and under the old Engraving Copyright Act. We compile from several morning papers the following account of a recent action before Mr. Justice Willes, in the Court of Common Pleas:—

### GAMBART V. HALL.

Mr. Collier, Q.C., Mr. Prentice, Mr. Brandt, and Mr. John Thompson, were for the plaintiff; and Mr. Coleridge, Q.C., and Mr. Rew, for the defendant.

It appeared, from the opening statement of the plaintiff's counsel, that the plaintiff had carried on the business of a publisher of first-class engravings on a large scale for many years, but had lately confined himself to the production of a few, but valuable prints, engraved from paintings of great merit, purchased by him at high prices. In this action, he sought to recover damages for piracy of his copyright in two well-known engravings, taken from equally well-known pictures. The first is a costly engraving of Mademoiselle Rosa Bonheur's "Horse Fair;" and the other, of Mr. Holman Hunt's, "The Light of the World." Mr. Gambart paid Mademoiselle Rosa Bonheur £1,600 for the "Horse Fair," and he paid Mr. Thomas Landseer 800 guineas for engraving it. To Mr. Hunt he paid 200 guineas for the right of engraving his celebrated painting of the "Light of the World;" and to Mr. Simmonds 300 guineas for engraving it, and £130 to the owner of the picture for the loan of it for the purpose of making the engraving. The original picture of the "Horse Fair" has been sold to an American gentleman, and is now in New York. Formerly, spurious prints could only be made by the same means as those used in the engraving of the real plates, and were always very inferior productions; but, since the discovery of the art of photography, the copies of first-class engravings, taken by the newly-invented process, are, in some instances, actually superior to the engravings themselves; and inasmuch as a ten-guinea print may be imitated successfully, and copies sold at prices varying from 6d. to 5s., it became clear that a profitable traffic in photographic copies of valuable engravings might be carried on, and Mr. Gambart found that his best prints were pirated in this manner. The defendant carries on the business of a printseller in Middle Row, Holborn, and on being informed that he was selling photographic copies of the two engravings in question, the plaintiff sent and purchased one of each at his shop, and the purchaser then saw a number of similar copies for sale. The defendant declined to give any other account of how he became possessed of them, than that he bought them from hawkers who went about to printsellers with such things for sale, and refused to give the plaintiff any assistance towards discovering the photographer who had pirated the plaintiff's engravings. The plaintiff then commenced this action against him, founded on the statute 17 George III., cap. 57; and, although interrogatories were administered to the defendant, his answers were far from satisfactory. The plaintiff has also brought other actions against other printsellers, who are selling similar pirated copies of these engravings, which are now pending.

Mr. Gambart was then called and said: I am the plaintiff in this case. I purchased the copyright of "The Light of the World" of Mr. Holman Hunt, for the sum of £210. I paid Mr. Coombe £130 for the loan of the picture, and I also paid the sum of £300 to Mr. Symonds to engrave it. The plate is not destroyed. What is called "the publication line" is on the plate, and was so when it was originally engraved. [The publication line contains "the date of the first publishing, and the name of the proprietor of the plate," according to the statute 8 George II., cap. 13, which requires those particulars to be printed on every print in which copyright is claimed.] The publication line was on the plate before a single impression was struck off. The photographs produced [they were admitted to have been sold at the defendant's shop] was taken from my engraving. The photograph produced [a small photograph about four inches long and three wide] was purchased at the defendant's shop. It is a copy of my engraving, and must have been photographed from it. There is no other engraving but my own in existance. The painting is still in the possession of Mr. Coombe. A photograph could not have been taken from the original painting, because it is too dark. If this photograph had been taken from the original the colours would be different, because there are some dark colours in it which must have come out light if it were photographed from the painting. I never gave the defendant, or any other person, authority to copy that engraving. I purchased the picture of the "Horse Fair" of Mademoiselle Rosa Bonheur. I have sold that picture since to an American gentleman, reserving to myself the copyright. Mademoiselle Rosa Bonheur did not retain the right to engrave. She sold me the picture and the copyright. There are two pictures of the "Horse Fair." One I sold, and one is still in my custody. I purchased the picture for £1,600. Mr. Thomas Landseer engraved it for me. I paid him 800 guineas for doing so. The date of the publication line on that picture is February 20th, 1857. The photograph produced [the same size as the other] must have been taken from my engraving. It could not have been photographed from anything else. I never gave the defendant, or any other person, any right to copy any engraving. The "Horse Fair" and the "Light of the World" were very successful pictures. They are worth to me £1,000 a year as long as I live. I lose money by ninety pictures out of every hundred that I publish; and, therefore, when I get trumps like these two pictures I make them pay.

Mr. Collier:—So you lose by the plain cards and win by the trumps?—Yes. The sale of the pictures was very successful up to the time that the photographs were published.

At this stage, Mr. Coleridge objected to the plaintiff's going into evidence of the depreciation of his property, occasioned by the piracy.

This led to a discussion, when the damages against this defendant were agreed to be taken at £10, but

The Court said that the plaintiff was not to be bound down to this sum as against other parties, but might sue for more substantial damages if they continued the sale of similar copies during the pendency of the question of the plaintiff's copyright.

The plaintiff was then cross-examined.—There are three classes of proofs of prints—artists' proofs, proofs before letters, and proofs with letters. I have known a few cases in which impressions have been struck off before the publication line was put on the plate. Those are exceptional cases. Artists' proofs means the first stage of the plate; proofs before letters the second stage before the title of the engraving is put on. It used to be a common practice, but not by respectable publishers, to put silver paper over the publication line and letters. The "Horse Fair" was painted in Paris. I am having it re-engraved on steel, by Mr. Lewis. To produce the photograph, the print is placed opposite to the camera, and its lights reflected in the camera, which produces a negative on the glass. From a large photograph you can produce a smaller one. [The one bought at the defendant's was a small one.] There is nothing to show whether the photograph produced was taken from another photograph or from the engraving.

The sale of the photographs by the defendant was admitted.

Mr. Coleridge submitted that there was no case. Although the photographs are copies of the engravings in one sense, yet they were not such copies as were meant by the statutes. They were not *fac-similes*.

Mr. Justice Willes.—They are wonderfully good.

Mr. Coleridge.—They are not copies whereby any one could be deceived into believing that they were purchasing original impressions of the engraving. The statutes were intended to protect the inventors and designers. They use the phrase "main design." These photographs are mere abridgments or imitations; they are not copies. Again, it is possible to produce one photograph from another, and there is no evidence that this may not have been so produced. The copy, to be the subject of an action, must have been produced through the medium of the engraving.

Mr. Justice Willes.—The plaintiff, who is a person of great experience, and has given his evidence with great candour, says he believes they are copies of his engravings

The jury said, on the question being put to them, We think they are copies.

Mr. Justice Willes.—I do not intend to decide this question. Photography is a recent art, and could not have been in the contemplation of the Legislature when the statutes on which this action is founded were passed. I know that this question has been much discussed, and that there is a difference of opinion upon it. My present impression is that these are substantially copies, and that the plaintiff is entitled to maintain this action, and I shall direct the verdict for the plaintiff, with the agreed damages of £10, reserving leave to the defendant to move to enter the verdict for him, in case the Court should be of opinion that there was no evidence to support the plaintiff's case on the objections raised.

Verdict for the plaintiff—Damages, £10.

## Proceedings of Societies.

### South London Photographic Society.

The usual monthly meeting of this society was held in the City of London College, Leadenhall Street, on the evening of Thursday, the 11th of December, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The usual routine proceedings having taken place, the following gentlemen were elected members of the society: Messrs. Jeffreys, Richehouse, and W. Sheppard Townsend.

Mr. Harman, the Secretary, exhibited some fine instantaneous stereographs, and a print from an enlarged negative. The original negative was a stereoscopic view of part of the Tower of London; the enlarged negative was 20 inches by 16 inches, and was well defined, brilliant, and perfect.

Mr. Wharton Simpson exhibited an instantaneous stereoscopic negative by Mr. Hurst, of Mirfield, illustrating some of the advantages and defects of ammonia when used in the development of tannin plates. One half of the plate had a clear good image of a wreck, sea, clouds, &c.; but the other half was covered with opaque granular spots, and the image was imperfectly brought out. A great tendency to this kind of defect Mr. Hurst had found to arise, when using ammonia with pyro for development. Mr. Simpson also showed some very exquisite card pictures, taken with Ross's No. 3 card lens, by Messrs. Southwell, Brothers.

The Chairman called attention to a couple of memoranda placed in his hand by the Secretary, from which it was seen that he had received a sum of £8 10s. 3d., and another sum of

£8 2s. 5d. from Messrs. Johnston and Matthey for chloride of silver and sulphide of silver precipitated from the washing water, fixing solutions, &c., accumulated in a very short time. The importance of recovering waste silver was thus forcibly illustrated.

Mr. VALENTINE BLANCHARD then read a paper on instantaneous photography. (See p. 602). On the completion of his paper, Mr. Blanchard exhibited a camera with the instantaneous shutter he employed, and illustrated its action. He also exhibited some very fine instantaneous London street and river views on paper, and some very beautiful glass transparencies of the same subjects, which were much admired.

After a few remarks from the CHAIRMAN on the excellence of the specimens and the interest of the paper,

Mr. WALL called especial attention to the point of view from which the street scenes had been taken. One great defect, which generally characterized such pictures, was that the horizon was much too high—from the fact that the camera had been placed at considerable elevation, probably on the top of a house, or at some high window. The result was an approximation to a bird's eye view, which gave the pictures an unfamiliar aspect.

The CHAIRMAN said this fact had struck him in looking at the specimens. The scenes were from familiar points of view, and yet it would seem impossible to plant the camera in the desirable position in a crowded street.

Mr. BLANCHARD proceeded to explain his method of obtaining the views in question. Being convinced that street views from lofty windows were unsatisfactory—from the fact that few people ever saw the streets from such a point—he had this summer resolved to remedy this evil by taking the negatives from a position in the streets, as nearly all the best views were quite inaccessible from any other place. He had, therefore, during the summer, employed a cab, working inside, and planting his camera stand on the top. He was thus enabled, with but a pause of a minute or two in any place, to secure a view from any point he desired. He had, on the whole, got on without much trouble or interruption in this novel position, although some laughable scenes had arisen during the course of his operations. The only one which at all promised to lead to serious results arose out of the over-officious stupidity of an Irish policeman in Covent-garden. This foolish fellow, seeing a cab with the windows blocked up with yellow calico, and several persons watching it, demanded of the cabman its nature and purpose. The driver simply stated that he was engaged, his fare being inside the cab. Whilst an altercation was proceeding, he (Mr. Blanchard) emerged from the cab; and as he found the policeman excited, vociferous, apparently drunk, and deaf to explanations, he at once desired him to proceed to Bow Street police-station, to settle the matter by reference to the inspector on duty. The officer at the station, on learning the details, at once decided that the cab was properly engaged, and beyond the reach of the policeman's interference, and reprimanded him for not distinguishing between an unengaged cab, loitering and causing obstruction, and one which, being engaged, practically stood for the time in the position of a private carriage.

