Conditions d’utilisation des contenus du Conservatoire numérique

1- Le Conservatoire numérique communément appelé le Cnum constitue une base de données, produite par le Conservatoire national des arts et métiers et protégée au sens des articles L341-1 et suivants du code de la propriété intellectuelle. La conception graphique du présent site a été réalisée par Eclydre (www.eclydre.fr).

2- Les contenus accessibles sur le site du Cnum sont majoritairement des reproductions numériques d’œuvres tombées dans le domaine public, provenant des collections patrimoniales imprimées du Cnam.

Leur réutilisation s’inscrit dans le cadre de la loi nº 78-753 du 17 juillet 1978 :

- **la réutilisation non commerciale de ces contenus est libre et gratuite dans le respect de la législation en vigueur ; la mention de source doit être maintenue (Cnum - Conservatoire numérique des Arts et Métiers - https://cnum.cnam.fr)**
- **la réutilisation commerciale de ces contenus doit faire l’objet d’une licence. Est entendue par réutilisation commerciale la revente de contenus sous forme de produits élaborés ou de fourniture de service.**

3- Certains documents sont soumis à un régime de réutilisation particulier :

- **les reproductions de documents protégés par le droit d’auteur, uniquement consultables dans l’enceinte de la bibliothèque centrale du Cnam. Ces reproductions ne peuvent être réutilisées, sauf dans le cadre de la copie privée, sans l’autorisation préalable du titulaire des droits.**

4- Pour obtenir la reproduction numérique d’un document du Cnum en haute définition, contacter cnum(at)cnam.fr

5- L’utilisateur s’engage à respecter les présentes conditions d’utilisation ainsi que la législation en vigueur. En cas de non respect de ces dispositions, il est notamment passible d’une amende prévue par la loi du 17 juillet 1978.

6- Les présentes conditions d’utilisation des contenus du Cnum sont régies par la loi française. En cas de réutilisation prévue dans un autre pays, il appartient à chaque utilisateur de vérifier la conformité de son projet avec le droit de ce pays.

NOTICE BIBLIOGRAPHIQUE

Auteur(s)	**McCollin, Thomas H. (18..-1...)**
Auteur(s) secondaire(s)	**Sachse, Julius Friedrich (1842-1919)**
Titre	**American Journal of Photography (Phildadelphia, Pa.). Vol. XV. January, 1894. N. 169**
Adresse	**Philadelphie : T. H. McCollin, 1887-1900**
Collation	**1 vol. ; 25 cm**
Nombre de vues	**97**
Cote	**CNAM-BIB 4 Tu 52 (P.6)**
Sujet(s)	**Photographie -- Périodiques**
Thématique(s)	**Technologies de l'information et de la communication**
Typologie	**Ouvrage**
Note	**Recueil factice intitulé "Métrophotographie" ayant probablement appartenu à Aimé Laussedat, la table des pièces étant écrite de sa main, et utilisé comme outil de travail pour ses publications.**
Langue	**Anglais**
Date de mise en ligne	**03/10/2014**
Date de génération du PDF	**28/02/2025**
Notice complète	**https://www.sudoc.fr/15082890X**
Permalien	**https://cnum.cnam.fr/redir?4TU52.6**

"THE MANTILLA"

Direct from the Original Painting by Menocal
by permission of
JAMES S. EARLE & SONS
No. 816 Chestnut Street, Philadelphia

Photograph in Colors
Reproduced from Oil Painting by the
Photo-Chromotype Company
718 Chestnut Street
Philadelphia

Printed in Three Colors on Steam Press of
Edward Stern & Co., Philadelphia

AMERICAN JOURNAL
OF
PHOTOGRAPHY

THOS. H. McCOLLIN, Managing Editor.

JULIUS F. SACHSE, Editor. XANTHUS SMITH, Associate Editor.

VOL. XV. JANUARY, 1894. No. 169.

1894.

FOR the New Year we repeat our usual salutation to the Photographic Guild at large, and trust that prosperity may abide with all of our patrons, as well as with every legitimate photographic bread-winner, no matter in what department he may be interested, portraiture, landscape, commercial, mechanical, or artistic.

So great has been the advancement of Photography within the past few years, that its various ramifications have found foothold in almost every branch of the arts, sciences, trades, and mechanics. No matter what venture is started, the aid of photography is usually impressed into service at the earliest stage of the scheme.

The past year may well be designated as a year of photographic disappointment. Never did a year open which seemed destined to form a greater epoch in the history of the photographic art science than the year of grace, 1893. The World's Columbian Exposition,—the Photographic Congress Auxiliary,—the National Convention,—are now a matter of history, and we will only say that the treatment accorded to the visiting photographer by the "Official" Concessionaire and his minions will for many months be spoken of as the meanest outrage perpetrated

upon the visitors to the white city. Just how many two dollar bills were taken from the pockets of hand-camerists will perhaps never be known to a certainty. It was a mean advantage taken of the photographic public, and does little credit to the management of the otherwise great enterprise.

Our mutual country has just passed through another great financial crisis and period of commercial depression, which have borne especially heavy upon the professional photographer. The darkest clouds, however, seem to have rolled by without breaking into a general storm of destruction and ruin. A brighter outlook is now in sight, and there can be but little doubt that a prosperous season is in store for the professional portrait photographer who conscientiously strives to elevate his art, and at the same time demands remunerative prices for his labor.

As to ourselves, with the present number we commence volume XV. of the JOURNAL. As in the past, the editorial staff and publishers will spare no pains or expense to keep the JOURNAL up to its present standard, with pages crisp and clean and independent of control from any clique or combination.

How our efforts and policy are appreciated is proven by our subscription list and the demand upon our advertising pages.

With best wishes for prosperity to all with whom we come into contact, the Editor trusts that, during the coming twelve months, he may have the pleasant duty to record still greater advancement in the photographic art science than is deemed possible at the present writing.

The revival of arts in Western Europe dates from the capture of Constantinople by the Venetians in 1204.

Apelles is said by Pliny to have invented the use of canvas in painting. He also employed oaken tablets.

The authentic period of Greek art begins with the arrival of Polygnotos of Thaos in Athens about 463 B.C.

Pausias of Sicyou was the inventor of encaustic painting, a method of burning the colors into wood or ivory.

THE ZEISS ANASTIGMATIC LENSES.

PROF. W. K. BURTON, IMPERIAL UNIVERSITY, TOKYO, JAPAN.

I MENTIONED these lenses in a communication I sent to you some time ago about the concentric lens. I have now had an opportunity of making a thorough test of three forms of their lenses, and think a description of their properties in actual practice, as compared with lenses of older form, may be of interest to your readers, the more particularly as I notice that a renowned firm of American opticians has taken up the manufacture of these instruments, and presumably turn out articles identical with those turned out by M. Carl Zeiss.

The general principles of these lenses, the mathematical equations, for which were worked out by Dr. Paul Rudolph, are thus described by him: "They are dissymmetrical doublets, consisting of an achromatic anterior part, whose *flint* has the higher refractive index, and an achromatic posterior part, in which the *crown* has the higher refractive index. These two cemented parts of the doublet possess, therefore, opposite differences of refractiveness in the crown and flint-glasses employed for achromatization. This embodies the important principle by which it became possible to effect anastigmatic aplanatism of a system of lenses corrected spherically and chromatically for large apertures."

Using very popular language, the following may be said of the various series of the lenses that I have examined. The *back* combination does all the common work of a lens,—that is to say, concentrates the light coming from each point of the object; the front combination corrects certain outstanding aberrations, especially astigmatism, but is hardly a *lens* at all in the popular sense. That is to say, it does not perceptibly either magnify or diminish an object looked at through it, although it produces considerable distortion. Indeed, so free from magnifying or diminishing power is this lens that, placing it in front of one eye, the visual images of the two eyes can be made to superpose about as completely as if a piece of plate-glass only were used. Indeed, in one of the

lenses I have examined, the focus appears to be a negative one when the posterior side of the lens is turned to a distant object, —say the sun.

Of the lenses that I have tested I consider that of series two to be the most remarkable, and I propose to briefly describe the tests made with this lens, and the conclusions that I have arrived at from them.

The lens tested is catalogued as of a trifle over 12 inches focus, working at *f*-6.5. The actual focus was found to be 16⅝ inches. The lens works at the intensity mentioned, though at first sight it would appear that it does not, for the longest aperture of the lens diaphragm is considerably less than $\frac{16.625}{6.5}$ inches. On examination, however, it is found that, although the light from a distant point, as it issues from the front lens, is in the form of a very long cone, yet it has its base of considerably smaller diameter than when it entered the lens. In other words, this light is considerably condensed or bunched together *within* the first combination, but extends again nearly parallel. For this reason common rules for the allowance, in the diameters of stops, on account of concentration of light by the front lens, that are approximately correct for aplanats do not apply at all to this lens.

The combinations of the lens are close together, there being only room for the diaphragm between them. The result of this is that, with large apertures, the illumination all over the plates is more uniform than with aplanats, whilst, with small stops, the rapid anastigmatic is an actual wide-angle lens, the oblique pencils not being cut off by the mount of the instrument.

For comparison, an aplanat of a focus catalogued at 16 inches, actually found by experiment to have a focus of 16 11-16 inches, was used. This lens, although sold as a "rapid symmetrical" is not actually symmetrical, the focus of the back combinations being several inches shorter than that of the front. It is comparatively slow, working at *f*-9, but is greatly superior in the matter of marginal definitions to any actually symmetrical aplanats that I have used. The difference in focus between the two lenses, being only 1-16 inches, may be disregarded.

The test object used was the facade of the Science College, Imperial University, Tokyo, described fully in my account of the performance of the concentric lens. I had, however, decorated the brick work with a series of chalk-drawn targets, with centres in a horizontal line passing through the axis of the lens, so as the more readily to be able to judge of astigmatism.

Plates of 18x14 inches in size were exposed.

Experiment I. Used full aperture, the Zeiss lens gave a circle of really sharp definition of about 9 inches diameter. Circles 4 inches from the centre of the plates were sharp. Those at 3½ inches from the centre were blurred, but the blurring was very nearly equal around the circumferences, showing the absence of astigmatism. The definition was throughout good enough for a portrait, although, of course, to avoid exaggerated perspective, it would be highly undesirable to cover a plate 18x14 inches with a lens of only 16⅝ inches focus.

Experiment II. The two lenses were used with aperture *f*-9. The aplanat covered sharply a circle of only some 6 inches in diameter; the circles 4 inches from the centre of the plates were blurred top and bottom, comparatively sharp at the sides, indicating considerable astigmatism; the circles 8½ inches from the centre are so blurred at top and bottom as not to be visible at all. The corners of the plates are not illuminated at all, and the light begins to fall off visibly at quite a distance within the corners.

The anastigmatic covered sharply a circle quite 11 inches in diameter. The circles 4 and 5 inches from the centre of the plate are quite sharp; those at 8½ inches from the centre are somewhat blurred, but the blurring is very nearly quite equal throughout, showing absence of astigmatism. The plate is equally illuminated to the corners, and the definition to the corners is good enough for most landscape work in practice.

Experiment III. Plates were exposed with stop *f*-22. The circle covered sharply with this aplanat is about 12 inches in diameter. The outer circles show strong indications of astigmatism, and the lighting falls off rapidly towards the corners, which are quite bare. In this negative a curious phenomenon is noticed.

Bricks along a vertical or horizontal line passing through the axis of the lens, are simply blurred at a certain distance from the centre. Those on a line at 45° with either the vertical or horizontal line, assume a lozenge shape.

The anastigmatic covers with perfect definition, equality of illumination (so far as the eye can judge), and without a trace of astigmatism to the very corner of the plate.

The anastigmatic, it scarcely need be said, is perfectly rectilinear.

The advantages of the anastigmatic are clear, and may be summed up as follows :

It is twice as rapid as the aplanat. Of course I am aware that there are aplanats that work at as great an aperture as the Series II. anastigmatic, or even somewhat greater. Indeed, I possess two such, but being of greatly different focus from the anastigmatic, they were not suitable for comparison, but such lenses, used with the same angular aperture, give much more marginal definition than the comparatively slow aplanat I used, and, except inasmuch as that they have the same maximum speed as the anastigmatic, would come off much worse in comparison with it, when working full aperture.

Giving the same marginal definition it works with at least twice the angular aperture,—that is to say, with at least four times the rapidity.

Whatever is the size of the plate, it gives more uniform illumination. With small stops a much larger plate can be covered.

Of the three other forms of the Zeiss lens that I have tried, one is a triplet that is not any longer made, and that, therefore, calls for no notice here.

Another is a Series V. lens of 10½ inches focus. This is in its properties so similiar to the Ross concentric, that it needs only a brief description. It is a wide-angle lens, and, like the concentric, puts entirely into the shade in the matter of flatness of field and absence of astigmatism, all old forms of wide-angle rectilinears, symmetricals, doublets, etc. In these respects the two lenses mentioned seem to be very equal. The Zeiss lens works with a maximum aperture of *f*-18, and as with this aperture it is free

from spherical aberration, it must be pronounced to be somewhat rapider than the concentric, which needs to be stopped down to at least *f*-20 to be free from spherical aberration. The anastigmatic includes with a small stop a larger angle than the concentric.