After some further conversation,

Mr. HARMAN called attention to two prints from the same negative, illustrating his remarks made at a former meeting as to the fact of negatives intensified with mercury and an iodide gradually becoming harder in course of printing. One print was very soft, and showed the original condition of the negative; the other print was so hard and chalky as to be quite useless, and illustrated the result of exposure to light, whilst producing some thousands of prints. In answer to a question Mr. Harman explained that the negative in question had been intensified with pyro and silver, as well as bichloride and odine.

Mr. WALL had had some experience with negatives, and in one instance only had he found that negatives treated with bichloride and an iodide only became harder. His negatives were all kept in the light.

Mr. HARMAN observed that this was altogether different to direct exposure, whilst printing some thousands. The question was an important one to decide.

Mr. BLANCHARD had never met, in his own practice, with an instance of such change, where bichloride and iodide only were used; but he had found that negatives, in which iodide of silver had been formed, changed during constant exposure. He had known some portraits which, having been treated with the bichloride and mercury, had so changed, and he remembered that the collodion gave a spongy film, and the action of the bichloride and iodide seemed to have passed right through, as the negative was brown at the opposite side. In his own negatives, the change seemed to take place on the surface only, the back remaining unchanged in appearance.

Mr. SIMPSON regretted that his remarks must increase the uncertainty of the bichloride and iodide process; but his own experience, and information from many able men, confirmed the notion that such negatives were liable, in some cases, from long exposure to light, to become denser. He had before stated that some of the negatives of the late Mr. Lacy, who, if not the originator of the process in question, gave it precision and also popularity, had become harder. Since last meeting he had had an opportunity of talking further with Mr. Hughes on the subject, who stated that not only had many of Mr. Lacy's negatives so changed, but that the same thing had occurred in his own practice of the same process, where no pyro or silver were used in the intensifying at all. Mr. T. R. Williams had also informed him that after a twelvemouth's experience of the process, he had come to the conclusion that some of the negatives did become harder. The perplexing part of the business was, that some changed and some did not, and as like causes must produce like effects there must be some difference in the conditions, which difference remained to be discovered. It was important to know exactly what the change was which this method of intensifying effected, and this was a point not well understood. When the bichloride solution was applied, there was of course a deposit of bichloride of mercury, which the subsequent application of iodide of potassium converted into iodide of mercury. But the action of the bichloride solution was not simply to cause a deposit of the salt of mercury; it was very probable that a portion of the chlorine was liberated; and, acting on the finely divided silver of the image, formed a portion of chloride of silver. Again, the action of the iodide solution might be to convert a portion of the silver into iodide of silver. Mr. Blanchard's suggestion that the presence of iodide of silver was the cause of such change would thus be explained, and his statement that it had occurred with porous films would further bear out the idea, as such films, by their easy permeability, would favour such changes. But the whole subject required more careful investigation, as conjectural or hypothetical suggestions would not really settle the question.

A conversation on the subject followed, in which Messrs. Sebastian Davis, Hart, Wall, Blanchard, Henderson, and others, took part, but in which nothing further of importance was elicited.

Mr. HOWARD asked how the transparencies were produced, and if the negative had been cut in order to secure each half in its proper position?

Mr. BLANCHARD said they were produced on wet collodion, by printing in the camera. The negatives were not cut, nor was cutting needed, although at first sight that appeared imperative; he had been very sceptical as to the possibility of avoiding it until his friend, Mr. Simpson, convinced him, by means of a diagram and experiment, in which it became apparent that as two lenses were used in copying, and that each picture was turned round on its own axis, this had a similar practical result to cutting the plate in two, and transposing the halves. (Mr. Blanchard here repeated the experiment, illustrating the nature of the operation.)

After some further conversation, Mr. Blanchard stated, in answer to a question, that he used various lenses, chiefly an old pair, one of which was American, and the other made he knew not where. He also used a pair of Shepherd's lenses, which served him very well. In answer to other questions, he said he used a looking-glass as a reflector for illuminating his negative in producing transparencies. He developed them with iron, toning with a solution of bichloride of mercury, followed by hydrosulphate of ammonia, completing the operation before drying.

Mr. SEBASTIAN DAVIS remarked, in reference to the silver bath for instantaneous negatives, that Mr. Blanchard had stated it lost sensitiveness rapidly. There must be a reason for this. Was it caused by the accumulation of a nitrate of the base used in the iodide with which the collodion was prepared, or from an accumulation of organic matter derived from the collodion?

Mr. BLANCHARD could not speak with certainty. He did not think that the accumulation of ether and alcohol was the cause, as he had placed the bath in an open dish in the sunshine to evaporate these, and had still found the bath, even after correction, less sensitive than at first.

Mr. Davis asked the ratio of loss of sensitiveness.

Mr. Blanchard said, perhaps the exposure was a fourth longer.

Mr. Martin suggested, that if Mr. Blanchard used a coloured collodion, the minute portions of nitric acid liberated by the free iodine would gradually cause loss of sensitiveness.

Mr. Blanchard said Mr. Martin was overlooking the fact that he had already said that he always used oxide of silver to correct the bath and neutralize any free acid, and that it was after such correction that the bath remained less sensitive than before.

Mr. Simpson said it was more probably from some effect produced by the accumulation of ether and alcohol. Although Mr. Blanchard had tried to remove these by evaporation, it would be but partially effected, as, even if a bath were boiled down to dryness, the characteristic smell of ether would remain almost to the last, showing that it was difficult to eliminate that body from the nitrate bath.

Mr. Harman suggested that the use of collodion made with methylated spirits would cause this.

Mr. Blanchard prepared his collodion with pure spirit; and Mr. England, who also used pure spirit, found the same loss of sensitiveness.

Mr. Hart said the presence of organic matter was recognized as causing loss of half tone, which was equivalent to loss of sensitiveness, as longer exposure was necessary to get the half tone.

Mr. Leake always commenced by treating his bath with carbonate of soda, and he found such baths gave more sensitiveness and better negatives after having been used a short time.

Mr. Blanchard said that he had observed, that the bath, when discarded for instantaneous work was in prime order for portraiture.

Some further conversation on the subject followed, in which Messrs. Leake, Wall, Harman, and others took part. A conversational discussion ensued, on the cause of increased actinism prevailing when light winds and white clouds were present, rather than with a clear blue sky.

The quality of yellow glass was the next subject of conversation.

Mr. Simpson said he believed it quite possible to get non-actinic glass. The guarantee Mr. Blanchard had received from a shopman who sold him a sample could scarcely be held as ensuring him the most perfect sample made. He had met with samples of silver-flashed glass and of orange pot metal, which not only were shown to cut off all actinic rays in the spectroscope, but gave no reduction on] plates coated with bromo-iodized collodion and developed with iron after thirty seconds exposure to strong light, in absolute contact with the glass.

Mr. Foxlee said the difference in the thickness of the flashed surface, even with silver flashed glass would make a difference in results.

Mr. Martin said it was clear that Mr. Fry had a very non-actinic glass in his dark-room, the window in which had four 12 by 10 panes in it.

After some further conversation on this and other subjects,

The Chairman called attention to a communication he had received from the Photographic Society at Marseilles, soliciting the interchange of papers and general reciprocation of good offices. An exhibition of that Society was also about to take place to which photographers were invited to contribute.

The proceedings then terminated.

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### American Polytechnic Society.

We extract the following from a Report of this Society in the *Scientific American*:—

*Photographic Printing Machine.*

Mr. Fontaine.—This is a machine for printing photograph positives from the negative. It looks, you see, something like a small wooden trunk. The negative is secured in the upper part of the lid directly below an opening through which the light enters, the light passing through the negative as usual and forming a reversed copy or positive upon the sensitive paper below. The sensitive paper is wound on this shaft and is turned under the opening by a crank. The negative is secured by a spring at one edge, and is pressed down in contact with the positive paper for a moment while the paper is stationary, and at the same instant the orifice for the light is opened by the hole in the revolving plate above it coming over the orifice. It will print four pictures a second, which is at the rate of 14,400 per hour. These sheets were printed with the machine, and I will pass them round for inspection. By condensing the light with a lens, 30,000 pictures per hour may be printed.

The President.—I see Professor Seely present; will he please to give us his opinion of this machine?

Professor Seely.—I admire the mechanical ingenuity displayed in the construction of the machine. The process employed is that which Talbot employed in 1840. It has been repeatedly tried, but is not now used to any extent.

Mr. Fisher.—How much time is occupied in changing the sheets?

Mr. Fontaine.—With one assistant (my daughter who is eighteen years old) I can print and finish 350 positives per hour.

Mr. Stevens.—Could this process be used for illustrating a book? I ask this question in reference to a work now in manuscript of an acquaintance who is delaying its publication on account of the illustrations. The work is on physiognomy. Heretofore works on this subject have been illustrated by portraits of different individuals, but the author of this wishes to illustrate all of the passions by a single countenance; showing its expression when in an amiable mood, again when distorted by anger, again in the pomposity of the military strut, and so on. What would be the price of pictures by the quantity if printed on this machine?

Mr. Fontaine.—They can be printed for two cents apiece. I sell them mounted on cards at four dollars per hundred.

Mr. Fisher.—Can you print them on rolls of paper, or is there a limit to the size.

Mr. Fontaine.—By having a slit across the box instead of a circular opening, the printing might be done on a roll by continuous motion. I have a photograph made by this process that is $5\frac{1}{2} \times 7$ feet.

The President.—There would be no difficulty in making a large machine and driving it by a steam engine?

Mr. Fontaine.—There would not.

## Correspondence.

### FOREIGN SCIENCE.

[From our Special Correspondent.]

*Paris*, 17*th December*, 1862.

M. L'Abbe Laborde, whose suggestions in photography always possess a marked interest and value, remarks that if we add to the positive nitrate bath one-fourth or one-fifth of its volume of alcohol, the following advantages will result:—

1st. A saving of the salt of silver, as equal results may be obtained with a weaker bath.

2nd. A saving of time, and a less scrupulous care in the sensitizing of the papers; for the alcoholic liquid penetrates them rapidly, and they require to be left a much shorter time in the silver bath.

3rd. The sensitized papers retain their whiteness for a much longer time.

4th. The silver bath scarcely becomes discoloured with albumenized papers, and most frequently there only forms on the surface a pellicle of reduced silver, which can be removed without having recourse to filtration. It can be skimmed off by means of a strip of paper.

5th. The gloss of albumenized papers retains all its brilliancy, due probably to the more complete coagulation of the albumen, which is coagulated both by the nitrate of silver and by the albumen.*

Herr Otho von Littrow, the son of the Director of the Observatory at Vienna, has invented and constructed a remarkably ingenious spectroscope, which has already given

* The Abbé Laborde, a high authority amongst French men of science, is here repeating the fallacies which we have recently exposed.—Ed.]

very satisfactory results; it enables the observer to discover many more lines in the solar spectrum than are shown in the instrument employed by M. Kirchoff. It is difficult to give an intelligible description of Herr Littrow's apparatus without the aid of diagrams; but it may be stated, as among other advantages it possesses, that it requires one lens less than M. Kirchoff's instrument, and gives double the effect with the same number of prisms, namely, four of flint-glass of 60 degrees. It is contained in a camera, measuring about twelve inches square by five inches in height. Its price is sixteen guineas.

M. Clerville has given the name of *Eau de Patako* to a liquid which possesses the valuable property of intensifying a negative, and at the same time preserving its transparency so as to yield positives on paper which, after being toned, present pure whites and shades of a good tone. The exposure must be complete, as there is no occasion to regard the veil almost always produced by sulphate of iron. Upon removal from the camera, the negative, developed but not intensified, is fixed by any convenient process, and well washed. It is then carried into the light, and its degree of strength ascertained, and the intensifying proceeded with if desirable. A sufficient quantity of the *Eau de Patako* is put into a glass measure and poured all over the surface of the negative, and immediately poured back into the measure, and then poured on again, until the desired result is obtained; a little solution of hyposulphite of soda now poured upon the plate gives it a fine black tone, and an irreproachable transparency.

M. Gaudin, who has witnessed the experiment, expresses his conviction that the employment of this liquid will be a great advantage to photographers. The negative acquired a remarkable degree of intensity, such as can be obtained only with much difficulty with all the mercurials, sulphides, &c., hitherto proposed for this purpose.

Dr. Goppelsröder, of Bâle, has discovered a very sensitive test for alkalies and alkaline nitrites, in the extract of the petals of the *mauve*, or mallow. The colour of this extract is violet, and it becomes red when acted upon by an acid. Paper is tinged with this red extract, and employed in the same manner as litmus paper. The alkaline bases render this paper violet when the solutions to be tested are weak, and green when they are more concentrated. When a solution contains only $\frac{1}{2000000}$ of caustic soda, this re-agent still colours the paper violet, while the reactions with litmus paper are ineffectual. The same reactions are manifested with the alkaline nitrites; thus, fused nitre and the ordinary nitre of commerce give this reaction, while nitrate of potassa, chemically pure, does not give it. Extract of leaves, crushed pears, tea, coffee, urine, and milk, also give it; hence we may conclude that these bodies contain alkaline nitrites.

The usual test for nitrites is starch, with iodide of potassium, and an acid. The nitrous acid is set free. By means of this test, we find nitrites in water which has been exposed to the air, in the saliva, in extracts of various plants, &c. Other plants contain nitrates. These show the reaction in question only after the expiration of twelve to twenty-four hours, because the organic substance must first reduce the nitrates into nitrites. Such is the case with the common nettle. Other plants contain both nitrates and nitrites. Thus the extract of common salad first gives the reaction of the nitrites; then this reaction disappears, because the nitrites are destroyed, but it reappears at the expiration of twelve to twenty-four hours, when the nitrates have become reduced into nitrites.

It is generally admitted that free iodine always gives the well-known reaction with starch, but it is not so. The protochloride of mercury (corrosive sublimate), and other salts of mercury, possess the property of preventing the colouration of starch, which appears, nevertheless, when we add chloride of sodium, sulphate of potassa, hydrochloric, hydrobromic, or hydriodic acids. So also, when to a solution of iodine, we add potassa in sufficient quantity for there to be no longer any free iodine, and for the starch to become entirely colourless. The colour reappears upon adding chloride of sodium.

M. Jeaurenaud's dry collodion process, which is said to leave nothing to be desired, consists of ordinary collodion, containing five per cent. of a saturated ethereal solution of amber. The plate is sensitized in a bath of nitrate of silver of the strength of seven to eight per cent., to which two per cent. of glacial acetic acid is added. The plate is washed in four or five waters, and developed as usual, either with pyrogallic acid or sulphate of iron. With large plates it is necessary to retain the collodion on the edges by means of a spirit varnish. The plates are as sensitive a month after preparation as on the first day. The exposure required is about double that for ordinary wet collodion, and a little less than for the Taupenot process.

M. Becquerel has published the results of some interesting researches upon the determination of high temperatures by means of the intensity of the light emitted by the incandescent bodies. He employed a thermo-electric pyrometer, formed of platinum and palladium wires, united together without soldering for the space of about $\frac{4}{10}$ of an inch. The intensity of the thermo-electric current developed in this pair is very great; it increases with the temperature in a more regular manner, without the unequal variations observed when other metals are employed; this pair is also available to nigh the fusing point of palladium, 2700°, Fah. By this instrument M. Becquerel ascertained the fusing point of silver to be between 1710° and 1730°, and that of gold scarcely 1962°.

## RESINIZED PAPER.

Dear Sir,—Allow me to be the first to publicly thank Mr. H. Cooper for the boon he has rendered to photographers, in making known the formula for the preparation of the resinized paper. It has so many *good* points in its favour, that I feel confident amateurs will be spared many a shilling, and lots of trouble and annoyance, in the employment of it—even supposing that they do not take the trouble to prepare it themselves, which they may easily do, and without dirting or disturbing the cleanliness of their fingers or clothes; sticky they will become certainly, but that is all. On the 13th ultimo I attended a meeting of the South London Society, and was then much struck with the extreme artistic effect of the prints, as there brought forward by Mr. Cooper. The contents of the paper he read on the subject, and which was so ably reported in the "News" and other journals, induced me, on my return home, to make some experiments upon what I then heard and saw. Having procured the necessary ingredients (which I may here state ought to be of the *best* quality to ensure success), I made my first attempt, but with only partial success; owing, as I afterwards found, to having mixed the gums in the wrong order. Having tried two or three times since, and each time a different way, I am prepared to state that the formula may be mixed in a quantity of 20 oz., and ready for filtration in about a quarter of an hour or 20 minutes.

I find I can employ two sorts of paper: thin Rive for "cartes," &c., thick Rive for large $12 \times 10$ pictures. In the one you require great delicacy, in the other boldness; in both, artistic feeling and an atmospheric effect; this you get in all its glory in the paper in question. As to the preparation of the paper, I proceed thus:—To make 4 oz. First weigh out your chloride of calcium, place in a mortar, pound until fine; add 1 oz. of spirits of wine (56 over proof mine is). When dissolved, powder into the filter, which has been previously placed in a glass funnel in a perfectly clean bottle, previously rinsed out with spirits of wine. Next weigh out your frankincense, place in the mortar, pound fine, add 1 oz. of spirits of wine; continue to use the pestle until all is dissolved, then place in the same filter as the chloride of calcium. Serve the mastic in the same way, only adding the remainder of the spirits of wine by degrees; filter as before; when all has run through, filter again through same filter into another bottle. It is then ready for use.

The paper is prepared by pouring out a small quantity into a flat dish, and laying the sheets in one by one. When all the material is absorbed, drain the paper into a measure and replace in the bottle; dry before the fire. To sensitize, use a 70 or an 80-grain bath; float the *thin* Rive three minutes, the *thick* five minutes; dry quickly. In the exposure in the frame the print must be *considerably* over-done—the whites all but obliterated.

After trimming the prints, wash them quickly in water: then immerse for three minutes in chloride of sodium and water, in the proportion of 1 ounce to 40 ounces; wash again thoroughly, tone and fix as usual.

I find I can get any tone, the same as with the albumenized paper—warm, cold, red, blue, black, purple; in short, it is much easier to work with than many samples of the albumenized paper one gets now-a-days; added to which, the total immunity from spots, stains, blue marks, streaks, measles, and the other diseases of albumenized paper, which all find, and about which so much has been said and written.

The paper is extremely sensitive to light, so much so, that I intend trying it in the summer-time in the enlarging camera; it is, therefore, very useful for printing under-exposed negatives, which can be printed in the shade or by diffused light, and thus get all the detail brought out. Gentlemen must bear in mind that they *must*, in *every* case, print until all the lights are very dark and the shadows bronzed; and in the toning they must "look sharp," or they will be done before you are aware of it. The sensitizing bath, I forgot to mention, must be tilted each time, and before floating the paper.

The bath becomes of a deep red colour after sensitizing, but clear and bright—no sediment; its loss in strength is very slight—about 3½ grains to the ounce. In washing before toning, a larger quantity of chloride is precipitated than with albumenized paper.

In conclusion, I will add that if photographers will only use care, cleanliness, and patience, they *must* succeed.

I will be happy to answer any questions upon the matter. Wishing you the compliments of the season, I remain, dear sir, yours truly, W. H. Warner, Photographer.

*Ross, December* 13, 1862.

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## COAGULATED ALBUMEN AND MR. DAWSON.

Sir,—Several mis-statements in an article on dried albumen which appeared in the *British Journal* of the 15th instant require correction; and as they have reference to my recent communication on this subject in your pages, the task I think very properly devolves on me.

In the first place it is due to you as well as to myself to deny that I was "instigated, aided, or abetted," in any of my communications, by you or any other person, the only instigation being my own desire for the promulgation of truth. The same reply will suffice for the foolish charge that I feel malice against Mr. Dawson or the *British Journal*. I know nothing of Mr. Dawson, personally, whatever, and very little of the *British Journal* beyond what is necessary to warn me against getting into any controversy with it, if I would avoid being pelted with mud.

Next, the article in question seems to claim for Mr. Dawson some especial immunity from the charge of error. I do not know of any reason why his errors should not be pointed out, the more so as, by the vain-glorious character of his "Lesson for the Learned," he tempts criticism. I may here add, in reply to another cavilling remark as to Mr. Dawson's office, that a man who accepts an office "takes upon himself" its duties, and a man who writes himself "Photographic Teacher" surely cannot deny that he has undertaken the duty of teaching.

Again, Mr. Dawson's words afforded no idea whatever that boiled white of egg was meant by "albumen coagulated by heat;" and now that the explanation is made, the experiments turn out to have still less relevancy than I supposed; for I am not aware that boiled eggs or anything analogous thereto have been used in any photographic operation.