The Series III. Zeiss is a much cheaper lens than the Series II. It is not quite so rapid,—working at *f*-7.2, and although it is superior in marginal definition, equality of illumination, and angle included, to rapid aplanats, it has not quite so flat a field as the Series II., and shows distinct traces of astigmatism.

It may very well be asked, "What, after all, seeing the work that has been done by older forms, do we gain by the improvements described? Is it not the case that the old lenses are as good as are needed for all pictorial purposes?" Well, it must be granted that for a great deal of pictorial work, the old lenses are as good as the new, and further, that for some kinds of work, the roundness of field that they exhibit is a positive advantage; but just this may be said of the new lenses. They make easy some work that was difficult before; they make some possible that was impossible before, whilst for all technical work, especially line work and enlarging, the advantages they afford are simply inestimable.

It is right to state that since the Zeiss anastigmatics were issued, Dr. Goerz has invented a rapid *symmetrical* anastigmatic, for which he claims advantages over the Zeiss anastigmatics. A certain advantage in the symmetry itself must be granted, but beyond this there is no evidence as yet of any superiority over the best form of Zeiss's anastigmatics. Dr. Goerz's comparisons were made between his own symmetrical anastigmatic and Zeiss's Series III. lens. This latter lens is, as has already been stated, a much cheaper one than the Series II., but is neither so rapid nor nearly so completely corrected for astigmatism. Further than this, there is some reason to doubt whether even the No. III. Zeiss got quite fair play at the trials.

All I can say is that if Dr. Goerz has improved upon the Zeiss Series II., he must have produced an instrument of truly extraordinary excellence.

BALLOON PHOTOGRAMMETRY.*

BY PROF. R. MEADE BACHE.

U. S. COAST AND GEODETIC SURVEY.

BALLOON photogrammetry has been practiced to some extent ever since the invention of the photographic dry plate. This method, however, has belonged rather to the sphere of reconnoissance than to that of surveying. When some prominent objects appear on the landscape, whose geographical relations to one another are known, the balloon photographic product may be of considerable value, if too large a circle has not been included by the camera ; and this method indicated, if the desirable conditions are strictly fulfilled, may be utilized to advantage if the resulting map is not required to be of rigid accuracy. When, however, such objects are very remote from one another, even when their geographical positions are known, the spherical aberration resulting from employing a large aperture of object-glass makes a product which cannot be regarded as of high value, one which cannot properly be dignified with the name of survey in the restricted sense of the term, and to which we should prefer to apply the name of reconnoissance. Without adjusted height for the camera, without near objects of known geographical relations to one another, to obtain orientation for the results, without precise regulation of the angular aperture of the object-glass of the camera, nothing can be produced by balloon photographic process that, in the restricted sense noted, merits the name of survey.

It is on account of my perception of this low estate of balloon photogrammetry that my attention is especially drawn to devising a method of applying the art upon true principles. By my method the balloon must be captive, not free, and being captive it may be made quite small, easily managed, and inexpensive, thus rendering its employment practicable for ordinary use, especially as, according to the plan sometimes adopted in the case of the military captive balloon (to the consideration of which we shall presently come), the gas requisite for inflating the balloon can readily be carried under high pressure in metallic cylinders.

* Read before the American Philosophical Society. (See December JOURNAL.)

The traverse line of land surveying is merely a zigzag course, consisting of stations, the angle between each successive three of which, and distance between each successive two, is measured. From these stations details of the terrene are generally procured. To enable a traverse line to form a portion of a general survey, there must be means adopted to place at least its initial and terminal points in relation to that survey, whereby all intermediate points fall into due relation with it.

This premised, I will now describe how my plan for introducing precision into balloon photogrammetry could be applied in various useful ways for delineations of portions of the earth's surface.

The appliances needed for carrying out the plan are a small spherical balloon capable of supporting a light photographic apparatus, swung in gimbals, and protected from injury in descent by a thin encircling cylinder of metal or of wood. A zone of cord would pass horizontally around the balloon, to which would be attached four equidistant guys of the size of codfish lines. A broad colored stripe would pass vertically around the balloon. From below the balloon would depend reophores enclosed in a graduated cord, the graduation serving the purpose of adjusting the balloon to any given height above the earth. The reophores would be electro-magnetically connected with the shutter of the camera, actuated from the ground by a small, but strong, galvanic battery.

The balloon, being inflated, would be compelled, by means of the four equatorially fastened guys, to assume a position regulated as to height by the graduated cord. This height will have been previously determined upon with reference to the scale of the map that may be desired, the focus of the camera having also been adjusted with reference to the contemplated height of the instrument above the earth. The position of the balloon would be over the middle of a given link of a traverse line, the orientation of the camera being secured by causing the vertical stripe on the balloon to range along the given link of the traverse line. Two disks, made of hoops covered with white cotton cloth, one of which should be larger than the other, would give on the photo-

graph, points representing the termini of the link corresponding to those on the ground, and the direction in which the link, as a portion of the traverse line, is lying.

A very low grade of accuracy could be obtained by the balloon photogrammetrical process by the method of omitting all angular and linear measurements on the ground, and letting the balloon camera, placed in a generalized position with reference to the parts of a traverse line, accomplish the whole work of determining the angles and directions of the parts of the line successively submitted to its operation, as well as of delineating what it must perforce include by the photographic process in the representation of the details of the subjacent terrene. In this method the end link of a given section of the line would have to be duplicated in the advancing survey of the line, so that the relations with one another of all parts of the line should be maintained. If, additionally, the azimuth of one of the links of the line were obtained, it would communicate azimuth to all the other links. But this method can, at best, be recommended for nothing beyond the requirements of reconnoissance.

The photographing of a link of a traverse line in the precise manner first described involves, of course, the necessity that the balloon and each of the two stations representing the link over the middle of which it is floating, should be intervisible. A similar condition, as between the two stations as viewed on the ground, is indispensable. It is evident, however, that if there are trees or other obstructions on the ground, the stations might be intervisible below, and yet that each might not be intervisible with the balloon. Consequently, as not only these conditions but the condition of ample space for the management of the guys must be fulfilled, precise operations with the balloon imply the existence of open ground, or ground substantially free from obstructions to sight.

In proportion as the balloon is allowed to attain a greater and greater height, so as to include more and more of the earth's surface, the scale of the resultant map would become smaller and smaller, and the apparatus more and more unmanageable, because at a greater height the guys cannot be maintained at the angles requisite to control its exact position. Therefore, it will in prac-

tice probably be found that heights of from three hundred and fifty to five hundred feet will be those most convenient for surveying by this method.

One gain made by elevation is more than counterbalanced by the loss of the clearness of delineation that belongs to a large scale. It is evident that, at moderate heights, the photographic projection of an abrupt rise of ground or other object, as, for instance, a house, on the plane of the photograph is at a greater distance by scale from the vertical passing through the balloon than it should be as related to nature, but that, as the height o the balloon above the earth increases, this error proportionately decreases. Therefore, for the moderate elevation that must be adopted for the balloon in order to manage it, we must, with broken surface, accept greater error in delineation than would attach to the same surface if greater elevation of the balloon were permissible. But we should be reconciled to this fact from the consideration that, even were it possible to manage the balloon at the height which would virtually eliminate the error of projection mentioned, the scale of the resulting map would be so small as to approach in character the results of a reconnoissance. Another circumstance should reconcile us to the insuperable fact mentioned, and that is that there are thousands of square miles in our country where, from the very fact that the surface is essentially level, the optical difficulty attaching to moderate elevation for the balloon would not exist.

Such a survey, by balloon photogrammetry, as that described could be very easily plotted by final process of photographic printing. In consequence of the fact that the balloon would be kept at a fixed height throughout a given survey, the scale of the links of the traverse line would be established through the photographic presentment of the length of those links. The scale of those links may also be fixed by the measurement of them on the ground. So the photographic scale and the other scale may be made the same. The traverse line having finally been laid down on helios paper, before the paper is sensitized, the paper would then be sensitized, and the photographic plates representing the links of the traverse line would be simultaneously adjusted

upon it along the traverse line as plotted, one scale, as derived from adjusting the balloon at a certain height, and the other scale, virtually the same, as derived from linear measurement along the ground, being made to accommodate themselves graphically to each other, thus eliminating error in the resultant map. This resultant map, if the picture of a plane surface, would have but one defect, that of exhibiting minute triangles of blank space where the photographic plates, cut off so as to fit along the links of the plotted traverse line, would necessarily not fill out entirely the delineation of the ground at those points, although otherwise perfecting it elsewhere, from the fact that they would form with one another a continuous series.

The captive balloon, if used only on days fit for ordinary field work, would occupy a position of almost stable equilibrium, if its power of flotation were sufficient, not only to support the photographic apparatus, but to strain upward upon the controlling guys, because the attachment of the guys would be made to the equator of the balloon, and the weight of the dependent apparatus would be close to its periphery, and therefore to the centre of the spherical figure of the balloon. In addition, for the purpose of increasing the stability of the balloon at the critical moment of taking a photograph, the operator would steady it with a gentle draught upon the dependent cord containing the reophores, at the precise point of time when he makes the electrical contact with the shutter of the camera.

I here conclude the description of that one of my proposed additions to the art of photogrammetry which relates to precision of results obtainable from it for a continuous line of survey, and invite your attention for a moment to a method I suggest of using a similar captive balloon in a manner which would be useful in military operations. It need hardly be said that, whether captive or not, balloons have heretofore been used at great disadvantage in military operations, unless we except the use made of them for escape, with indirect reference to those operations during the recent siege of Paris. If the free aëronautic balloon passes over the enemy at such a distance as to make useful what can be observed from it, the glimpse is but transient, while its nearness and

immense volume place it in great danger. If, on the other hand, a captive aëronautic balloon be used for military observation, it must ascend far from the enemy, to a height which measurably neutralizes the accuracy of the information sought.

The use for military purposes of a modification of the small spherical captive balloon which I have described would be conditioned solely upon the circumstance that the wind should be blowing towards the enemy's lines. The only change in it from the one described, that would be entailed by its new purpose, would be that it should be mounted with a simple network similar to that which is used on the kite, and to which the string for flying it, fastened similarly to the way in which it is fixed on the kite, should be attached. This string, with which the balloon would be flown like a tailless kite, would contain ordinary filigree reophores, through whose instrumentality the photographic shutter of the camera would be controlled by the operator. Lying several hundred yards away, or even a mile or two, if desirable, outside of an enemy's lines of circumvallation, or line of battle, with the wind blowing in his direction, the balloon could be sent up with ballast proportioned to the general elevation intended for its soaring over his position. I have said "general elevation," because change of volume in the balloon, in accordance with the change of temperature, or increased weight on it, from an accession of moisture, preclude the possibility of calculating upon obtaining precise predetermined elevation for the balloon. The weight of the string for the length to be paid out to the contemplated distance would of course enter into the amount of ballast needed to secure an approximately special elevation at a special distance. The distance to the enemy's position being known, and the vertical angle being taken to the balloon from its point of departure, when it is approximately delivered at its destination, the exact remaining length of string, with allowance for sagging, necessary to pay out so as to cause the balloon fairly to dominate the enemy's military works or line of battle, would at once be known by a simple computation, or could be taken from a table of angles and distances. This operation being completely performed at several points along the opposing military lines, a series

of pictures, at varying distances from front to rear, and from right to left of the enemy's position could be secured by means of the electro-magnetic attachment to the shutters of the photographic cameras, each individual one of which could take a number of pictures without replenishment of plates. It is evident that such a use of the balloon and the photographic camera would have proved greatly advantageous to either side in such modern sieges as those of Sebastopol, Richmond, and Paris.

Waiting for That "Pleased Expression."—"Stranger," said the young man with the white hair and the dyed mustache to the photographer, "I am here to git my picture took, and I'll tell you how it is. I've just popped the question to a widder down our way, with forty acres of as good ground as ever a hog stuck his nose into, and I am now going to read her answer. When you see the pleasant smile stealing over my face I want you to fire off your ole machine and let 'er go."

"All right."

The young man took his position, but he didn't get the photograph taken. Instead, he rose to go without a word.

"What's the matter?" asked the photographer.

"There hain't nothin' the matter, 'ceptin' that she says she's stuck on a preacher, and that I hain't got the sense I was borned with, that's all."—*Indianapolis Journal.*

A Sacrifice.—Mr. Sourly.—"I'm going to have my picture taken to-day."

Mr. Sourly's Wife.—"You will have to make a great sacrifice if you do."

Mr. S.—"Why?"

Mr. S.'s W.—"You'll have to look pleasant for a moment or two."—*New York Press.*

Bind Your Volume of the AMERICAN JOURNAL OF PHOTOGRAPHY. If you know of no binder, send your numbers to us and we will have them bound for you at trade rates.