The editor of the *British* next has some confused remarks on the coagulation of albumen, in which it is not quite clear whether he is defending the popular notion, or trying to prove that it is not held. That the notion is common every photographer knows; that it has been promulgated by many authorities, from Mr. Hardwich downwards, I could readily prove by quotations from their published writings. That the notion is erroneous, and therefore mischievous, I have shown in my former letters. The exposure of error is a duty which all photographers owe to the photographic community, whenever they may detect it. The task is not always a pleasant one, but such men as Mr. Shadbolt, by their insinuations of mean or spiteful motives, make the task even dangerous. Is this suspicion of the motives, of others derived from his knowledge of his own habit of mind?

It would require too much of your space to enter into a more elaborate reply to this lengthy attack upon the Photographic News, its Editor, and myself; and I have already written more, perhaps, than the matter is worthy of. I now leave the subject in your hands, to deal with it further if you think well.—Yours, &c., G. Price.

*Mornington Road, Deptford.*

[We have no intention whatever of noticing the outburst of spleen referred to. Mis-statements and mean imputations from such a quarter have very little weight with anybody. We have better occupation for our time, thought, and space, than to answer such imputations.]

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## Photographic Notes and Queries.

### Coagulated Albumen.

Sir,—Allow me to say a few words concerning the coagulation of albumen. I thought it was generally understood that coagulated albumen was a compound of water and albumen (hydrate); such, at least, has always been my view. Hence, if albumen was first dried, neither heat nor any other agent could coagulate it without water being present. If a plate, coated with the white of egg, was held before the fire, it dried before the temperature was reached necessary to the coagulation. Many years since, before the discovery of collodion, I prepared albumen plates for sale, which were advertised in the *Athenæum*, &c., no Photographic News or Journal then offering a comparative easy road to photography. My process was described in the *Athenæum* and other journals, and in a work on photography by Willets, of Ironmonger Lane. I was then carrying on business in Oxford Street, London. The plates coated with albumen, either wet or dry, were introduced into an atmosphere of steam, which at once afforded both the heat and water necessary; the result was a transparent film, perfectly insoluble in water. The apparatus was very simple—a tin boiler a little larger than the plate, containing water heated by charcoal; the plate was placed horizontal, face upwards, the cover put on, and two or three minutes completed the operation. The iodide of potassium was added previously.—Yours truly, T. Reeves.

*Bedford Street, Plymouth, Dec. 9th*, 1862.

### Substitute for Tannin in the Colonies.

Dear Sir,—Having, through the medium of your valuable paper, been induced to try the tannin process, I thought I would see how a solution of our black wattle bark would answer. I accordingly steeped some, cut up pretty fine, in boiling water for twenty-four hours, then strained, and added a little honey to it, say 12 or 15 grains to the ounce of solution. The resulting liquid is of the colour of dark brandy. After sensitizing and the usual washing, I immerse the plate in a bath, containing the tan, then dry. I find it to answer remarkably well, the results being quite equal to those prepared with the pure tannic acid. I have taken a stereoscopic picture in five seconds—full sunshine. Meniscus lens and half inch diaphragm, development as usual. The dark colour of the preservative does not seem to affect the transparency of the shadows, the picture coming out beautifully sharp, and all the details distinct. Perhaps the above may be of service to some of your readers, to whom tannic acid is not at all times procurable, and I imagine any bark would answer, as long as it contained tan.—Yours truly, R. H.

*Tasmania, Sept. 22nd*, 1862.

## Talk in the Studio.

Parkesine.—A New York paper says :—"This article hardly attracts the attention it merits. It is a substance of gluey aspect, with certain phases of character which suggest cheap and inferior confectionery. From all I can gather, it is destined at some remote day to supersede everything. Parkesine is obtained by condensing oil, chloride of sulphur, and collodion in certain proportions. A hardened mass is the result, which solidifies immediately. It is then capable of being used for nearly every purpose to which india-rubber and gutta percha can be applied, with the additional advantages of being excessively hard and indestructible, besides being in thin plates, perfectly transparent. It is susceptible of being coloured, either with an opaque pigment or a transparent colour. It forms a varnish, coloured or not, which is perfectly hard and impervious to moisture. For buttons, combs, knife-handles, and all other articles for which horn and ivory are generally employed, it is singularly valuable, as it is not only capable of being moulded into any required form, but possesses a hardness equal to iron. Its insulating properties are very great, and it is said to be quite indestructible by damp. The inventor of this 'big thing' has not yet completed his experiments on its uses, but it seems difficult to put a limit to them, especially when it is remembered that Parkesine can be made for a few cents a pound. A patent for a similar production was taken out some time ago in this country. We have not heard to what extent it has been used."

Photography and the Lancashire Fund.—We are glad to know that photographers and photography are contributing freely in aid of our distressed countrymen in the cotton manufacturing districts. On Friday (this day) the London Stereoscopic and Photographic Company devote the gross receipts of their retail sale of Exhibition photographs to this fund. All the employés in the same establishment have been making contributions. We commend the example to others. The forthcoming exhibition will afford many an opportunity of aiding this cause.

Vignette Glasses.—Our correspondent, Charles Derby, who described his mode of making vignette glasses in a recent number, suggests that plates of mica, or Squire's silicious laminæ, may be used with great advantage, instead of glass, for the purpose, as they are easier to use, and incur no danger of breakage.

Patent Albumenized Paper.—Mr. Sutton intends shortly to issue a pamphlet on his new method of preparing paper, illustrated with a photograph on the paper so prepared.

Fine Surface in Card Pictures.—We have been repeatedly asked, by persons who have examined the card pictures of Mr. McNab, to what the extremely fine surface and high glaze were due. The prints have the appearance of having received some especial treatment or varnish after finishing. Mr. McNab informs us that this surface depends entirely upon careful manipulation and good rolling. The paper is highly albumenized and selected with great care, and the surface is not allowed to deteriorate by long soaking or other careless manipulations in any part of the operations. He adds that he considers one of the best tests of careful manipulation to be, the retaining in the finished print of the same amount of surface the albumenized paper possessed before printing.

Manchester Photographic Society.—The following gentlemen were elected officers of the Manchester Photographic Society, at the recent annual meeting. *President.*—The Lord Bishop of Manchester. *Vice-Presidents.*—J. B. Dancer, F.R.A.S., J. P. Joule, LL.D., F.R.S., J. Parry, H. E. Roscoe, B.A., Joseph Sidebotham, W. C. Williamson, F.R.S. *Council.*—The President, the Vice-Presidents, W. T. Mabley, Jas. Mudd, M. Noton, J. Rogerson, H. Thorp, T. Haywood, John H. Gilbert, Wm. Hooper, Ed. Mann, H. Petschler, A. Patterson, J. H. Young, F. C. Tobler, G. Wardley, T. H. Nevill. *Treasurer.*—Edwyn Offer. *Honorary Secretaries.*—Benjamin Consterdine and L. J. Montefiore. We also observe that future meetings will have a social character, tea and coffee being provided at half-past six o'clock, before each meeting.

## To Correspondents.

⁂ Our advertising friends will please notice that new advertisements, or alterations, must be received a day earlier next week, as, owing to the intervention of Christmas Day, we go to press on Wednesday.

Z.—There are two distinct physical faults in the collodion film which are sometimes classed under the common head of craping. One arises from the pyroxyline giving coarse ridges or lines, and yielding a film like morocco leather. Age, alkalies, or considerable dilution with ether and alcohol, may prove remedies to some extent; but nothing that we know of will cure it. The addition of a few drops of chloroform used at one time to be recommended as a cure, but we never experienced any advantage from its use. The other form of craping, which is more correctly described by that word, arises from the use of solvents containing too much water, and when dry the film is seen to be reticulated, and form a very fine network. Certain kinds of pyroxyline favour the production of this result, but it is always, we believe, caused by water. Allowing the film to set well will lessen the chance of this evil; but there is no real remedy. You may sometimes work the collodion off by mixture with an anhydrous sample.

B. G.—A coarse ground glass is an effectual preventive to perfect focussing. Your only remedy is to get a piece of finer ground glass. Most dealers, and all camera makers, can supply you. The common, or cheap French cameras, are generally supplied with this coarse, useless glass.

A. B.—Any copy of a copyright picture, whether produced by painting or photography, is a piracy. The Act makes use of the phrase "by any means whatsoever," and therefore any mode of reproduction without permission is precluded.

Cur Nescire Pudens.—In using bichloride of mercury and iodide of potassium for intensifying, the strength of the bichloride solution is unimportant. A saturated solution is often recommended, but a weak one may be used, about 10 grains to an ounce of water being a convenient strength. The operator must be guided by the colour of the film produced by the action of the mercury rather than by any rule as to its strength. It should not pass the stage of a uniform dark grey; if the whitening action commence, the intensification will not be right when the iodide is applied. The solution of iodide of potassium should be about one grain to an ounce of water, and this may be applied longer, pouring off and on until the right amount of intensity is gained. Always wash carefully between the application of every fresh solution. On the subject of intensifying with mercury and iodide, see discussion at the South London meeting, reported on another page. You may intensify old negatives with pyro and silver, if previous to applying the solution you treat the film with a solution of iodine. The silver will readily deposit then, and give you any desired intensity. See a chapter on intensifying in our Year-Book of Photography for 1863.

A. B.—The rules for exhibitors at the approaching Exhibition of the Photographic Society were inadvertently issued without correcting the address; 5, Pall Mall, used to be the proper place in former years; Suffolk Street Gallery is the proper place to address for this Exhibition. The "front of each picture" may mean either the card mount, or the glass. All that is meant is that the description of the picture shall be placed where it can be read.

A. T. P.—We have not heard Mr. Spiller state the exact quantity of caustic soda that should be added to the water for boilers; the quantity of lime salts in the water would, of course, somewhat affect the question. "A little" is spoken of: try an ounce to a gallon of water.

J. F. N.—In the formula to which you refer the writer had inadvertently omitted to subjoin at the conclusion "then add 12 ounces of water;" this would make a total of 16 ounces for the 480 grains, or 30 grains to the ounce.

C. P.—We cannot, with fairness, recommend particular makers by name in this column.

J. F.—The irregular supply of your copy of the News is due to the provincial agent. It is published in London regularly every Friday morning at 12 o'clock. Messrs. Smith receive a large number regularly, so the fault is not with them, but with their provincial agent.

A Young Photographer though a Matured Man.—The combined fumes of the dark room are not beneficial to breathe, and it is desirable, therefore, to secure good ventilation. But unless gross carelessness be used in leaving bottles of acetic acid, cyanide of potassium, ammonia, hydrosulphate of ammonia, ether, collodion, &c., &c., unstopped, there is not much danger of injurious consequences to an amateur. Many operators spend the whole day there constantly, and yet enjoy good health. Take care to avoid the unnecessary presence of fumes, and preserve as much ventilation as possible, and you need not fear injurious consequences. The symptoms you describe are those of dispepsia.