Cut-price Artists are rarely of the kind who have use for any of the photographic periodicals.

ARTISTIC WORK ON NEGATIVES.

XANTHUS SMITH.

THERE has been a good deal of discussion from time to time about the legitimacy of what is called "tinkering" or "doctoring" in photography.

What is meant by the above terms is the appliance of all sorts of ingenious means to the end of producing certain effects in the finished prints.

These effects may either be merely efforts to overcome certain imperfections in the negative, or subject from which the negative was produced, or they may be what are known as artistic effects.

There can be no doubt but that all those things which come under the head of imperfections should be remedied as far as possible in all photographic work, but as to the latter, namely, striving after artistic effects, there seems to be a difference of opinion.

Some writers hold the view that a photograph should stand on its own merits as a photograph. That the art of artists and the art of the photographers are two entirely different things, and that any tampering with a photograph, provided all has been done which it is possible to do for it in a legitimate way as a purely mechanical art, is out of place, in fact, detrimental to the photographic art rather than of advantage to it. Now it seems to us that, as with many other subjects, there is truth to be found on both sides, and that it will not do to take too extreme a view of either.

Certain it is that in the vast amount of commercial work produced by the professional photographer, tampering with his work to any extent further than is practiced would be an impossibility, both on account of the want of time to do so, and the want of appreciation of any high-flown results which might be attained. But for a large class of amateur photographers, we do not see why every possible means might not be resorted to by which all the artistic effects attainable might be produced.

The amateur in many instances has an abundance of time to bestow upon his work. It is not necessary for him to turn out

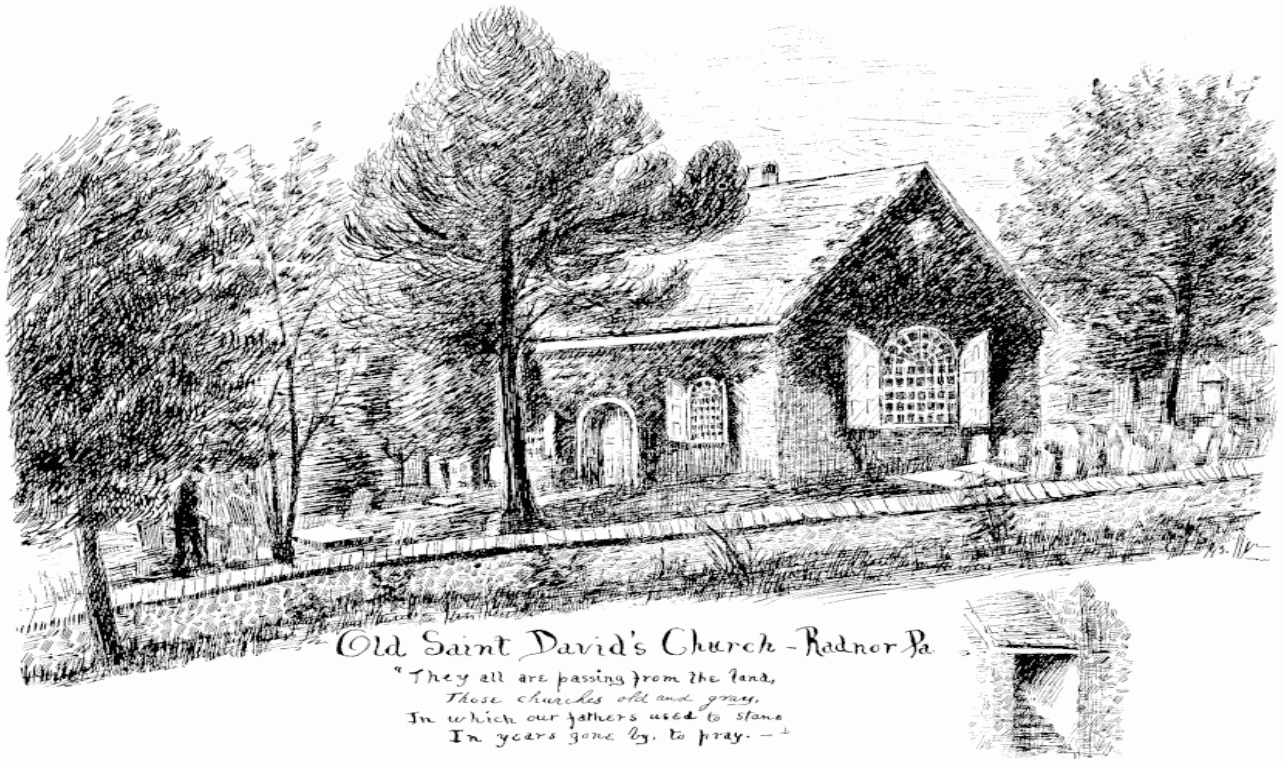
his prints by the dozens, and if he spend a whole day or even two days in making a print, what matters it? so that he succeeds in arriving at something in the nature of a work of art.

Many amateurs are supposed to possess a large share of artistic taste and cultivation, and why should they not exercise it in this way just as fittingly as in making drawings or paintings, furnishing them, as photography does, with so much more ready means of attaining what they wish to express than by the plodding road of the painters? The bestowal of such pains will certainly give an individuality to their work—a lifting it out of the ordinary routine, and attracting an attention and interest from all those of kindred tastes and inclinations which it would never otherwise get.

We would, therefore, recommend to all those practicing photography who have the time and the inclination, to adopt every known means to the end of producing as artistic and effective work as their talents make them capable of.

The most that is to be done in the way of changing the relative lights and darks in a photograph must be accomplished by work upon the negative after the process of development has been completed. Many recommend tinkering with the negative during development by means such as the application of an accelerator to certain parts which it is desirable to accentuate, and the use of a retarder for other portions which are to be kept in subservience, but however much success some individuals may have had by resorting to such means, we doubt the possibility of their becoming generally useful. The chief drawbacks to this means are the difficulty of determining the precise amount of action which is taking place in the hurry of some conditions of development, and the disposition for the applied liquid to flow beyond the boundary at which we would have it terminate its action. We must admit, however, having seen very good results attained in this way in marine subjects by swabbing a strong solution of bromide across the sky while developing, thus preserving a good cloud effect which would otherwise have been lost.

The surest way, as we have said, in all manipulations for the improvement of effects, is to treat the finished negative. Re-



SPECIMEN OF PHOTO-ZINC ETCHING.

touching upon the face and painting upon the backs of the negatives in various ways, are the principal modes to be adopted. Retouching, as we all know, is done in the retouching frame with suitable leads upon the face of the negative, the latter having been coated with retouching liquid. Work upon the back, or glass side of the negative, may either be done with color applied with a brush, or by coating with ground glass substitute, and applying lead or crayon with a stump. In working directly upon the glass opaque is a pigment much used. As its name implies, it is of great body and consequent opaqueness, and may be applied so as to ensure absolute opacity or modified by the addition of water so as to give only the most delicate lights. Sepia and Prussian blue are also used to attain certain effects. A good plan is to lay patches of different colors (finely ground water colors) on a sheet of clean glass, and, exposing it over some silver paper in a printing frame, see the relative effect that they have in retarding the action of light upon the sensitive sheet. You may judge very accurately in this way of what to apply and in what degree of density. The glass should, in all cases, be absolutely clean when attempting to apply the colors, otherwise it will not flow or lie evenly upon its surface. It has been our own practice after cleaning carefully the back of the negative to be worked upon, to go over it finally with ox-gall solution. Dilute ammonia would probably answer the purpose of removing all greasiness.

In the case of using the ground glass substitute and stumping on the dry crayon powders some very nice soft effects may be produced. It is especially useful for skies. But it is impossible to attain that crispness which can be secured with colors applied with a brush. There is always a certain woolliness about stumped works. A friend, a bold worker, had very good success in improving his negatives by working with oil colors directly upon the gelatine side of his negatives. However successful this might be with some, we would not recommend it, for should the colors never dry hard, but remain sticky, it would be impossible to print from the negative, and it would, in all probability, be spoiled. It would be safer in using oil colors to do so on the ground glass substitute on the back of the negative, as in case

of failure the whole could be removed without injury to the negative.

All the means referred to are to the end of attaining lights and half lights in place of shadows and half shadows on the finished print, and are comparatively easy, but the most difficult thing of attainment, and one often very desirable to be attained, is the reduction of lights which are too dense. We do not know of any very satisfactory means of coming at this important desideratum. Scraping and pumicing are recommended. We have been successful sometimes in removing small lights by scraping with a very sharp knife with a curved blade, but extreme pains are required, because there is such a disposition for the surface to give away more rapidly in some places than in others.

The use of a reducing liquid on the finished negative seems to be impracticable, because its action must be stopped by washing, and this immediately flows it beyond the part to be acted upon, and the surroundings become reduced also.

Much is often done by shading in printing. Carefully-cut pieces of yellow envelope paper, or card board, over certain portions of the negative will retard the printing of such portions, and small openings in sheets covering the negative will accentuate positions in which it is desirable to attain touches of very deep shadows. Generally, though, either the printing frame or the card board must be kept in motion to prevent the formation of a definite edge.

It has been recommended as a means of securing good prints from negatives of entirely too violent contrasts, to make a paper negative and superimpose this in printing, care being taken to see that the subjects tally precisely.

The more important photographic exhibitions furnish us with numerous examples of what may be done by the application of time and skill in the way of lifting some photographic works out of the ordinary commonplace routine, and must act as a source of emulation to many who have the opportunities for doing such work, and we will hope not always simply for a desire to carry off honors on such occasions, but for the sake of excellence itself.

PHOTOGRAPHY IN TRAVEL.

PROF. ANGELO HEILPRIN.

IT will be generally admitted that the camera is to-day one of the most important adjuncts of the traveler's equipment. It not only renders faithfully what the traveler sees and learns, but it prevents that perversion and distortion of facts to which, unfortunately, many (indeed, one might say, the greater number of) travelers are prone. The sketch-book and color-box, while they are still necessities of every tour of exploration, are at all times difficult to manipulate, especially in the hands of the many who are not initiated into the mysteries of art, and cannot help, in the absence of the correcting medium of the camera, graphically to misrepresent the aspects of a country and of its inhabitants. One has but to compare the works of travel illustrated by the free-hand process with those to which photography has lent its aid to know how vast is the difference in the results obtained. If the same region is treated of by the two classes of books, it will frequently be found that the landscape is indeterminable and even the physiognomies of the people unrecognizable. We have but to place before our readers, as one of innumerable examples that could be brought forward, two representations of the Greenland Eskimo, one from the facile pencil of the distinguished Kane, and the other from the kodak of Mr. Peary, to illustrate the points in view. Not even a bond of racial relationship can be obtained from the comparison.

It is true that there are those who faithfully and effectively wield the pencil or brush, but they belong more particularly to the class of the professional artists rather than to that of the explorers, and their assistance can generally be obtained only in the work of elaboration after the completion of a journey. The deficiencies of the pencil-

and-brush method arise not alone from the difficulty of handling these instruments, but from the still greater difficulty of mentally interpreting what the eye sees. How many observers, for example, can correctly, or even with an approach to correctness, estimate the height of an object in the field, whether it be a tree, a steeple, or a mountain, and place such an object in its true relations in a drawing? How many are there who can properly gauge the angle of slope of a mountain? It is well known that travelers frequently describe great rock-masses as rising nearly vertically for thousands of feet, when possibly the average angle of slope does not exceed thirty or thirty-five degrees; and even experienced mountaineers have been known to describe long mountain slopes as rising at an angle of some fifty or sixty degrees, when the actual inclination barely exceeded half that amount. The time-honored representations of volcanic peaks rising like sugar-cones are an illustration of this deception. The following views of Orizaba, the one taken from Humboldt's *Vues des Cordillères*, and the other from a photograph, require no comment.

It may, however, be objected that the mind interprets differently from the camera, and that the mental picture requires the correction of the pencil. A man standing near the base of a giant wall and gazing upward at its cornice, usually sees the wall impending over him; the foreshortening of the upper distance has brought the line over his head. This deception is frequently experienced in high mountain regions. The Dolomites of the Tyrol may appear, so to say, vertical, the Matterhorn (especially if its base is shrouded over in fog and cloud) to arch over the visitor from Grindelwald. The great Cañon of the Colorado is commonly received as being a narrow cut or fissure of the earth's crust, when in reality the walls slope outward at such an angle as to separate the crests of the

cañon by an interval of from ten to fifteen miles. The mental aberration has its true effect, but it should have no justification from the pencil. Each individual observer sees differently, all seemingly in the same direction of exaggeration, and therefore the multiple observations should be reduced to a single standard of comparison—that of the true picture. From this picture, then, every one can deduce his own individual mental concepts.

The use of the camera in travel is by no means new, some of the finest results in exploration having been obtained as many as twenty or twenty-five years ago. It is only within the last few years, however, with the advances that have been made in the photographic art, that the instrument has become a *sine qua non* with the traveler. The direction of improvement lies largely, one might say mainly, in the compacting of the instrument and the introduction of the film-roll. There is no spot to-day where the traveler goes that the camera cannot go with him, and with scarcely an addition of weight to his accoutrement.