G. L.—We believe there is no limit to size or number of contributions, provided they are good. Contributors receive a season ticket.

C. T. G.—We have, as you suggest, but without inconsistency, spoken highly of Mr. Dawson as a photographer. We have reason to believe that he is a good photographer, and a careful experimentalist; but all men are liable to error or mistake, and therefore subject to correction. We would not willingly do any one injustice, and an opponent least of all; and in the present instance we have scrupulously avoided it, nor shall taunts tempt us into further retort. The weak and foolish only cry out loudly, and reiterate hard words.

J. J. F.—Constant change of water, and the use of a sponge, are much better than long soaking. If you have time to rub the surface of each print with a sponge, or a piece of cotton wool, it will materially aid and hasten perfect washing. A final rinse in warm, or even hot water, is valuable, but we do not like boiling water; it seems to reduce the brilliancy of a print. The use of a hot iron does not darken a print, unless there be sulphur present. We have noticed that gold-toned prints sometimes look a little redder after the use of a hot iron.

M.—We prefer a gold mount for coloured prints generally. Gold harmonizes with almost anything, and generally adds richness to the picture.

H. J.—We believe that the adjudicators of the prizes have not yet been appointed, nor is it decided who will undertake the duties. The medals are silver. One side will have for design, "Phaeton in the Chariot of the Sun;" the other is not determined.

Several articles, reviews, and letters in type are compelled to stand over until our next for want of space.

Several correspondents in our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32, Paternoster Row, London.

# THE PHOTOGRAPHIC NEWS.

Vol. VI. No. 225.—*December* 26, 1862.



## REGISTRATION OF PHOTOGRAPHS.

We have received from various correspondents statements of a difficulty experienced by provincial artists as to the registration of their photographs for the purpose of securing the copyright. Many of our readers very naturally supposed, after the instructions we gave some months ago, that nothing further would be necessary than to fill up the proper form and forward it to the registering officer at Stationers' Hall, with the amount of the fee for registration in postage stamps. They are met at the outset, however, by this answer from the registering officer :—" The form must be brought to the office ; no forms are received by post, and no stamps are taken for fees." This decision, which may at first appear arbitrary and unreasonable, as causing much inconvenience to residents in the country, is really not intended to be uncourteous by the officer. It is a simple statement of the fact : there is no provision made for other than personal attendance. If forms were received by post, it would often lead to explanatory correspondence, which is no part of the duty of the registering officer.

To meet this difficulty, we have determined to act upon the suggestion of a correspondent, and undertake arrangements for the registration of photographs for our readers. In order to facilitate these arrangements, it will be necessary that those of our readers who desire to avail themselves of our agency should adhere as closely as possible to the instructions which follow.

We refer our readers, in the first place, to articles on pages 374, 380, and 398, containing the fullest information on the subject of the new Copyright Act and Registration. It will be seen that the details for registration are to be supplied in a given manner, in a form, the blank copies of which are to be purchased, at a penny each, of the registering officer at Stationers' Hall. The briefest distinctive description is desirable, together with a copy of the photograph—a spoiled one will do—to be registered. We will now specify the steps to be taken by our readers who wish us to undertake the registration of their pictures.

The form, properly filled up, and with the photograph attached, should be forwarded to our office, addressed to "The Publisher of the Photographic News," with a memorandum outside of the envelope, "Photograph for Registration." Each photograph must be accompanied by fifteen penny postage stamps, twelve of which will be required, as the registering fee, by the officer at Stationers' Hall, and three for contingent expenses.

In order to avoid unnecessary correspondence, the reception of all prints will be acknowledged, and the registration notified, from week to week, on the last page of the Photographic News. We trust that this arrangement for facilitating registration will prove satisfactory to our country friends.

We may here add, that our publisher is just about making further arrangements for the convenience of provincial readers and photographers generally. From many communications, we learn that photographers frequently experience some trouble in obtaining various works connected with the art. The publisher of the Photographic News will, therefore, undertake to supply, post free, any work in photographic literature, on receipt of the price of the work in postage stamps or post office order. Other arrangements, in connection with the printing, publishing, and sale of the literature of photography will be made, and duly announced in our advertisement columns. We hope that these arrangements will also be found convenient and satisfactory to photographers.

## The International Exhibition.

### FOREIGN APPARATUS—A FEW FINAL WORDS.

Before taking final leave of photography in the International we must add a few closing words. We endeavoured from time to time, during the period that the Exhibition was open, to give a tolerably comprehensive description of the British Photographic Department ; and we have also called attention, from time to time, to the specialities in which foreign photographers displayed peculiar excellence. We have noticed the magnificent enlargements of Ghemar, Disderi, Wothley, Albert, and others ; the enamels of Camarsac ; the silk prints of Madame Lafon ; the noble direct prints of Angerer, of Ken, and others ; the exquisite instantaneous pictures of Warnod ; the carbon prints of Fargier, Charavet, Camarsac, and others ; and various other photographs which, by the perfectness of the process, or the beauty of the result, claimed the attention of photographers. We have not entered into detailed or systematic description of the various foreign pictures, simply because so little information was obtainable regarding the method used ; and an extended notice of pictures regarding the production of which we could give but uncertain information, did not appear to us a mode of filling our pages profitable to our readers.

We have given still less attention to foreign apparatus, and for various reasons. After a careful examination of the various examples of apparatus exhibited by foreign manufacturers, guided by the best information we could obtain concerning them, we were confirmed in a conviction which we had before held, that in real excellence and efficiency, English apparatus generally was unrivalled. Many articles of continental manufacturers display considerable ingenuity and skill, and it is probable that in some matters of arrangement our own makers may have gathered a few hints for future use. But for thorough excellence of material and workmanship, and real usefulness, we much prefer the products of English makers. In one feature alone the contributions of continental manufactures appeared to take precedence of those in the British department—they were apparently much cheaper. Possibly in some respects there might be some reality in this ; but for the most part we believe this appearance of cheapness was delusive. That in some cases a real saving of cost was effected by disregard of that nice finish, without which the better class of English manufacturers would regard their work as imperfect, we have no doubt. But we know that in many instances, an impression most erroneous in itself, and unfair to dealers and makers in this country, was created by the prices marked on objects contributed in various continental courts. We will mention one illustration :—A correspondent recently called our attention to certain articles in glass ware in the Austrian Court, and asked very naturally why articles equally good in quality, convenient in shape, and moderate in price, could not be procured in this country. For the purpose of obtaining really correct information on this subject, we gave especial attention to this individual illustration. On examining the contributions in question, we found it consist of certain glass vessels, which for years past have been imported constantly, and have been in regular use in this country, the only difference being that the examples in question were perhaps picked specimens. The list of prices attached, however, appeared marvellously low, and much cheaper than English photographers were in the habit of paying for the self-same articles. This led us to inquire further, and we met with a tolerably clear solution of the enigma. The prices attached for public guidance, and which photographers would naturally base their opinions upon, did not afford the slightest idea of the real prices at which the articles would reach the public. They were manufacturer's prices, not retailer's prices. The dealer in this country wishing to supply these vessels to English photographers, must order them in given quantities, probably dozens, of the agent appointed by the manufacturer. They are invoiced to him at the prices quoted in the Exhibition; but with 25 per cent. added for breakage, carriage, etc., in bringing them to this country. To this added 25 per cent., the retailer must add his profit, and charge for risk and breakage. The result is that the price of each vessel, when it reaches the photographer, becomes nearly double that quoted in the list referred to.

We have mentioned a single instance; but we have reason to believe that it is by no means an isolated case. The motive suggested for affixing the manufacturer's price to articles intended for public inspection we cannot determine with certainty; but it has been suggested that as cheapness was to be regarded as an element of merit, many continental manufacturers, not only of photographic apparatus, but of various other articles, ticketed their various productions in the way we have described, for the purpose of giving them an appearance of cheapness not justified by their selling prices. Whatever may have been the motive, we believe that the fact is as we have stated it, and that some injustice to dealers and consumers was the result of the misleading prices displayed.

The final pageant, which was to have concluded the business of the Exhibition by a formal distribution of prizes, is not, it now appears, to take place. The prizes are, we believe, ready for distribution; but when and how they will be distributed we cannot with certainty say. We regret to state that the final proceedings of the Commissioners appear to be as objectionable as much of their conduct has been from the beginning. Such of the goods as were not taken away by exhibitors have been packed up and sent home, with an exorbitant demand for cases, package, &c., the original cases having been confiscated. This demand has not only been excessive in amount, but imperative and offensive in its tone in the last degree. Such enterprises are doubtless difficult to manage so as to give entire satisfaction to everybody; but we fear this has been so mismanaged that it will be difficult, at least until the lapse of years shall have dimmed the memory of annoyance, to persuade the nation into another similar undertaking.

## THE STEREOGRAPH AND THE STEREOSCOPE.*

Having arrived at a breathing place in the discussion which has occupied my attention for the last few months, I feel myself called upon to express *my* opinion on a subject on which opinion is divided among the scientific both of England and France. I refer to the twin figures of Chimenti.

The following extract from a paper by Sir David Brewster, published in the 119th number of the *Photographic Journal*, will introduce the reader at once into the subject in question :—

"In 1859, when Dr. John Brown and his brother Dr. Alexander Crum Brown were visiting the Museum of Wica at Lille, their attention was called to two pictures of a man sitting upon a low stool, and holding in his left hand a pair of compasses, and in his right hand a line reaching the ground. These two pictures appeared to be exactly the same, as if the one had been copied from the other. They were each about *twelve* inches high and *eight and a half* broad, and were placed close to one another like the pictures in a stereoscopic slide.

"Dr. A. Crum Brown, on his return to England, sent me, through Principal Forbes, the following account of these two pictures, which I think was read in his presence at a former meeting of this Society.

"'These two drawings,' he says, 'are by Jacobo Chimenti da Empoli, a painter of the Florentine school, who was born in 1554, and who died in 1640. They are drawings of the same person from points of view slightly different. That on the right hand is from a point of view slightly to the left of that on the left hand. They are so exactly on the same scale that, by converging the optic axis, I succeeded in uniting the two so as to produce *an image in relief.* They united so easily and completely, that I could not help thinking that they had been drawn for the purpose of being looked at in that way. So far as I could judge, the difference between the pictures was greater than would be produced by a change of the position of a spectator equal to the distance between the two eyes; so that the *steroscopic effect was somewhat exaggerated.* I think, if we had a photograph of the pictures, it would be much easier to prove the stereoscopic character than merely by referring to them; and if the photographs were of such a size that they could be *transposed*, and put in the stereoscope, anyone could see it.'"

Immediately after the above suggestion was made, the *Photographic Journal* issued in the 120th No. a lithograph of the two drawings diminished to the ordinary size of the stereographic slide; and on the 15th of June last we find an engraved helioplastic reproduction of these two figures in the *Moniteur de la Photographie* reduced to the stereographic size. The latter form is the more reliable of the two from which to draw correct conclusions.

In all our text-books on natural philosophy we are taught that gravity is a property of matter *universally*, namely, that there is no exception; in like manner in stereoscopy, the gradual *increase* or *decrease* of distance from corresponding point to corresponding point in the two photographs or drawings, from anterior gradually to posterior objects, or *vice versâ*, according as stereograph is *strabonic* or *lenticular*, is a *universal* property; if this property be wanting, there is no authority for any mathematician to argue by the formulas of probability that any twin figures were intended to be stereoscopic; just as little as we should have no right to assert that the laws of gravity would account for all the phenomena of astral mechanics if these laws had exceptions.

Let twenty different artists take duplicate copies of any single object or engraving as accurately as the eye and the pencil can perform the operation, of the stereographic size, and let the duplicates be mounted on cardboard as stereographs. The result will be, *undoubtedly* be, that these copies will possess relief, an *irregular relief*, more or less, when viewed either strabonically or lenticularly; but this relief will be *different* in each of the mounted duplicates. This irregularity or difference of relief arises from the fact that the *gradual increase* or *decrease* of distances does not exist, and not existing, we are authorized to conclude that such duplicates are not *stereoscopic*.

Let us now put Chimenti's drawings to the test. For this purpose I use the figures as reproduced in the *Moniteur* by Poitevin's process.

### *Chimenti's Figures Analyzed.*

If we place a living object so as to represent the figure in Chimenti's drawings, we shall be convinced that the toe of the left foot will be the nearest point of the figure to the artist or photographer; the knee of the left leg will be the next; the compasses in the left hand the next; probably

* From *Humphrey's Journal*.

the left shoulder the next; the back of the coat at the shoulders, or on the stool, will probably be the most remote.

HORIZONTAL DISTANCES.

Anterior Objects.

| | | |
|---|---|---|
| From left toe to left toe | 2.13 | inches. |
| From left shoe-string to left shoe-string | 2.73 | ,, |
| From left tibia to left tibia | 2.18 | ,, |
| From left knee to left knee | 2.27 | ,, |
| From left garter to left garter | 2.18 | ,, |
| From left hand to left hand | 2.22 | ,, |
| From left wrist to left wrist | 2.205 | ,, |
| From left shoulder (right line) to left do. | 2·28 | ,, |
| From left shoulder (left line) to left do. | 2.28 | ,, |
| From left collar to left collar | 2.22 | ,, |
| From left side of coat near the elbow to do. | 2·23 | ,, |
| From button on the left knee to do. | 2.21 | ,, |
| From right leg of compasses to do. | 2.27 | ,, |
| From left leg of compasses to do. | 2.29 | ,, |
| From lower end of black line on shoulder to do. | 2.26 | ,, |

Posterior Objects.

| | | |
|---|---|---|
| From right toe to right toe | 2.19 | inches. |
| From right shoe-string to right shoe-string | 2.14 | ,, |
| From right heel to right heel | 2.20 | ,, |
| From right elbow to right elbow | 2.17 | ,, |
| From right wrist to right wrist | 2.18 | ,, |
| From right shoulder to right shoulder | 2 205 | ,, |
| From back of the neck to do. | 2.23 | ,, |
| From back of right shoulder to do. | 2.20 | ,, |
| From prominence on back of coat to do. | 2.23 | ,, |
| From back of stool to back of stool | 2·19 | ,, |
| From back of right leg to do. | 2.20 | ,, |
| From button on the right side to do. | 2.19 | ,, |
| From upper angle of right knee to do. | 2.115 | ,, |
| From lower angle of right knee to do. | 2.14 | ,, |
| From leg of stool to leg of stool | 2.205 | ,, |

| | | |
|---|---|---|
| Nose to nose | 2.20 | inches. |
| Chin to chin | 2.21 | ,, |
| Mouth to mouth | 2.21 | ,, |
| Ear to ear | 2.20 | ,, |
| Occiput to occiput | 2.22 | ,, |

*General Observations on these Distances.*—The greatest difference between the extremes is a little more than one-sixth of an inch, a difference *vastly greater* than ever occurs in the stereograph of a human being. If we regard the drawings as a lenticular stereograph, then the lines on the left shoulder are shown to be far behind the back of the right shoulder; also the left knee is behind the prominence on the back of the coat, etc.; if we regard the drawings as a strabonic stereograph, the distortions are equally manifest; in fact, since the distances are so irregular, the relief arising out of them will be equally irregular, and consequently offensive to the eyes to behold. We are certainly authorized, from a comparison of the above distances, to conclude that the pictures, if intended to produce stereoscopic effect, do not in any way whatever succeed. Another evidence of this conclusion is manifest from a comparison of the following vertical distances:—

VERTICAL DISTANCES.

Left Figure.

| | | |
|---|---|---|
| From nose to toe of left figure | 2.3 | inches. |
| From lapel on shoulder to foot of stool | 1.62 | ,, |
| From wrist to chin | 1.1 | ,, |
| From left knee to waist-belt behind | 1.59 | ,, |
| From right knee to tip of toe | 1.37 | ,, |
| From middle button to opposite of body | 0.6 | ,, |
| From highest prominence on the head to foot of stool | 2.49 | ,, |

Right Figure.

| | | |
|---|---|---|
| From nose to toe of right figure | 2.42 | inches. |
| From lapel on shoulder to foot of stool | 1.76 | ,, |
| From wrist to chin | 1.15 | ,, |
| From left knee to waist-belt behind | 1·7 | ,, |
| From right knee to tip of toe | 1.485 | ,, |
| From middle button to opposite side of body | ·68 | ,, |
| From highest prominence on the head to foot of stool | 2·715 | ,, |

From this comparison it appears that the right figure is about one-quarter of an inch taller than the left, and all the other proportions are nearly in the same degree as regards size. Such a discrepancy is never found in a stereograph.

The difference in binocular vision was known before the time of Chimenti, and it is supposed that, having read the works of Baptista Porta and Leonardo da Vinci, Chimenti may have received some idea of the superimposition of two pictures so as to produce relief. Not having succeeded in producing true stereoscopic effect by the figures under discussion, we cannot argue therefrom that he was ignorant of stereoscopicity, or that these figures were *not intended* to effect stereoscopic relief. We can alone maintain that the figures fail of their object, if such was their object; and, failing of this object, they do not indicate that Chimenti was acquainted with stereography.—*Humphrey's Journal.*

## A SHORT LESSON IN CHEMISTRY.—No. 6.*

In the first place, I will call your attention to the following table, which contains the per centage of iodine, bromine, and chlorine, in the salts which are or may be used in photography, and I will afterwards make some application of this table.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 100 | parts of iodide of | lithium | contain | 95.1 | parts of iodine. | | |
| 100 | ,, | ,, | magnesium | ,, | 91.4 | ,, | ,, |
| 100 | ,, | ,, | ammonium | ,, | 87.6 | ,, | ,, |
| 100 | ,, | ,, | calcium | ,, | 86.3 | ,, | ,, |
| 100 | ,, | ,, | sodium | ,, | 84.7 | ,, | ,, |
| 100 | ,, | ,, | iron | ,, | 82.0 | ,, | ,, |
| 100 | ,, | ,, | zinc | ,, | 78.4 | ,, | ,, |
| 100 | ,, | ,, | potassium | ,, | 76.0 | ,, | ,, |
| 100 | ,, | ,, | cadmium | ,, | 69.3 | ,, | ,, |
| 100 | ,, | ,, | barium | ,, | 64.8 | ,, | ,, |
| 100 | parts of bromide of | lithium | contain | 92.5 | parts of bromine. | | |
| 100 | ,, | ,, | magnesium | ,, | 91.3 | ,, | ,, |
| 100 | ,, | ,, | ammonium | ,, | 81.6 | ,, | ,, |
| 100 | ,, | ,, | calcium | ,, | 79.6 | ,, | ,, |
| 100 | ,, | ,, | sodium | ,, | 77.7 | ,, | ,, |
| 100 | ,, | ,, | iron | ,, | 74.0 | ,, | ,, |
| 100 | ,, | ,, | zinc | ,, | 70.8 | ,, | ,, |
| 100 | ,, | ,, | potassium | ,, | 67.8 | ,, | ,, |
| 100 | ,, | ,, | cadmium | ,, | 59.0 | ,, | ,, |
| 100 | ,, | ,, | barium | ,, | 53.2 | ,, | ,, |
| 100 | parts of chloride of | lithium | contain | 84.4 | parts of chlorine. | | |
| 100 | ,, | ,, | magnesium | ,, | 74.7 | ,, | ,, |
| 100 | ,, | ,, | ammonium | ,, | 66.3 | ,, | ,, |
| 100 | ,, | ,, | calcium | ,, | 63.9 | ,, | ,, |
| 100 | ,, | ,, | sodium | ,, | 60.7 | ,, | ,, |
| 100 | ,, | ,, | iron | ,, | 55.9 | ,, | ,, |
| 100 | ,, | ,, | zinc | ,, | 52.2 | ,, | ,, |
| 100 | ,, | ,, | potassium | ,, | 47.5 | ,, | ,, |
| 100 | ,, | ,, | cadmium | ,, | 38.8 | ,, | ,, |
| 100 | ,, | ,, | barium | ,, | 34.0 | ,, | ,, |

Collodion is sensitized with one or more of the iodides in the preceding table, or with a mixture of the iodides and bromides. The collodion film owes its sensitive character to the iodine or bromine, or to both, and not to the metal contained in these salts; therefore, it is evident that those salts will be the most efficacious in photography which contain the largest quantity of iodine and bromine in comparison with the metals entering into the formation of the salts.

* From *Humphrey's Journal.*

Now, if all the preceding salts were equally expensive, equally soluble in alcohol and ether, equally easy o decomposition by nitrate of silver, and equally permanent as salts under all ordinary circumstances, then we should have no hesitancy whatever in pronouncing the iodide and the bromide of lithium as the best sensitizing salts in the manufacture of collodion. Such is found to be the case, even although the metal lithium is somewhat rare and consequently expensive.

But in the performance of chemical operations for practical purposes, we must pay regard not alone to the immediate effects produced, but to a whole chain of facts, in order to effectuate the best results with the least expenditure of material in all the operations combined.