Objection has been frequently urged against the film-roll camera on the ground that its results are not so good as those obtained by the " regular " instruments, and that, in fact, there are often no results at all. The statement of results is in a measure a true one, and there can be no question as to the desirability of using a plate camera when this can be done. But it cannot be too strongly insisted upon that there are many places in a journey where the ordinary camera, whether by reason of bulk or weight, cannot be conveniently taken, or cannot be taken at all. In such places a film-roll can do efficient service, even if the results obtained do not prove in every way satisfactory. But a half-satisfactory result, from the point of view of the explorer, is much better than no result at all, and the explorer, if he is wise, will use his camera under all conditions, and not heed the oft-given advice of the professional photographer as to the uselessness of pictures taken under conditions of fog, cloud or rain. Views frequently present themselves but once in the journey, and the traveler cannot abide his time waiting for favorable conditions to set in. The results obtained may not be " pictures " in the artist's sense of the term, but they are permanent renderings, either in part or in

whole, of scenes of nature gathered in the course of exploration, and are the more important. It is the experience of many travelers, however—an experience covering the greater part of the earth's surface—that absolutely satisfactory results can be obtained from the film-roll camera, and it is to them also well known that in the treatment of ethnological subjects, in a region where a natural shyness makes approach to the natives difficult or all but impossible, oftentimes only the instantaneous and "ready-multiple" method can be successfully followed. The disadvantages of using the film are well known, and should be properly borne in mind. The film-roll camera should not usurp the place of the regular camera, but it should invariably be added as an adjunct to it, helping to do the work, and doing the work where it would have been left undone without it. Its compact form and light weight should entitle it to a permanent position about the body, ready for service at an instant's notice.—*Around the World.*

About Paper.—Paper can be made out of almost anything that can be pounded to pulp. Over fifty kinds of bark are employed, while old sacking or bagging makes a good article. Paper is made out of banana skins, from bean stalks, pea vines, cocoanut fibre, clover and timothy hay, straw, fresh water weeds, sea weeds, and more than one hundred kinds of grass. Paper has been made from hair, fur, and wool, from asbestos, which furnishes an article indestructible by fire; from hop plants, from husks of any and every kind of grain. Leaves make a good strong paper, while the husks and stems of Indian corn have also been tried, and almost every kind of moss can be made into paper. There are patents for making paper from sawdust and shavings, from thistles and thistledown, from tobacco stalks and tanbark. It is said that there are over two thousand patents in this country covering the manufacture of paper. No matter what the substance, the process is substantially the same. The material is ground to a pulp, then spread thinly over a frame and allowed to dry, the subsequent treatment depending on the kind of paper to be made.

It's wonderful how proud a man acts when he is going to have his picture published, and how humble he is after it has happened.

THE PRACTICAL TESTING OF PHOTOGRAPHIC OBJECTIVES*.

DR. ADOLPH MIETHE.

THOUGH it is of great interest to the optician to obtain an exact knowledge of all the properties and faults of any photographic system by numerical calculation, it is generally sufficient for the photographer, whether professional or amateur, to form a rougher idea of the capacity of any photographic objective. The following is intended to aid the amateur to determine by comparison, without any particular apparatus, the capabilities of lenses, and it may be mentioned at once that this examination is just as exact (and much more comprehensible with regard to its results) as the measurements obtained by the use of the so-called testing apparatus.

For all examinations of photographic lenses the maxim must be laid down, that only lenses of exactly the same character may be compared together, and that, above all, their constants must be decided. We take it for granted that the amateur knows the simple methods employed for ascertaining the focal length and the aperture, and thereby the intensity of the instrument. We therefore have only the following questions to decide :—

1. Which instrument, with a given aperture not too small for instantaneous photography, gives the largest area of sharpness?

2. Which instrument gives the most even illumination of the field within this area of sharp definition?

3. Which instrument gives negatives with the greatest absence of fog?

4. Which instrument gives with the largest stop the largest area of sharpness?

All other questions which may be proposed in comparing objectives are useless; for instance, it is often said that this or that instrument possesses a greater depth of definition than another. We know, however, that this depends solely on the strength of lighting, at least, in so far as concerns the centre of the field.

*Read before the Photographic Congress.

Our first question must therefore be settled, because upon the utilisation of the sharpness with the largest aperture depends the applicability of the instrument for instantaneous work. The test is very simple. Supposing two lenses are to be compared, one with the greatest illuminating power of *f*-8, the other of *f*-7.3, we should commence our work by stopping down the lens of *f*-7.3 to *f*-8, in order to equalize the conditions under which both lenses work. If a suitable stop were not supplied with the lens it could be easily made of blackened card-board or tin. We now screw the lens to the fixed apparatus, which must be reliable as to keeping the surface of the screen and of the sensitive plate vertical to the axis of the lens. We then focus a distant object perfectly sharp, for which purpose it is best to use an achromatic magnifying glass placed upon the centre of the focusing screen. The best object for this purpose is a so-called test-screen (a flat wall about ten feet square would do), which is completely covered with a net of lines, printed pages, geometrical designs, silhouettes, etc. The objective must not be too near this screen; the distance must be at least fifty times that of the focal length. Care must be taken that the apparatus is so placed that the axis of the lens is directed as perpendicular as possible to the surface of the test-screen. Should the focusing not result in an absolute sharpness in the middle of the field with the stop employed, it is necessary, by introducing other stops, to find out the largest aperture which will give perfect sharpness, and to insert a corresponding stop in the other objective. When in this way we have focused the centre with the greatest possible accuracy we proceed with the exposure. For this purpose it is best to use a plate of very fine grain, such as a transparency plate, and to expose for as short a time as will suffice. This done we fix the other objective without changing the position of the camera, and take a second photograph with the same length of exposure and relative aperture. It is important that both exposures be of exactly equal duration, and that the plates be developed together in the same tray. From the plates so obtained various things can be ascertained by examining them on a retouching desk with a magnifying glass, starting from the centre, and marking those points where

sharpness is just appreciably beginning to fall off. That objective which gives the larger part of the image in sharp definition is the more perfect one, because the object was photographed under the same angle in both cases. But a further examination of the plates gives us at once an answer to our second question—viz., which of the two objectives gives the more even illumination of the field. It is easy to notice, especially if the exposure was a comparatively short one, that the density of both negatives decreases from the centre to the edges of the plates. The more rapid this decrease is the less suitable is the lens for instantaneous work.

If we now repeat this comparison test of the two objectives with a very small stop, say of *f*-40, we can form an idea of the capability of the lenses for all such cases in which it becomes necessary to employ a small stop, whether to obtain depth of definition, to improve the definition at the edges of the field, or to prolong the exposure.

It will frequently be found that the proportionate advantage of one instrument over the other in the first trial proves to be the reverse in the second. So it may happen that an objective which with a full aperture shows poor definition at the edge of the plate, and which for this reason would be declared to be inferior to the other, may, if worked with a small aperture, prove vastly superior to its rival. In estimating the values of the competitive lenses it is therefore necessary to consider for which special purpose they are intended to be used. For instantaneous photography the preference will always be given to the lens which, with a full aperture, gives the largest area of good definition; while that lens is the best for landscape photography which with a rather small stop gives sufficient sharpness over a wide angle, with a fairly even illumination of the picture.

An important test which is rarely resorted to, though it can be carried out with very little trouble, is the one referred to by question 3—viz., the examination as to the absence of fog—that is, the brilliancy of the picture produced by the lens.

There is formed in each lens, by the repeated reflections from its polished surfaces, a certain amount of false light, which under

certain circumstances may cause more or less fogging of the plate and a conspicuous flatness of the picture. The test as to this property of the lens is very simple. Fix on to the centre of the focusing screen a piece of tinfoil or black paper of the size of a pea, focus the objective sharply upon the horizon, and then step out with the camera into the sunshine. The lens must then be directed towards the sun, so that its image falls exactly on the tinfoil or paper spot. Now move the camera a little to and fro, and you will observe a number of luminous circles of various diameters, arranged in a straight line, which change their size and position according to the motion of the apparatus. The luminous circles are nothing else than conical pencils or rays of false light thrown by the lens upon the flat surface of the screen, and their size gives a clue as to the amount and harmlessness of the false light peculiar to the lens. If the size of the stop used for this purpose is taken as a unit, that objective must be declared superior in this matter of which the largest luminous circle is in proportion to this unit of the greatest diameter. Besides this that objective is generally the superior one of which the number of the visible luminous circles is the smallest and the increase of their diameters the quickest.

The ordinary photographic lenses of the aplanatic type generally show three or four, sometimes even six such luminous circles, if the operator covers his head with a focusing cloth in order to shut out as far as possible all extraneous light. Experience has shown that under unfavorable conditions the objective gives also a distinct spot of light, if the smallest of the luminous circles is of about six times the diameter of the stop. The objective of which the smallest luminous circle is about ten or fifteen times the diameter of the stop would be considered a very good one, and such lenses give very clear negatives.

The necessity for ascertaining by personal tests the value of the many types of objectives has lately become a very urgent one. The great variety of new types of objectives lately introduced by English and German opticians makes it very difficult for the photographer to determine which he will select. The modern anastigmats and the somewhat similar concentric lens of Schröeder

have raised the standard of perfection which may be reasonably required of an ordinary photographic system, to a very considerable extent, and it would therefore be useless to compare such instruments with older ones, such as aplanatic and symmetrical lenses at all; they are very much superior to them. But it is not so easy to decide the question as to which of all these new systems should be preferred. In Germany it is chiefly Zeiss and Goerz who claim to have produced the most perfect objective. Until lately the palm has been given to the Zeiss anastigmat *f*-6·3 as the undeniably best objective extant for instantaneous photographs; this position it has now, in our opinion, lost, as it is much surpassed by the new double anastigmat of Goerz, and in all cases where the illuminating power of this instrument is sufficient (*f*-7·7) it may deservedly be called the best of all existing objectives.

Quite recently, however, the firm of Zeiss have endeavored to produce an objective, in the form of their new anastigmat *f*-8, to be equal in value to that of Goerz. It is perhaps not yet decided in how far the makers have succeeded. Certain it is that the new anastigmat of Zeiss *f*-8 is superior to the former Zeiss objectives, and only careful comparative tests will reveal whether it is equal or superior to Goerz's instrument. In any case this much can be said, that photographic optics have in the last five years made advances which before that period perhaps nobody would ever have imagined. A further essential improvement is, one might say, scarcely necessary. All the new instruments allow, with an aperture of *f*-8, which is sufficient for nearly all purposes of instantaneous photography, the reproduction of a sharply defined picture with its greatest dimensions at least equal to the focal length of the lens. The old aplanats, however, remain very much behind this; they cover, according to circumstances, a plate of hardly two-fifths of their focal length with absolute sharpness.

DISCUSSION.

Mr. W. E. Debenham had long tried to get photographers to examine their lenses, and had tried to show them how to do it. Many had got certain notions into their heads, particularly that some lenses had more depth of focus than others, and he hoped

the paper would have the effect of inducing some of them to test their lenses for themselves. One point, perhaps, called for criticism. Dr. Miethe spoke of absolute sharpness. Mr. Debenham thought they should not use quite such an expression as that, because nothing was absolutely sharp. It depended upon the amount of power brought to the examination of a particular image whether it was found sharp or not, and therefore he thought it was better to fix some practical standard. He had suggested that a standard which would suffice very well for the purpose of comparing one lens with another, was to reduce a column of a daily paper to a certain size, preferably the column containing the Birth, Marriages, and Deaths, as that contained a variety of type. He had previously decidedly expressed his opinion that the Zeiss anastigmats were superior to any lens that had preceded them.

The President remarked that the paper seemed a good practical one, and he hoped with Mr. Debenham that photographers would pay attention to it. He asked Mr. Debenham the exact diminution he recommended in the case of the newspaper test. It was a good practical test, and one easily carried out.

Mr. Debenham had published the suggestion some time ago, but forgot the exact diminution he had mentioned.

The President said they knew that to test lenses, say for instantaneous use in a hand camera, required a great deal of thought, and on the whole he was of opinion that Dr. Miethe had given them a good practical way of finding out what they wanted to know.

A vote of thanks was accorded to Dr. Miethe for his communication.

Photograph Album Patents.—The suit of Joshua R. Jones, trading as the National Publishing Company, against William A. Holman, trading as A. J. Holman & Co., for infringement on a patented improvement in photograph albums, has been decided in favor of the plaintiff by Judge Dallas in an opinion filed in the United States Circuit Court. An injunction was granted enjoining the defendants from further infringement, and an accounting of profits derived from former infringement by them was directed.

COMPOSITE HELIOCHROMY.

ACTION BY THE FRANKLIN INSTITUTE OF PHILADELPHIA.

THE Committee on Science and the Arts of the Franklin Institute recently awarded to Mr. Frederic E. Ives, with the approval of the Institute, the Elliott Cresson gold medal for his system of color photography, known as Composite Heliochromy. The report of the sub-committee, upon which this action was based, has just been made public. The report is as follows:

Your sub-committee, appointed to examine into the merits of Mr. Frederic E. Ives's system of color photography, known as heliochromy, beg leave to report:

In order to satisfy themselves as to what had been accomplished by other workers in the line of color photography, your snb-committee corresponded with the following named gentlemen, viz., Professor Lippmann, Paris: Leon Vidal, Paris; Dr. H. W. Vogel, Berlin, and Dr. Eder, Vienna. They received replies from Leon Vidal and Dr. Vogel. The former disclaimed any originality in heliochromy so far as he was concerned, and stated that he had simply experimented with polychromic projections on the lines laid down by others.

Dr. Vogel submitted through Mr. Kurtz, of New York, specimen prints in color, printed on the power press in three impressions, to represent the colors of nature; two subjects from nature, and one taken from a sample of carpet. These prints seem to possess considerable merit, although, not having the originals before us for comparison, we are unable to judge as to how correctly their colors are reproduced. We conclude, from the examinations of these specimens, and from the statements of Dr. Vogel in a letter submitted to us, that Dr. Vogel and Mr. Ives, although both workers in the line of color photography, yet are operating in different directions, and we are of opinion that Dr. Vogel's claims do not interfere with those of Mr. Ives, and need not, therefore, be further considered.

Your sub-committee, to satisfy themselves of the claims made by Mr. Ives to reproduce the colors of nature of any object by

means of his special camera and photo-chromoscope, provided a bouquet of flowers, which was photographed in their presence by Mr. Ives with his special camera, in which one lens only was used to make a triple negative on a single plate at one exposure.

Your sub-committee having seen the negatives developed and a triple positive made therefrom in the usual manner, the latter was placed in the photo-chromoscope and viewed by your sub-committee in comparison with the original bouquet. It was their unanimous opinion that Mr. Ives, claims were fully borne out in the demonstration there witnessed. The bouquet furnished consisted of flowers specially selected by your sub-committee, having the colors red, blue, yellow and green, of both strong and delicate tints, furnishing a very severe test of his process.

Other examples were submitted by Mr. Ives and examined critically by your sub-committee, the original objects, in many cases, being placed alongside the photo-chromoscope for comparison, and though different both in substance and color from the bouquet of flowers, they were rendered with great fidelity.

Your sub-committee, in describing the demonstration made by Mr. Ives, as above set forth, to avoid any misconception of their report, desire it to be distinctly understood that they do not wish to convey the idea that Mr. Ives either reproduces the colors in the camera direct or in the nature of prints, as aimed at by Albert, Vogel and others, but by aid of his special camera having one lens, producing three images equal in form and perspective on a single sensitive plate by means of a system of reflecting and refracting mirrors, which, in connection with suitable color screens, yields a negative giving a correct record in monochrome of the original colors photographed. From this triple negative a triple positive is then made which, when placed in an instrument invented by Mr. Ives and known as the photo-chromoscope, a similar device to the camera, the object originally photographed is shown in its true form and color.

Herewith we present the claims as made in brief by Mr. Ives:

"1. A triple positive, one image of which represents by its light and shade the effect of light from the object upon the fundamental red sensation; another the effect upon the fundamental

green sensation; another the effect upon the fundamental blue-violet sensation. This claim dates from November 21, 1888, (Journal of the Franklin Institute, January, 1889), previous to which no one else had made photographs answering to that description or recognized the principle involved. Such photographs are obtained by a method of precision, in accordance with actual measurements of the relative power of different spectrum rays to excite the fundamental color sensation.

"N.B. To make photographs, 'through red, green and violet glasses,' or 'by red, green or violet rays,' is either positively and fatally wrong, or else the names of colors are used in such an indefinite sense that the statements have only a vague meaning. Nobody working with such vague ideas ever did or ever would accomplish anything of value.

"2. A camera producing the triple photograph on a single sensitive plate by a single exposure, from one point of view. Although many tried, nobody else succeeded in devising such a camera. Dallmeyer took out three provisional patents for ideas that failed to accomplish the result. Without such a camera, the procedure is too complicated and difficult to be carried out successfully by any but scientific experts.

"3. The photo-chromoscope: The only successful device for optically recombining the three images of the chromogram to form one image on the retina of the eye, reproducing the colors.

"It is also important to recognize the fact that this system produces photographs by the action of *all* visible spectrum rays, but shows them by means of *three* kinds of spectrum rays only, and that nobody else saw the necessity for such a procedure, although no other is possible in accordance with the modern theory of color vision.

"It is further claimed that the above named improvements have,

"First. Solved the problem of reproducing the natural colors by photography.

"Second. Simplified the procedure so much as to make it possible for any good photographic operator to make the photographs when supplied with the special camera, even if he have no knowledge whatever of color science."

Your sub-committee having carefully gone over the claims of Mr. Ives and his predecessors, and so far as able examined into their results, can come but to this conclusion: That Mr. Ives, by his original investigations and special construction of camera and photo-chromoscope for recording and reproducing color, as set forth in United States Patent Specifications, No. 432,530, July 22d, 1890, and No. 475,084, May 17th, 1892, has offered a practical solution of the problem of reproducing by means of photography the colors of nature, and would, therefore, respectfully recommend that your committee award to Mr. Frederic E. Ives the Elliott Cresson Gold Medal, in recognition thereof.

Photography Proved the Signature.—Photography played an important part in a suit at Cincinnati. The suit is one of local standing, involving the title of 1500 acres of valuable farm land. It is based on a deed made nearly seventy-five years ago by the owners of the land, and turns on the point whether the deed had five signatures or only four. In order to test this question it was decided to have the deed photographed, and the clerk of the court was ordered to give the matter his personal supervision. For that purpose it was taken to Washington, and submitted to an expert photographer of that city. The original deed, discolored and yellow with age, showed traces of four signatures and a space where there might have been a fifth, but no trace of it. The photographing was done in the presence of the clerk of the court, who refused to let the deed go out of his sight. The negative revealed traces of the missing signature, and when it was enlarged ten times the entire name became as plain as when first written. The court pronounced the evidence conclusive, and the result will be the reversal of a former decision and a change in the ownership of the land.

Photographing Projectiles in Transit.—Prof. Fritch, lecturing in Berlin in the Museum of Ethnology to two hundred military officials, stated that with the aid of electricity he had been able to photograph projectiles in transit. He exhibited photographs showing the air waves caused by the missiles, which form a legible record of the velocity with which they had travelled. The apparatus used by the Professor is the invention of a resident of Edinburgh, Scotland.

"THE OLDEST SUN PICTURE OF THE HUMAN COUNTENANCE"?

PERSISTENT EFFORTS TO DETRACT FROM THE HONOR DUE PHILADELPHIA SCIENTISTS.

JULIUS F. SACHSE.

THE persistency with which certain parties connected with the University of the City of New York, during the past year have attempted to controvert photographic history, and thereby claim for themselves honors which belong to others in Philadelphia, is certainly worthy of a better cause, the more so as it is done in the face of indisputable proof published in the AMERICAN JOURNAL OF PHOTOGRAPHY and the *Journal of the Franklin Institute*, both of which publications were sent by the writer to the parties in question, at both Chicago and New York.

The facts as to who made the first "sun picture" are so well known, and the documentary proof is so positive and strong, and has been so widely published at home and abroad, that we fail to understand why these continued persistent efforts.

The writer repeats that he does not wish to detract one iota from the credit due Professor J. W. Draper[1] for his valuable researches and experiments in the early days of Heliography. At the same time we challenge our New York friends to show a single line in the writings of Dr. Draper wherein he claims the priority in heliographic portraiture.

A full account of his earliest experiments with reference to the authorities quoted was published in the AMERICAN JOURNAL OF PHOTOGRAPHY, vol. xiii., 361–2, to which renewed attention is called.

As is well known, the first portrait of a human face taken by aid of the sun and a sensitive plate was made in Philadelphia, and shown before the American Philosophical Society at the meeting held December 6th, 1839. During the same month others were made by both Cornelius and Dr. Paul Beck Goddard, and in less

[1] AMERICAN JOURNAL OF PHOTOGRAPHY, Vol. xiii., p. 243.

than three months the daguerreotype miniature had ceased to be a novelty in Philadelphia. These originals are still in existence and in possession of the Historical Society of Pennsylvania.

Another fact to be remembered is that photographie portraiture (daguerreotype miniatures) was worked commercially, and a regular studio established in Philadelphia, months before this alleged portrait of Dorothy Draper is claimed to have been made. Further, there are a number of these Philadelphia miniatures still in existence, which are dated, as was the custom at the time.[2]

A specimen of above in possession of the writer was taken early in the year 1840 (February). (See AMERICAN JOURNAL OF PHOTOGRAPHY, vol. xiii., p. 312.)

Further, a commercial studio was opened in New York City by Walcott and Johnson some time after the successful establishment of the Philadelphia gallery, and several months prior to the date given by Mr. William John Herschel, and it was not until September 1840 that Professor Draper sent his communication to the *London Journal of Science* describing "The process of daguerreotype, and its application to taking portraits from life." (See AMERICAN JOURNAL OF PHOTOGRAPHY, Vol. xiii., p. 404).

A reference to the U. S. patent reports will disclose the fact that May 8th, 1840, a patent was granted to Alexander J. Walcott, City of New York, for an "Improved Apparatus for taking Daguerreotype Likenesses." (See AMERICAN JOURNAL OF PHOTOGRAPHY, Vol. xiii., p. 408, specifications in full.)

Here are material facts which cannot be disputed, and all antedate Professor Draper's experiment which is now heralded about the country with so much *eclat* after having been exhibited at the World's Fair at Chicago, during the late exhibition.

An examination of the alleged Draper portrait, a crude copy of which we here reproduce, shows at a glance that it is not the result of an experimental exposure. The studied pose, the carefully arranged dress of the sitter, the lighting and the finish of the picture, all prove that this was a result obtained long after the experimental stage of Daguerrean portraiture had passed. It is not to be denied that the portrait is an early specimen of helio-

[2]See AMERICAN JOURNAL OF PHOTOGRAPHY, Vol. xiv., pp. 370–1.

graphic portraiture, but the persistent claim that it is "the earliest sunlight picture of a human face," is misleading, and sets forth a claim which cannot be substantiated.

The occasion that calls forth these remarks is the account o the special meeting held Tuesday evening, December 19th, 1893, by the Society of Amateur Photographers of New York, for the express purpose of exhibiting the daguerreotype of Miss Dorothy Draper.

President R. A. B. Dayton presided. T. J. Burton Secretary. Mr. Dayton announced that through the courtesy of Chancellor MacCracken and Professor D. W. Hering of the University of the City of New York the Society was enabled to exhibit the original cameras used by Professor John W. Draper in his experiments in and about 1840, also the first daguerreotype of the human countenance. Professor Daniel W. Hering was presented to the Society and read the following paper:

"Some of the rarest, and most interesting relics that were displayed at the World's Fair in Chicago, were those which comprised the exhibit of the University of the City of New York. The exhibit was situated in the gallery of the Liberal Arts Build-

ing, and formed a part of the great exhibit from the State of New York, the largest American educational exhibit at the Fair. Foremost among the achievements in sciences stand those of the Drapers, John W., and Henry—father and son. Some of the first applications of the camera to obtain pictures of living objects were made by Dr. John W. Draper.

Daguerre made pictures of inanimate objects, but the process was a long one. Professor Draper, by the application of a different chemical to the plate, reduced the necessary time of exposure from forty-five minutes to about one minute, and was thus able not only to daguerreotype inanimate objects, but also the human face. The picture which he took of his sister is claimed to be the first sunlight portrait ever made. The history of this picture is interesting. It was presented by Professor Draper to his warm friend Sir William Herschel, the great astronomer. After Sir William's death it passed, with his effects, into the possession of his son Sir William John Herschel, and seems to have been forgotten. Chancellor MacCracken knew of this picture, and when the exhibit was proposed, set about to obtain it, feeling that it would form a valuable addition to the University's display, and be, at the same time, a tribute to Professor Draper. A letter was accordingly sent through Minister Lincoln to Sir Willian John Herschel; at first the picture could not be found, and the expectation of recovering it was given up. But later a cable message was received, saying that the picture had been found, and would be forwarded. The following legend was attached to the picture during the exposition:

'The Oldest Sun Picture of the human countenance. Taken upon the roof of the University of the City of New York by Professor John W. Draper early in 1840. Kindly loaned through the Hon. Robert Lincoln to Chancellor MacCracken by Sir William John Herschel, to whose father, Sir William Herschel, it was presented in a letter, of which the original draft is here given, as also Sir John Herschel's reply. The photograph by its side is of the same person, taken more than half a century later.'