The silver bath contains, when freshly prepared, a solution of nitrate of silver saturated with iodide of silver. After it has been in use for some time, it holds in solution, in addition to the above, the nitrates of all the metals that have been employed in the collodion, as well as a large quantity of alcohol, ether, and organic impurities. In consequence of this accumulation of extraneous salts and unnecessary substances, the bath becomes utterly useless long before the nitrate of silver is exhausted. If we had any chemical means of separating the solution of nitrate of silver from this mass of unnecessary materials, without decomposition of the nitrate, the bath might be used for an indefinite time, and always comparatively in a normal condition. Now let us see if this can be done. The ether and the alcohol can easily be separated by distillation—the organic matter by filtration. Now, about the rest? The bath probably contains nitrate of ammonia, nitrate of potassa, nitrate of soda, nitrate of lithia, and nitrate of the oxide of cadmium; it may, as a general thing, if collodion has been employed from different manufacturing houses, contain all these salts. If these salts could be converted into other salts of the metal mentioned, and which salts are insoluble in a solution of free nitric acid and nitrate of silver, then the difficulty might be solved very easily; but we are acquainted with no means of doing this under the circumstances in question; so that a spoiled bath cannot be remedied.

As an exercise in photographic chemistry, I will now teach you how to separate the different materials from each other in an old sensitizing bath; these different materials being those already mentioned. In the first place, I will distil the bath at the low temperature of about 120 deg. Fahrenheit; by this treatment the ether is distilled over into the receiver. As soon as ether ceases to be condensed, raise the temperature of the bath to about 180 deg.; the alcohol will now distil over. When this fluid has ceased to pass over, the bath may be raised to the temperature of boiling water, and then allowed to cool. By this process you observe that a quantity of a dark substance has subsided; this is a mixture of silver and organic matter from the alcohol, ether, and collodion, and can be separated easily by filtration. The solution now contains only the nitrates above-mentioned. By adding to this solution hydrochloric acid, as long as any white precipitate is formed, the silver subsides in the form of chloride—an insoluble substance. A second filtration separates this chloride from the liquid thoroughly. Whilst it is still on the filter, fresh water may be repeatedly poured upon it, whereby it becomes washed; after this the white sediment may be placed in a warm dry place in the dark room, and dried. This chloride contains all, or nearly all, the silver in the bath. Our next step is to precipitate the cadmium, which we can effectually do by passing a current of hydrosulphuric acid gas through the bath; the current must pass for some time. The liquid, after standing for a number of hours, is raised to the boiling temperature, which is continued until all smell of hydrosulphuric acid has been driven off; it is then filtered for the third time; the yellow sediment on the filter is sulphide of cadmium, containing also a minute portion of sulphide of silver, which had remained after the action of hydrochloric acid. The solution now contains the alkaline salts alone. By evaporation to dryness we obtain the nitrate of ammonia, the nitrate of lithia, the nitrate of soda, and the nitrate of potassa. Dissolve this amorphous mass of salts in a very small quantity of water, and then add a strong solution of bichloride of platinum and a little alcohol; this will precipitate the salt of potassa in the form of minute crystals, which can be separated by filtration.

The superfluous platinum salt is afterwards removed by hydrosulphuric acid gas in the same way that the cadmium salt was obtained. When this operation is performed, we have left the three remaining salts in the solution, which is again evaporated to dryness; the residue is then fused, and kept at this temperature as long as any gas is given off; by this process the nitrate of ammonia is converted into protoxide of nitrogen and the vapour of water. The residue contains the salts of lithia and soda. By adding sulphuric acid in proper quantity, and by heat, the nitrates are converted into sulphates, and the nitric acid is expelled.

These sulphates are now dissolved in water, and decomposed into their corresponding chlorides by means of the careful addition of chloride of barium in solution, and afterwards separated by filtration from the sulphate of baryta thus formed. The filtrate now contains the chloride of sodium and the chloride of lithium, which is now to be evaporated to dryness. The residue is now placed in a well-closed vial containing a mixture of absolute alcohol and ether, and put aside for a few days, at the end of which time the whole of the chloride of lithium becomes dissolved, whilst the chloride of sodium remains undissolved, and may be obtained by filtration. If it had been an object to obtain the ammoniacal salt in the form of ammonia, the process would have been different, which I will not now describe, because the present lesson is rather long already.

## Proceedings of Societies.

### North London Photographic Association.

The monthly meeting of this association was held on the evening of Wednesday, December 17, Mr. G. Shadbolt in the chair.

After the usual routine proceedings, the following gentlemen were elected members of this society: Messrs. Dallmeyer, May, Bockett, and Lock.

In the absence of any paper, the Chairman called attention to some enlarged photographs by Mr. Wenderoth, of Philadelphia. They were enlarged by the solar camera; but instead of the use of the mirror, the camera *itself* was directed to the sun, a ¼-plate Voigtländer being used as the enlarging lens. The pictures were printed direct, and the time of exposure required was stated to be about two hours. The prints themselves were wanting in definition, and altogether not of sufficient excellence to demand especial description. The Chairman pointed out the unsatisfactory nature as regards definition, &c., of these prints, reiterating his own objections to the principles of the solar camera, and expressing a conviction that the best mode of enlarging consisted in producing from the original negative a suitable transparency, and from this obtain an enlarged negative, and print in the usual way. He was of opinion that even if one copy only were required, that this was the proper course to pursue. He especially directed the attention of photographers wishing to enlarge, to his suggestion of first *reducing* the picture to be enlarged, and then at once to enlarge the same to the required size. He observed a gentleman present, who, if he would, could throw considerable light on the subject.

Mr. Dallmeyer, who was thus called upon, made some observations on the principles of the solar camera, in which he concurred in the main with the observations made by the chairman; but remarked that he had lately seen some photographs enlarged by the aid of the solar camera by Mr. Stuart of Glasgow,* which certainly took him by surprise, for as regards definition, these pictures left little, if anything, to be desired. Before seeing these pictures he himself had always strongly recommended the production of an enlarged negative, from which

* Mr. Dallmeyer had seen the pictures by Mr. Stuart we recently described, see p. 590.

to print in the ordinary way, in preference to the use of the solar camera; but photographers generally appeared to prefer obtaining an enlarged *print* direct, as it involved one operation only. It appeared to him now that all that was required to attain a perfect result in the direct printing process, was further to perfect the mechanical appliances of the solar camera, and use a perfect enlarging lens, which he was happy to say he had completed, and hoped shortly further to describe.

Some discussion then followed as to the best mode of using the sun as the luminary, either by pointing the camera direct to the sun, or using a reflector. The Chairman preferred the latter mode of illumination.

Mr. Bockett asked whether there was not more loss of light in using a glass mirror for the solar camera than a speculum?

Mr. Dallmeyer observed that the loss of light by speculum reflection was much greater than by the silvered mirror; in fact, silver was the best reflector.

Some observations by Mr. Burr, Mr. Hislop, and others, on the respective merits of mirrors, mode of illumination, &c., followed, after which

A conversation arose on a singular incident, related by Mr. Hill, in several negatives he had taken the image of the white crossbars in a shed, were reproduced about half an inch above the original image. Various suggestions were offered, but no satisfactory solution arrived at.

The use of methylatic spirits and ether, for collodion, was next discussed, the chairman strongly condemning its use. Some members, confirmed by Mr. Martin, expressed a conviction that much of the methylic ether could be removed by heat. Mr. How stated that the disadvantages chiefly arose from the use of old pyroxyline in methylated solvents.

The Chairman exhibited some prints of machinery, &c., taken by Harrison's new globe lenses; but there was nothing extraordinary in these specimens, or tests, as to the capabilities of the lens. He also exhibited some specimens of American card pictures, which scarcely came up to the best English standard.

Mr. Hill handed round the Society's album containing some beautiful specimens, by himself and others, and stated that members could have the loan of the same for one month in turn.

After some further desultory conversation, the proceedings terminated.

### Photographic Society of Scotland.

The ordinary meeting of this Society was held December 9th, Mr. George Moir in the chair.

After the usual routine, the Chairman announced that Mr. A. F. Adam, the Honorary Secretary, had felt that press of other duties compelled him to resign, and that Mr. T. B. Johnson had accepted the office. He then announced that the Council had, for various reasons, although with great reluctance, come to the resolution that there should be no Exhibition of Photographs this season. The experience of last year's Exhibition had not been encouraging, as the receipts had not nearly covered the expenditure. This season had not been a good photographic one, whilst the attractions of the Great Exhibition had prevented the greater number of amateurs from doing anything. Then there was considerable commercial distress in the country; and above all, it was not possible to procure an exhibition-room of sufficient size in a good locality. But he looked forward with confidence to the removal of all, or at least the greater part of these difficulties before the return of another Exhibition-season. In lieu of the regular Exhibition, there would be, in February or March, an Exhibition of photographs to the Society, of works competing for the various medals which the Council had resolved to award, as usual, to the successful competitors. The Secretary would advertise shortly in the various journals the subjects for which medals would be awarded, and the time when the pictures would require to be delivered.

A letter from Mr. Pouncy, in answer to a request to him to forward to the Society specimens of his more recent carbon prints, was then read. Mr. Pouncy willingly would comply with this request, upon condition that negatives be forwarded to him, so that his carbon prints may be directly compared with silver prints from the same negatives. This was agreed to, and the Secretary was requested to send such negatives as would afford a satisfactory test of the matter.

The Chairman then called attention to a collection of photographs of ancient Rome which covered the walls, by Mr. M'Pherson, of Rome, who was called upon to give descriptions of some of the views, and also to explain his mode of working.

Mr. M'Pherson stated that his views were all taken by the collodio-albumen process, which he found, from long experience, to be best adapted for subjects requiring long exposure. The exposure depended entirely upon circumstances; for a distant landscape, in a good light, five minutes was enough; for near objects, ten or twenty minutes; and in some of the sculpture-galleries, where the light was deficient, two hours were often required; and in one or two cases, even an exposure of two days was necessary to produce a good negative.

In answer to the Chairman, Mr. M'Pherson stated that he had not been induced to continue working his process of photo-lithography for views—not from any want of confidence as to the result, but simply from the difficulty of procuring lithographic stones and other materials in Rome, and also from there not being such a thing as a good printer, accustomed to fine work, in that city.

After some other proceedings the meeting was concluded.

## Correspondence.

### FREE NITRATE IN DRY PLATES.

Sir,—About a month ago, being confined to the house through indisposition, I betook myself to trying some experiments with tannin and honey, and tannin and gum, and using free nitrate of silver in the preservation; but the unfortunate continuance of bad weather prevented me from getting out to expose the plates I had thus prepared. However, not be done out of trying the effect, I resolved to expose some of them as transparencies, and (to use an old phrase) was agreeably disappointed with the results. The tone was a rich purple brown, soft and delicate, having somewhat the appearance of stained glass, and gave me every encouragement for further experiment when time and opportunity afford. I will not trouble you with any lengthy detail, but briefly state my method of procedure, which is as follows, much the same as Mr. Hannaford used in his Fothergill modification:—Sensitize the plate in the usual manner, and wash in one or two changes of rain water. Apply the preservative at one corner; let it flow evenly over the plate, and off; repeat a second quantity, and allow it to remain on for a few seconds, keeping the plate in motion; pour off, and wash under a tap, or other convenient way. This must be well effected, or stains and markings will be the result of neglecting this precaution. Set up to drain awhile, and remove to box to dry, on clean slips of glass with blotting-paper under.