Lying alongside the relic was the following autograph memorandum by Sir W. J. Herschel:

'This daguerreotype of Miss Draper was taken by Professor Draper of the University of the City of New York, her brother, not later than 28th July, 1840, when he sent it to Sir William Herschel in England, in whose possession and that of his family it has remained ever since. Thanks to the inquiry made for it by the Chancellor of the University its unique history and value were brought to light again in 1893.

Oxford, 25. March. W. J. H.

Except the case the mounting is as received from America originally.'

A little further away were the following autograph directions by the same person:

'This daguerreotype is lent to the Chancellor of the University of the City of New York to be used at his discretion during the Chicago Exhibition, and to be returned by him to Sir W. J. Herschel, Bt., Oxford, by the close of this year. It has never been opened, but may be so if the Chancellor desires to copy it by any process which does not involve contact of any substance with the surface or the application of heat. W. J. H.

Note.—The outer American case does not belong to it, but please return it.'

The camera with which this picture was taken was a cigar-box camera and was lost. The other early cameras used by Dr. Draper and the microscope and other apparatus with which he applied the daguerrotype process to microscopy, were exhibited in the case occupying the centre of the alcove. Some of the apparatus for sensitizing the silver plates is hand-made and crudely put together, but important scientific results were achieved by its use.

In the show-case was another piece of apparatus, called the Chlor-Hydrogen Photometer, the invention of Professor John W. Draper. It was based on the property which chlorine and hydrogen have for uniting, when exposed to the light. It could be exposed to but a small amount of light or the chlorine and hydrogen would unite with an explosion. However, it was an exceeding delicate and accurate instrument, and for a long time was the most useful of all photometers.

The following note is taken from *Harper's Magazine*.

'Professors Bunsen and Roscoe, in their chemical researches, made at the University of Heidelberg, and communicated to the Royal Society of London, 1856, say:

The first and only attempt which has been made to refer the chemical action of light to a standard measure, is to be found in the researches of Draper. * * * *

Professors Bunsen and Roscoe, having modified this instrument to suit the objects they had in view, accordingly used it in their very exhaustive and important series of researches.'

On the right side of the exhibit stood the bust of Henry Draper, and behind it his great work in science. The largest one is the photograph of the moon, about five feet in length. It was enlarged from a small negative perhaps two and a half inches in size. Seven hundred negatives were taken before one was secured sufficiently clear to enlarge, and this was in the days when wet plates were used! There was no paper made at that time large enough to print the photograph, and four pieces were pasted together.

The other photographs show his discovery of oxygen in the sun, and the early investigations of star spectra."

Professor Hering exhibited the cameras of Professor Draper, and also some of micrographs made by him in the early days.

Mr. J. WellsChampney, at the close of the paper, moved that a hearty vote of thanks be tendered to Professor Hering, for his interesting paper. The motion was unanimously adopted. The meeting closed with an interesting exhibit of new apparatus.

OUR ILLUSTRATIONS.

Our Frontispiece.—A photo-mechanical reproduction in colors, direct from the original painting by Menocal, it is the product of the Photo-chromotype Company of Philadelphia, and is printed on an ordinary steam press in three colors from as many copper plates. The picture is well worthy of a close examination, and is but another instance of Philadelphia's advanced position in all matters photographic.

A comparison with specimens from European and American sources will show the superiority of our home product for fidelity to nature, excellent coloring, perfect modulations and exact register. The Photo-chromotype Company certainly deserve encouragement and success. This is virtually the first practical application of the half-tone process to photo-chromotype, which works perfectly in all its various features.

Old St. David's Church.—A direct photo-mechanical reproduction etched upon a zinc plate blocked type high and printed on an ordinary printing-press. This is a specimen of one of the most common photo-mechanical processes, used for book-illustrations, and in its crudest form for newspaper illustrations.

The subject is Old St. David's Church, in Radnor, Pennsylvania, the oldest and quaintest Episcopal Church in Pennsylvania, and which furnished the theme for one of the Poet Longfellow's finest poems.

> "What an image of peace and rest
> Is this little church among its graves!
> All is so quiet! the troubled breast,
> The wounded spirit, the heart oppressed,
> Here may find the repose it craves."

The church, built in the year 1715, has stood comparatively unaltered until the present year, when the interior was completely torn out and altered to meet the demands of the present suburban congregation. The church is chiefly known from the fact that within the cemetery rest the remains of General Anthony Wayne, Pennsylvania's most heroic character during the revolutionary struggle.

Cost of a Universal Patent-right.—There are sixty-four countries in which a patent-right may be procured, and an invention protected. It costs something over $15,000 to obtain a patent from all of the various goverments.

To remove fruit stains dip the spots several times in scalding milk.

The Editorial Dropshutter.

Rewards for Meritorious Discoveries and Inventions.—The attention of ingenious men and women is hereby directed to the fact that the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts may grant, or recommend the grant of, certain medals for meritorious discoveries and inventions which contribute to the promotion of the arts and manufactures.

The character and conditions of these awards are briefly stated in the following:

The Elliott Cresson Medal, founded in 1848 by the gift of the late Elliott Cresson. This Medal is of gold, and by the terms of the deed of trust may be granted for some discovery in the arts and sciences, or for the invention or improvement of some useful machine, or for some new process or combination of materials in manufactures, or for ingenuity, skill or perfection in workmanship.

The John Scott Legacy Premium and Medal (twenty dollars and a medal of bronze), awarded by the City of Philadelphia. This medal was founded in 1816 by John Scott, a merchant of Edinburgh, Scotland, who bequeathed to the City of Philadelphia a considerable sum of money, the interest of which should be devoted to rewarding ingenious men and women who make useful inventions. The premium is not to exceed twenty dollars, and the medal is to be of copper, and inscribed "To the most deserving."

The control of the Scott Legacy Premium and Medal (by Act of the Ordinance of Councils in 1869) passed to the Board of Directors of City Trusts, and has been referred by the Board to its Committee on Minor Trusts, and that Committee has resolved that it will receive favorably the name of any person whom the Franklin Institute may from time to time report to the Committee on Minor Trusts as worthy to receive the Scott Legacy Premium and Medal.

The Edward Longstreth Medal of Merit, founded in 1889, by Edward Longstreth, machinist, and late member of the Baldwin Locomotive Works. This medal is of silver, and may be awarded for useful invention, important discovery, and meritorious work in, or contributions to, science or the industrial arts.

Full directions as to the manner and form in which applications for the investigation of inventions and discoveries should properly be made will be sent to interested parties on application to

WILLIAM H. WAHL, *Secretary.*

A Serious Conflagration.—The American Aristotype Co., of Jamestown, N. Y., announce that on December 22d last, their factory Number One was burned to the ground. This building they were using for manufacturing their entire out-put. Fortunately another factory, known as Number Two, a duplicate of the one burned, was built during the past summer as an emergency plant and to provide against such misfortune as has just befallen the Company. This building has a full equipment of finished machinery. The power house, chemical vaults and raw stock storage were in separate buildings and are not damaged in the least. All, therefore, that is required to operate the new plant is in making steam connections and adjusting machinery, and the Company have every confidence that they will be turning out paper as usual, within the next ten days or two weeks at the outside.

Miss Frances Johnson, of Washington, D. C., who assisted in photographing the Annapolis students at the World's Fair, has been engaged as an expert to assist in making the photographic illustrations for the report of the United States Government. She has already made several hundred negatives of various sections of the buildings.

Artificial Sunlight.—In a dark room with alternating currents of 800,000 voltage, Nicola Tesla, by means of atmospheric vibrations, caused a faint glow of light to appear. Explaining the phenomena, he said; "If I can increase the atmospheric vibrations, say 1,000,000, or ten thousand millions, I can produce sunlight in this room. Of course, I can increase the vibrations by increasing the voltage. I can make the voltage 8,000,000 as easily as 800,000, but I am not ready to handle 8,000,000 volts of electricity. Currents of such strength would kill everybody in the room. I expect, however, to learn how to control a large voltage. When I have increased the atmospheric vibrations perhaps a thousand times, the phenomena will be no longer electricity. It will be light. I am satisfied that sunlight can be made from electricity without doing harm to anybody, and I expect to discover how it is done. It is a grand idea, and whether the voice through which it came be hushed and still, or yet resounds in the proclamations of new truths, the idea itself will be carried to fruitage, and the world will be wiser, whatever may be the issue."

In the statues of their deities the Greeks often made the flesh of ivory and drapery of gold, brass or iron.

Photographic Hints and Formulæ.

New Method of Toning Gelatino-Chloride Prints.—In *Science Illustre*, M. Bulher proposes the following plan, which is said to give tones resembling those of crayon pictures. The printed picture is first of all immersed in a litre of water acidulated with two or three drops of acetic acid. After washing in several changes of water it is toned.

The toning bath (used at 30° C.) is made up as follows:

A. Distilled water . . . . . 1000 grammes
Gold chloride . . . . . 2 "

After the gold is dissolved:

Strontium chloride . . . . . 200 grammes

is added, and the solution heated to ebullition.

B. Distilled water . . . . . 1000 grammes
Ammonium sulphocyanide . . . 200 to 250 "

This is added little by little to A, the combined solution being agitated, allowed to cool, and filtered, 40 c.c. of distilled water being added.

The stock solution is preserved in well-stoppered bottles. The bath is made up of

Water . . . . . 1000 c.c.
Stock solution as above . . . . . 50 to 70 c.c.

The toning is finished when the half tones by transmitted light, look of a greenish color. After washing, the prints are fixed in hypo, again well-washed, and then immersed in a filtered solution consisting of

Distilled water . . . . . 1000 c.c.
Ammonia alum . . . . . 50 "
Ammonia liquor . . . . . 50 to 75 drops

It is left in this for a quarter of an hour and finally washed.

Boric Acid in the Combined Toning and Fixing Bath.—Herr Gaedicke, having experimented with eighty-four different kinds of toning and fixing baths, recommends one containing boric acid. The addition of a lead salt is necessary. The following is the formula:

Distilled water . . . . . 1000 c.c.
Hypo . . . . . 200 grammes
Boric acid . . . . . 30 "
Nitrate of lead solution 1:15 . . . . . 15 "
Ammonium sulphocyanide . . . . . 20 "
Gold chloride solution 1:20 . . . . . 60 c.c.

The paper, if acid, should be washed in water, to which a trace of ammonia or sodium carbonate has been added. After washing place is above solution. The tone is of a reddish color, but it dries darker.

Blue Lantern Slides.—A good method to utilize spoiled dry plates is to use them for lantern slides. If the plates have not been developed, it is only necessary to fix and wash them thoroughly, then dry in the usual manner, after which they can be cut down to the standard size, and sensitized like ferro-prussiate paper.

Water	4 ounces
Red prussiate of potash	2 drachms
Ammonia citrate of iron	2½ drachms

This solution can be spread over the gelatine with a soft sponge. This coating must be done by a safe ruby light; the subsequent drying is best done in absolute darkness.

The plates when ready are exposed under the negative to daylight and developed by washing under a tap until the high lights are entirely clear. As the plates cannot be examined during the exposure, the time becomes a matter of experience and judgement.

A guide to the time of exposure may be arrived at by a trial exposure of ferro-prussiate paper.

It has been stated that plates spoiled in development or exposure can be utilized for the same purpose by treating the negative in a bath of

Water	5 ounces
Bichromate of potash	15 grains
Alum	1¼ drachms
Hydrochloric acid	½ drachms

After being thoroghly bleached in this bath the plate should be washed under the tap for fully twenty minutes, and then fixed in the usual hypo bath, which, if properly done, will completely remove the image. This must be done by artificial light. After fixing and drying proceed as above.

Chemical Method of Engraving on Wood.—M. Delaurier, in the course of his business, employed wooden agitators to dissolve the bichromate of potash or other salts, which he put into a mixture of sulphuric acid and water. These agitators gradually dissolved, without being carbonized, as would be the case with sulphuric acid alone, especially if at all concentrated; and without softening, either, as with nitric acid. M. Delaurier has not endeavored to ascertain why this should be so, although he has no doubt that the investigation

would be of scientific importance and of interest to trade, but he suggests that his observation be utilized for a method of engraving on wood, the block being coated with a resist varnish, the design being drawn in with a point as when engraving on metal, then to etch away the wood by immersion in the following mixture:

Sulphuric acid	4 parts.
Soda bichromate	1 part.
Water	6 parts.

M. Delaurier made the experiment with perfect success.—*British Lithographer.*

Another Gas Cylinder Explosion has been added to the already large record of such disastrous events. It appears that a boy in the employ of a firm in Bradford, England, while attempting to lift a charged oxygen cylinder containing twenty cubic feet of the gas, allowed it to drop, when it immediately burst with a loud explosion. The boy's head was almost completely severed from his body, death being instantaneous. In addition, a number of persons who happened to be in the vicinity were injured, though not seriously. A cylinder containing hydrogen, which was being dragged at the time by the same boy, was found intact beside him on the ground. The pressure in the exploded cylinder was the usual one of about one thousand two-hundred pounds per square inch, and, considering the fact that it had been tested for more than double that amount, it was considered quite safe. So far as we know, this is the first accident of the kind that has occurred with these high-pressure cylinders, and they have always been looked upon with perfect confidence.