The preservative I used was made as follows:—Equal parts of a 15-grain solution per ounce of tannin and honey, or tannin and gum (the gum solution to be sufficiently thin to flow freely), to which is added a ½-drachm of a 30-grain solution of pure nitrate of silver, containing ½-grain citric acid, and used when newly made. To develop the plate, moisten with distilled water, and apply a 1-grain solution per ounce pyro only, until the image make its appearance; wash, and apply 2-grain solution of pyro, 1-grain citric acid, and a few drops of 30-grain solution of nitrate of silver, until the development be completed.

I should apologize for now troubling you; but as your journal had just come to hand, I was pleased to find (although I thought it strange) that another gentleman had been experimenting in the same direction as myself; and, though in a somewhat different way, yet I believe to the same end. However, the above facts are at your disposal, should you think them of any service.—I am, sir, yours very respectfully,

John Frew.

7, *Railway Terrace, North Shields*, 8*th Dec.*, 1862.

P.S.—I exposed some of the plates on Saturday, having much c earer weather; but previous engagements prevented me from developing them until to-day, when I only got one done, which was very good. The exposure was the same as for wet; the collodion was bromo-iodized. J. F.

## Talk in the Studio.

Photographic Piracy.—Another prosecution under the new Copyright Act was heard at Marlborough Street, on Monday. Wm. Peter Haywood, of Great Portland Street, appeared to answer a summons under the Amended Copyright Act, for, without the consent of Messrs. Southwell, photographers, of Baker-street, offering for sale copies of the photograph of Miss. Lydia Thompson in Scotch costume, in which there is a subsisting copyright to the said Messrs. Southwell. Evidence having been adduced, the magistrate said that, as the defendant had given up the whole of the copies, a fine of 5s—though he was liable to a fine of £10—would do. William Milford, of Dorset-street and Oxford-street, was next summoned for a similar offence, the proceedings, as in the preceding case, being under the Amended Copyright Act. Mr. Greenwood, who appeared for the complainants, said he should press for the full penalty, as the defendant was the person who had sold the photographs. The case having been proved, Mr. Tyrwhitt said he should not impose the full penalty, but order the defendant to pay 40s. and costs. Mr. Gambart has written the following letter to the daily papers on this subject :—Sir,—In your police reports of this day I see that Messrs. Southwell Brothers, photographers and publishers, have obtained prompt justice against Mr. Hayward, of Great Portland Street, and Mr. Milford, of Dorset Street, both being convicted of selling spurious copies of Miss Lydia Thompson's portrait, and that they were fined by Mr. Tyrwhitt for the offence. I have often heard of two weights and two measures; but, although a foreigner, I still cling to my belief in English justice. I cannot, however, help looking with disappointment on the different manner in which cases were received in other courts where I have sought remedies against like offenders. I am not, indeed, the publisher of charming portraits, but I do try to protect works of art, such as "The Light of the World," by Holman Hunt, and Rosa Bonheur's "Horse Fair;" and what is my experience? I appear under the same Act, 25th and 26th Victoria, before Mr. Corrie, and am told it will not do, and must go to another court. I appeal to Justice Willes, when, after much talk by eminent lawyers, points are reserved, and I am left in suspense as to whether my property belongs to me or not. But this is not all. Twenty years of residence in England have thoroughly imbued me with English ideas, and admiration for the laws and institutions of the country; and, when speaking of these with praise to my brother publishers of the continent, they cry out, "What about the International Copyright Treaty between France and England? Come to France; travel from Calais to Marseilles, and you will not find any pirated copies of English engravings offered for sale, or, if any occur, you have instant remedy against the offender; but all over London we see infringements of our copyrights, and are told that we have no remedy except at enormous expense, and then with a doubtful result. *Perfide Albion* has done us again."—I am, sir, yours, &c.,

*December* 23. E. Gambart.

The Sleep of Sorrow, &c.—Monti's exquisite group in marble—"The Sleep of Sorrow and the Dream of Joy," has been purchased by the London Stereoscopic Company. They have also become the possessors of the charming statue of Daphne, by Marshall Wood.

Photographic Gift Book.—Amongst a number of books and pictures on our table waiting for review we have one which claims immediate attention, as being one of the best Christmas Gift Books which a photographer can present to a friend. We refer to an edition of Scott's "Lady of the Lake," just issued by Mr. Bennett, of Bishopsgate Street. The various charming scenes in which the action of the poem is laid are illustrated by photographs, executed by G. W. Wilson and by T. Ogle. Few poems could present a greater number of scenes which, apart from the associations of the poem, present so much of picturesque beauty to the camera, whilst the stirring descriptions of the poet impart to them a peculiar interest which will be readily appreciated by every lover of the poem. Who, for instance, that has read the poem—and who has not?—can gaze on the charming photograph of Coilantogle ford without picturing to himself the terrible combat between James Fitz-James and Roderick Dhu? or on Ellen's Isle, without fancying the little skiff of the Lady of the Lake skimming the surface of Lock Katrine with stately Benvenue beyond? The majority of the photographs are, moreover, very fine and full of atmosphere. Adverse criticism of any part of a work so well intended and so well worked out would be somewhat ungracious, otherwise we would suggest that some of the prints are a trifle dark, and that the square shape is not the best for such pictures. The work is beautifully printed on tinted vellum paper, and very handsomely bound, and altogether a very beautiful book.

## To Correspondents.

*** Owing to an unusual pressure in our printing office, the intervention of Christmas Day, and the preparation of an elaborate index, we have been compelled to delay the publication of the Photographic News to Saturday, instead of Friday. The four pages extra, rendered necessary by the title-page, index, &c., are given without extra charge.

A. T. P.—Mr. Spiller has kindly furnished us with some further hints as to the use of caustic soda for preventing, or removing, the incrustation in steam boilers. From two to three pounds, for 1,000 gallons of water, are used in the Royal Arsenal. Mr. Spiller's "Memorandum on the Prevention of Incrustation in Steam Boilers" appeared in the proceedings of the Royal Agricultural Society. It is extracted at length in an article on "Boiler Explosions," in *The Engineer* of the 21st of last month.

J. W.—We have not used the formula of M. Schuatz. It will be very easy to try whether a less proportion of platinum will answer the purpose. We do not see any advantage to be gained by toning after fixation, although some operators prefer that method. The process is more difficult, and requires a stronger gold solution. Mr. England fixes in a saturated solution of hyposulphite of soda, and then tones in a bath of hyposulphite of soda and gold You may fix first, and then, after a very thorough washing, tone in the ordinary alkaline gold solution; it will generally require, however, to be much stronger than if the print were toned before fixing.

E. J. T.—All prints, and especially those on albumenized paper, such as card pictures, should be prepared for receiving water colours. Newman's "preparation" for the purpose is the best material we know. 2. Ordinary good water colours are used. 3. It is not customary to use any varnish, or other final coating, after colouring. Some persons use an encaustic paste, after touching, to give uniformity of surface. You will find Mr. Wall's work, a "Manual of Colouring Photographs," price 6s. 6d., or "Newman's Harmonious Colouring Applied to Photographs," price 1s., a new edition of which is just published, of great service to you in colouring.

W. B., a New Subscriber.—Gum and treacle would not make a suitable preparation for application to photographs. There is no lens capable of producing more than one impression at once.

P. M —We have not used the lens in question, but should not recommend it for card pictures.

G. M. Redaway.—It is difficult to determine the cause of the dull, red, poor effect of your prints. Had you not stated the direct contrary, we should at once, from their appearance, have concluded that the silver bath was much too weak. Possibly it is too acid, or possibly the paper is in fault. In any case much deeper printing would have been desirable, and longer toning. We should think that the negatives were very good.

P. M.—Your toning bath contains right proportions. In order to get blacker tones, you must print considerably deeper.

An Amateur.—You do not state sufficient particulars to enable us to form an opinion of the cause of the red tone in your print. It may have been inactivity of the gold bath, or it may have been insufficient time of immersion; or it may be bad paper.

Vaissier et Verey.—We will make enquiry of Mr. Fry as to where his yellow glass was obtained; but we must warn you that, without testing the sample you purchase, there is very little certainty of obtaining a truly non-actinic glass.

Geo. Fielder.—We have received many complaints recently of the difficulty of obtaining deep tones; probably the cold weather, in some degree, affects the question. Print deep, and slightly warm the toning bath; this will probably aid you.

Globe Lens —We have seen several pictures produced by the globe lens, but none that give the slightest evidence of its alleged superiority. It is not likely that it will be manufactured in this country, as it is patented. We have seen the specification of the patent, with diagrams, but cannot perceive anything in its construction which can justify the claims made for it. The field must be very much curved indeed; to render it at all available, it appears to us, that it must be used with an extremely small stop, which would make it very slow. We do not imagine that it will ever come much into use, as it appears very dear, without any real compensating qualities that we can ascertain.

N.—The use of freshly precipitated oxide of silver is the most philosophical mode of neutralizing free nitric acid in a bath; but bicarbonate of soda may be used with perfect safety, and sometimes, indeed, with greater advantage than anything else; as, when added slightly in excess, a precipitate of carbonate of silver is thrown down, which often takes with it other impurities and improves the bath

W. Atkins.—If the toning bath be decomposed by the immersion of prints, it generally indicates the presence of free nitrate of silver in the prints. Try washing the prints, as well as immersing them in the acetate solution. Slow or unsatisfactory toning, at this season of the year, is often removed by warming the solution.

Studio.—If you make your sitter face the south, and shut out direct sunshine by means of blinds, you will lose more light than by making him face the north, without blinds. 2. We do not quite understand what you mean by the half circle over the head, but it is probably due to other causes than the lens.

Nitrate of Silver.—A correspondent, whose letter is mislaid, asks how to make nitrate of silver from the metal recovered from his waste, may be converted into nitrate. He will find full instructions in an article on page 6 of the fifth vol. of the Photographic News.

Erratum.—In Mr. Stewart's paper on the Solar Camera, p. 595, the sixth line from the bottom of the article, he is made to say that he is "satisfied with the apparatus. The word should have been "dissatisfied."

Several correspondents in our next.

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END OF VOL. VI.

LONDON: PRINTED BY THOMAS PIPER, 32, PATERNOSTER ROW.