It is to be hoped that a rigid examination at the coroner's inquest will reveal the cause of the disaster, so that its recurrence may be prevented in the future.

A Professional Sitter.—American—"Well, John, still in the laundry business?"

John—"No, me gettee better work, better payee. Me plofessional."

"You are in a profession, are you? Well, what is your profession?"

"Sittee flo photoglaph flo Chinamans what want to legister."

Society Notes.

The Photographic Society of Philadelphia. — A stated meeting of the society was held Wednesday evening, November 8th, 1893, the President, Mr. Joseph H. Burroughs, in the chair.

The Board of Directors reported the following gifts to the Society :—

Dr. Charles M. Cresson had presented a framed photograph of the old Philadelphia Gas Works, and two negatives of the same subject. Both the negatives and the print were made in 1861, the latter being on plain salted paper. The negatives were on a wet plate eighteen by twenty-two inches and were in a perfect state of preservation.

New members have been elected as follows: Messrs. Horace A. Blakiston, George H. Taber, Jr., Christian Emil Ronne, J. Albert Haddock, and Henry Cartwright Burr.

At the Conversational Meeting, October 25th, American Interchange Lantern Slides from Buffalo and Syracuse were shown ; and at the first "Visitors' Night," November 1st, slides from Detroit and last season's Philadelphia set.

Photographic Society.—The Photographic Society of Philadelphia at its December meeting received an elaborate and exhaustive report from a special committee appointed to consider the subject of a standard light and a uniform method of ascertaining and marking the sensitiveness of dry plates. The committee, through its chairman, recommended the adoption of the standard candle, burning 120 grains of spermaceti per hour, as most nearly meeting the requirements of uniformity, etc., and as possessing the fewest disadvantages. The committee also recommended that the society take suitable steps to confer with other societies of America on the practicability of inducing plate manufacturers to adopt a uniform system of marking plates, and that in such conference the society favor the adoption of the system of Hunter & Duffield. Some novelties in apparatus were shown, and there was an interesting discussion as to the safety and method of manufacture of steel cylinders for the compression of gases used in optical projection.

The Camera Club of Hartford.—The club has just closed an exhibition of the work of Mr. L. Bundy of Hartford. This collection of sixty pictures represented many years of experimental work in prin-

ting, most of the larger portraits and heads being on various kinds of paper. Many different tones were shown as well as a great variety of unique methods of finishing.

By some process invented, we believe by Mr. Bundy, the photograph is made to look exactly like brush work even to the extent of showing, apparently, the brush mark as in a background. But in this case it is all done in the printing. The artistic effects produced are very striking indeed—both in posing and lighting. Unlike the ordinary photographer, Mr. Bundy makes his exposures where he happens to be in the open air, or indoors by the aid of what light can be had from a small window. The results, however, rival the best skylight work.

It is safe to say that no such exhibition of artistic photography in portraiture has ever been seen in this city.

During the coming week there will be an exhibition of water-colors by Mr. D. F. Wentworth.

The first of a series of demonstrations was given December 9th, the subjects being Development, by Mr. H. Warner, and Flashlight, by Mr. F. A. Thompson.

The club is taking steps to form a Connecticut Division of American League of Amateur Photographers. Wm. R. A. Wadsworth, Corresponding Secretary of the club, received a diploma from the recent exhibition in Hamburg.

Worcester Camera Club.—This club held its regular monthly meeting on Monday evening, December 4th, and it was gratifying to see so many of the lady members in attendance, notwithstanding many counter attractions the same evening. The lantern slides of the Portland and Mystic Clubs were exhibited, and according to the requirements of the New England Lantern Slide Exchange, a selection was voted upon of the five best slides from each club.

The club has just closed another of its annual exhibitions, which was held the 28th, 29th and 30th of November, and December 1st and 2d. A large number of prints of various processes were shown, as well as a number of very handsome and creditable enlargements. The special attraction of the exhibition was the contest for the best negatives made upon Standard plates, in competition for a prize offered by the Standard Plate Company. The prizes were awarded to J. J. Alton, first prize, Charles Brooks, second prize, and D. William Carter, third prize. Excellent work was also shown on these plates by A. M. Powell, the president of the club, and Mr. Horace Wyman.

In the Twilight Hour.

ILL doers are ill thinkers.

CARE and dilligence bring luck.

ALL work is hard work for a lazy man.

A GOSSIP speaks ill of all, and all of her.

HUNGRY men never call for cake. What they want is bread.

HOW we all admire the wisdom of those who come to us for advice.

IF happiness in this life is your object, don't try too hard to get rich.

GOD finds it hard to bless a man who looks at everything through money.

THE justice that a wicked man never wants is the justice that he deserves.

THE lean pig is the one that squeals the most. Let the faultfinder make a note.

WHENEVER we try to make others happy, we get paid for it in heaven's money.

THERE are some men who have to be knocked down first and argued with afterward.

THE man who turns aside every time he sees a mountain before him will travel a very crooked road.

HAPPINESS generally depends more on the opinion we have of things, than on the things themselves.

THE man who starts out to be a reformer should be well prepared for bad roads and rough weather.

MEN of mean qualities show but little favor to great virtues. A lofty wisdom offends an ordinary reason.

HEAR not ill of a friend, nor speak any of an enemy Believe not all you hear, nor report all you believe.

THE man who is always willing to let some one else do his duties will want to wear some one else's crown.

SAWING an inch from your yardstick will shrink the door of heaven so much that your soul cannot enter.

OUR idea of a man thoroughly equipped for the serious business of life is one who can't learn to chew tobacco.

YOU can generally tell by a man's tracks which way he is going. If they point toward the saloon he is not on his way to prosperity.

THERE is a world of wisdom in this pithy saying of Principal Fairbairn: "Boys were given to educite homes as much as homes were given toeducate boys.

THERE are many disappointments in store for the coming generation. Mothers are bringing up their babes to believe that they can have every thing their own way.

LET not your zeal for a cause push you into a hazardous engagement Set bounds to your zeal by discretion to error by truth, to passion by reason, to divisions by charity.

USEFUL knowledge can have no enemies, except the ignorant it cherishes youth, delights the aged, is an ornament in prosperity, and yields comfort in adversity.

AS the blade of wheat whilst ungrown and empty holds itself up, but so soon as the ear is filled with grain bends humbly down, so is real wisdom and worth modest and unassuming, whilst gnorance and folly is forward and presuming.

Literary and Business Notes.

ORTHOCHROMATIC PHOTOGRAPHY AND ITS PRACTICAL APPLICATION. By John Carbutt.

A neat pamphlet on above subject, embodying the paper read before the Photographic Congress of the World's Auxiliary of the Columbian Exposition of 1893. Can be had free upon application to John Carbutt, Wayne Junction, Philadelphia.

PHOTOGRAPHIC MOSAICS FOR 1894. Edward L. Wilson, New York.

An annual record of photographic progress. Mosaics, though the smallest in bulk of all the annuals, is by no means the least important. The present issue is the thirtieth of its existence. It contains almost 300 pages of readiug matter, with numerous illustrations, both full-page and in the text. The work contains much practical information for both professional and amateur. Not the least important is the able and impartial review of photographic progress during the past year,—a department which bristles with hints for the photographic worker.

Mosaics can be obtained at publisher's rates at the office of the AMERICAN JOURNAL OF PHOTOGRAPHY.

THE AMERICAN ANNUAL OF PHOTOGRAPHY AND PHOTOGRAPHIC TIMES ALMANAC FOR 1894. Edited by W. I. Lincoln Adams. The Scovill & Adams Co., New York,

The eighth volume of this Annual was issued promptly on the day announced, and is fully up to the standard of the preceding volumes. The frontispiece is a specimen of chromotype by the Kurtz Coloritype Company, and shows what advancement has been made in this branch of photo-mechanics under the Kurtz & Vogel system. The volume is embellished with several specimens of the aristotype, photogravure, and collotype processes, together with numerous half-tone and process reproductions. There are over 400 pages of reading matter, which, besides much practical information, contains one hundred and twenty-four papers contributed by well-known writers on photographic subjects. The Annual is always on our library shelf within easy reach. Copies of the Annual can be obtained from the publication office of the AMERICAN JOURNAL OF PHOTOGRAPHY. Price, 50 cents in paper, $1.10 in cloth.

THE INTERNATIONAL ANNUAL OF ANTHONY'S BULLETIN. Edited by A. H. Elliott, Ph.D., F.C.S., and F. P. Smith, Ph.B. E. & H. Anthony & Co., New York.

The sixth of the series, enlarged, illustrated, and substantially bound. The Annual for 1894 is enlarged, and contains 350 pages of reading matter, and is embellished with twenty-one full-page illustrations and numerous cuts in the text. A complete list of photographic formulas in the back of the Annual makes the work a valuable one for the amateur or experimentalist. Volume VI. of the International Annual distances all of its predecessors. Copies can be obtained either in cloth or boards at publication office of the AMERICAN JOURNAL OF PHOTOGRAPHY at publisher's rates.

PHOTOGRAPHY AT NIGHT. P. C. Duchochois. Illustrated. Published by the author. New York, 1893.

This work claims to be an exhaustive one upon the subject of photography by artificial light, and is handled in the usual thorough and practical manner by the author, well-known in photographic literature. The various sources of artificial light are dwelt upon at length. In this department the writer, however, contrary to his usual accuracy, seems to have overlooked the most largely used compound in photography by artificial light,—we allude to "Blitz-Pulver." Portraiture, copying, enlargements, printing, and transparencies by artificial light are all prominent subjects in the work.

BARGAIN LIST.—JAN., 1894.

Lenses:

1—5x8 Beck Lens, Iris Diaphragm $30 00
1—5x8 Wide-angle Lens, ... 9 00
1—10x12 Blair Orthographic Lens 20 00
1—½-size Francais Portrait Lens 15 00
1—Extra 4x4 Darlot Lens . . . 20 00
1—Set 1-9 Gem Lenses 18 00
1—4x5 Dallmeyer R R Lens . . . 22 00
1—4x5 Darlot Wide Angle Lens 10 00
1—R R Detective Camera Lens . 3 00
1—Matched pair Gundlach Stereo Lenses 13 00
4—¼-tubes in plate 12 00
1—¼ Voigtlander Lens 9 00
1—6½x8½ E. A. Single Lens . . 5 00
1—4x5 Rectilinear Lens 4 50
1—4-4 Harrison Portrait Lens, no stops 16 00
1—4-4 Jamin Globe Lens 12 00
1—¼ size Holmes, Booth & Hayden Lens 4 00
1—¼ size Harrison Lens 4 00
1—¼ size Gem Lens 1 50
1—5x8 R. O. Co's. Single Lens . 2 50
1—2 B Dallmeyer Lens 50 00
1—¼-size Voigtlander Lens . . 6 00
1—5x8 W. A. Lens 5 00

HAND CAMERAS.

1—4x5 Folding Premier Camera, R. R. Lens, ... 22 00
1—No. 1 Kodak, ... 10 00
1—A Ordinary Kodak, new, . . 5 00
1—A Daylight " " . . 7 25
1—C Ordinary " " . . 13 50
1—5x7 Folding Kodak " . . 55 00
1—3¼x4¼ New Model Improved Camera, new, ... 11 00
1—Leather Covered Hawk Eye, with 2 Holders 10 00
1—4x5 Climax Detective Camera, leather-covered, new 20 00
1—4x5 Turnover Camera, new, 15 00
1—4x5 Montauk Detective Camera, new 20 00

VIEW CAMERAS.

1—5x7 Waterbury Camera, lens and tripod, ... 7 00
1—8x10 Double Swing View Camera, reversible back, 25 00
1—5x8 Blair R. B. Camera, 6 holders, 8x10 Attachment, 5 holders, and Euryscope lens, 45 00
1—6½x8½ Novelette Camera, new 20 00
1—5x8 Blair Single Swing View Camera $15 00
1—6½ x 8½ American Optical Co.'s first quality View Camera, new 20 00
1—5x8 Wet Plate Stereo. Camera, 3 holders, case and tripod . 20 00
1—5x8 Tourist Outfit, 2 Daisy Holders, tripod and case . . 25 00
1—5x7 Blair Rev. Back Camera, new 25 00
1—5x8 Boston Rev. Back Camera, new 25 00
1—5x7 Favorite Camera, 6 holders and tripod 12 00
1—Eclipse Outfit, 3¼x4¼, . . . 2 00

PORTRAIT CAMERAS.

1—8x10 Portrait Camera, double swing 15 00
1—10x12 Climax Portrait Camera, double swing, with Benster holder, good as new 35 00
1—8x10 Double Swing Portrait Camera with Benster Holder, new 27 00
1—5x7 Victoria Ferrotype Camera 9 00

Accessories:

PROFESSIONAL.

Lot of Picture Mats. Write for particulars.
1—20-in. Double Roll Entrekin Burnisher, ... 20 00
1—Acme Print Trimmer, new, . 10 80
1—Baldwin Print Cutter. 14 00
1—11-in. Acme Burnisher, . . . 12 00
7—6½x8½ Book Holders for New Model Camera, each 1 20
8—5x7 ditto, each 1 00
1—14x17 Printing Frame 1 00
1—Air Brush 30 00
1—10 in. Quadruplex Enameler, 15 00
2—10 in. Entrekin Eureka Burnishers, each 10 00
1—10 in. Entrekin Accurate Burnisher, ... 12 00
1—14 in. Entrekin Eureka Burnisher 18 00
1—15 in. Entrekin Duplex Rotary Burnisher 15 00
1—6x8 Children's Background . 3 00
1—6x8 Children's " . . 4 00
1—8x10 Bryant " . . . 7 00
1—8x10 Bryant " . . . 6 00
1—Wall Accessory 4 00
1—Electric Retouching Machine, good order 20 00

1—15-in. Improved Eureka Burnisher	25 00
1—15 in. Acme Burnisher, good as new	25 00
1—16x20 Deep Porcelain Tray good as new,	6 40
1—8x10 Washing Box	1 88
1—10x12 Adaptable Washing Box	3 00
1—11x14 Adaptable Washing Box	3 75
1—14x17 Washing-Box	4 50
2—5x8 Adt. Printing Frames, each	50
1—Seavey Swiss Cottage	8 00
1—Hetherington Daisy Foreground	4 00
1—Osborne's Rock Accessory, new,	10 00
Lot of second-hand backgrounds, 8x8 and 8x10, $5.00 to $9.00; write for particulars.	
1—Osborne's Pillar Accessory	15 00
Full line of Packard Bros.' 6x8 Grounds *in stock*. Interiors $5.00; exteriors, $4.00; send for samples.	
Peerless Varnish Pots, each	40
Pearl Leads, the best retouching points in the market, each	15
2—7x9 Flat Printing Frame, each	40
10—6½x8½ Attwood's Printing Frames, each	40
1—18x22 Deep Printing Frame	2 50

AMATEUR.

1—Taylor Tripod	1 50
10—Junior Ruby Lamps, each,	75
6—4x5 Feather-weight Holders, each	60
1—4½x5½ Negative Box	35
1—8x10 Negative Box	90
10 doz. Eastman Peerless Plates, 5x8, per doz	94
15 doz. Woodbury 5x8 Plates, per doz	75
1—Walmsley Reversible Finder	2 50
1—Card-size Burnisher	3 00
Lot 4x5 Glass Trays, each	20
Lot 5x8 Glass Trays, each	25

ALBUMEN PAPER.

8 Reams second choice Pense Paper, per ream	22 50

CARD MOUNTS.

Job lot assorted light color card mounts, per 1000	1 00

TERMS: NET CASH.

Lenses will be sent with privilege of trial.

THOS. H. McCOLLIN & CO.,

1030 Arch Street, Philadelphia.

SITUATION WANTED. — First-class printer will be open for engagement January 1st. Thoroughly competent. Best of references. GEORGE CHORPENNING, care of Barnum's Gallery, Springfield, Ohio.

WANTED.—Situation as crayon and pastel artist. Address CHAS. HAES, 126 S. Twelfth St., Reading, Pa.

A GRAND OPPORTUNITY. — New building, the best in town. No opposition. In the live town of Elkton. Rooms fitted for the purpose. Don't wait to write, but come and see for yourself. J. J. PAYNE, Elkton, Md.

EXPERIENCED Retoucher wants a position to retouch and learn printing and operating. Address M. BILLINGER, Stormy Creek Mills, Berks County, Reading, Pa.

SOLIO.

The "WHY" of it.

FIVE PITHY POINTS MADE BY SOLIO CONSUMERS.

First, **A SELLER.**

My trade has increased 50% since I began to use Solio.
W. P. RHODES, Staunton, Va.

The public seems to take to Solio.
F. B. CLENCH, Fairport, N. Y.

Second, **EASY TO WORK.**

My printers have no trouble working it.
P. S RYDER, Syracuse, N. Y.

Solio is the Easiest Working Paper I ever used.
A. H. DELANE, Plattsburgh, N. Y.

Third, **PERMANENT,**

I have always been somewhat of a "crank" on the permanency of silver prints and fully believe that Solio fills the bill.
E. DECKER, Cleveland, Ohio.

I find it superior in durability to Albumen.
G. L. PEARSALL, Albany, N. Y.

Fourth, **ADAPTED TO ALL NEGATIVES.**

With Solio we do not have to make the negative to suit the paper.
GEO. G. ROCKWOOD, New York City.

For adaptability to the various grades of negatives I consider it far superior to any of the other prepared papers.
G. M. ELTON, Palmyra, N. Y.

Fifth, **RELIABLE.**

I like Solio because of the evenness of the emulsions.
A. C. HOPKINS, Palmyra, N. Y

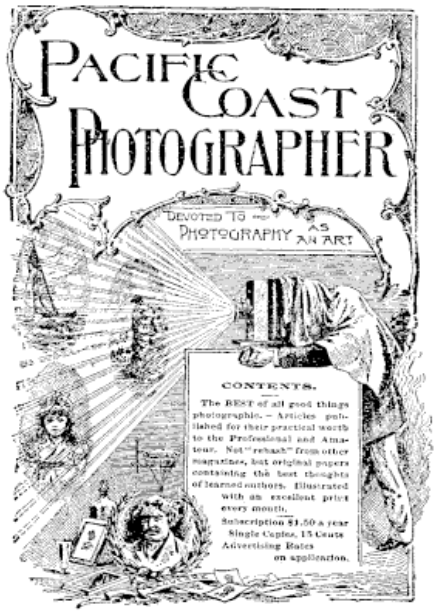
Solio is an honest paper.
A. B. RUMSEY, Miles City, Mont.

NOTHING SUCCEEDS LIKE SOLIO.

World's Fair Medal Awarded

Eastman's Solio Paper, Eastman's Bromide Papers and Kodaks.

EASTMAN KODAK CO.
ROCHESTER, N. Y



Morgan Backus, Ed tor, 408 Sacramento St, San Francisco, Cal.

This is a Representative Journal of the Pacific Coast.

We give you a Magazine every month which will please you, and more than satisfy you to the extent of

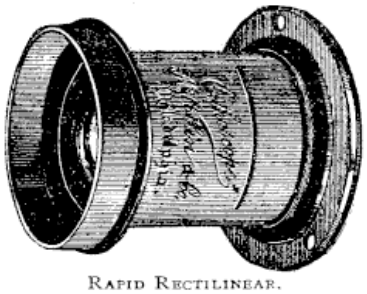
$1.50 PER YEAR,

which is the subscription price.

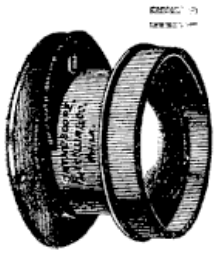
Write for Sample Copy.

MORGAN BACKUS, Editor,
408 Sacramento Street, San Francisco, Cal.

Orthoscope Lenses.



RAPID RECTILINEAR.



WIDE ANGLE.

RAPID RECTILINEAR, EMBRACING AN ANGLE OF 75°

	Size of Plate.	Focal Length.	Price.
No. 1, Rapid Rectilinear,	4 x 5	6 inches	$10.00
2, " "	5 x 8	8½ "	15.00
3, " "	8 x 10	11½ "	20.00
4, " "	11 x 14	16 "	30.00

WIDE ANGLE RECTILINEAR, EMBRACING AN ANGLE OF 90°.

	Size of Plate.	Focal Length.	Price.
No. 1, Wide Angle,	5 x 8	4¾ inches	$10.00
2, " "	6½ x 8½	6 "	15.00

Perfectly Rectilinear. Quick Acting. Every Lens Guaranteed

PORTRAIT SERIES.

Though but recently introduced, these lenses have given such universal satisfaction that we have no hesitation in recommending them as the best in the market.

They are specially adapted for Portraits, Groups, Landscapes, or Instantaneous Subjects, working sharp to the edge.

The stops for these are cut to the standard sizes of the British Photographic Society.

	Diameter.	Focus.	Size.	Price.
No. 3,	$1\frac{5}{16}$ inches	7½ inches	5 x 7	$20.00
4,	$1\frac{11}{16}$ "	10¼ "	6½ x 8½	25.00
5,	2⅛ "	12½ "	8 x 10	30.00
6,	$2\frac{11}{16}$ "	19½ "	12 x 15	50.00
7,	$3\frac{3}{16}$ "	23 "	16 x 20	75.00

WILL BE SENT ON TRIAL ON RECEIPT OF PRICE.

THOS. H. McCOLLIN & CO., Sole Agents

1030 Arch Street, Philadelphia.

THE AMERICAN AMATEUR PHOTOGRAPHER.

Edited by CATHARINE WEED BARNES and F. C. BEACH.

CONTENTS FOR OCTOBER, 1892.

THE AMERICAN PHOTOGRAPHIC PUBLISHING CO.,
239-241 FIFTH AVENUE, NEW YORK.

Single Numbers, 20 Cents. $2.00 a Year. With THE AMERICAN JOURNAL OF PHOTOGRAPHY, $3.00.
Write to us for a Sample Copy.

Original American Dry Plate Factory, 1878.

CARBUTT'S Dry Plate and Film Works.

Office and Factory: Wayne Junction, Philadelphia.

JOHN CARBUTT PROPRIETOR

TRADE MARK

THE KEYSTONE BRANDS.

Eclipse, "B" and Orthochromatic.

Sizes.	Per Dozen.	Strippers. Per Doz.	No. of Doz. in Case.
3¼ x 4¼	$0 45	.....	36
4 x 5	65	.....	36
4¼ x 5½	75	.....	24
4¼ x 6½	90	.....	24
4¾ x 6½	1 00	.....	24
5 x 7	1 10	$1 45	24
5 x 8	1 25	1 65	24
6½ x 8½	1 65	2 20	12
7 x 10	2 10	2 75	12
8 x 10	2 40	3 20	12
10 x 12	3 80	5 05	4
11 x 14	5 00	6 65	3
14 x 17	9 00	12 00	2
16 x 20	12 50	16 65	1
17 x 20	13 00	17 30	1
18 x 22	15 50	20 00	1
20 x 24	18 50	24 50	1

COLUMBIAN ANTI-HALATION PLATES.

Sens. 23 to 27. Eclipse and Orthochromatic.

Sizes.	Plain.	Strippers.
3¼ x 4¼	$0 55	.....
4 x 5	80	.....
4¼ x 5½	90	.....
4¼ x 6½	1 10	.....
4¾ x 6½	1 20	.....
5 x 7	1 30	$1 60
5 x 8	1 50	1 80
6½ x 8½	2 00	2 40
7 x 10	2 50	3 00
8 x 10	2 90	3 50
10 x 12	4 50	5 40
11 x 14	6 00	7 20
14 x 17	10 80	12 95
16 x 20	15 00	18 00
17 x 20	15 60	18 70
18 x 22	18 60	21 30
20 x 24	22 50	27 00

CARBUTT'S LANTERN PLATES

On Specially Imported Thin Crystal Glass, 55 Cents Per Dozen.

CELLULOID FILMS

Require precisely the same treatment as Glass Plates. Coated with Eclipse, "B," and Orthochromatic 23 to 27 Emulsions.

Sizes.	Per Dozen.
3¼ x 4¼	$0 55
4 x 5	80
4¼ x 5½	90
4¼ x 6½	1 10
4¾ x 6½	1 20
5 x 7	1 40
5 x 8	1 55
6½ x 8½	2 10
8 x 10	3 00
10 x 12	4 75
11 x 14	6 25

Any size made to order up to 20 x 49 inches, prices on application through your dealer.

N. B.—**Carbutt's Anti-Halation Plates** consist of a rich single coating, with a ray absorbing backing—easily removed—requiring same treatment in exposure and development as a plain plate, yielding results superior to double coated plate.

CARBUTT'S DEVELOPERS.

Pyro and Potash	2 8-oz. Bottles	$0 60
Eiko cum Hydro	" "	60
Hydrochinon	" "	60

NEGATIVE VARNISHES.

The Keystone	8-oz. Bottles	$0 50
Roxyline Enamel	" "	60

ORTHOCHROMATIC COLOR SCREENS.

Size 2½ x 2½, $1.00. 3½ x 3½, $1.50

Only the above sizes in Yellow in stock; other sizes to order. Also Orange, Red, Green and Violet screens for Color Process Work.

MULTUM IN PARVO LANTERN.

Boxed ready for Shipment $6 00

CARBUTT'S ORTHOCHROMATIC PLATES

Are Recommended for All Purposes of General Photography; Guaranteed to Keep as Long as Ordinary Plates, and Prices the Same. FOR SALE BY ALL DEALERS.

INTERCHANGEABLE VIEW ALBUMS

Each album contains 24 leaves, held in place by a cord, which ties on the inside of cover. Neatly bound in cloth with leather back and corners.

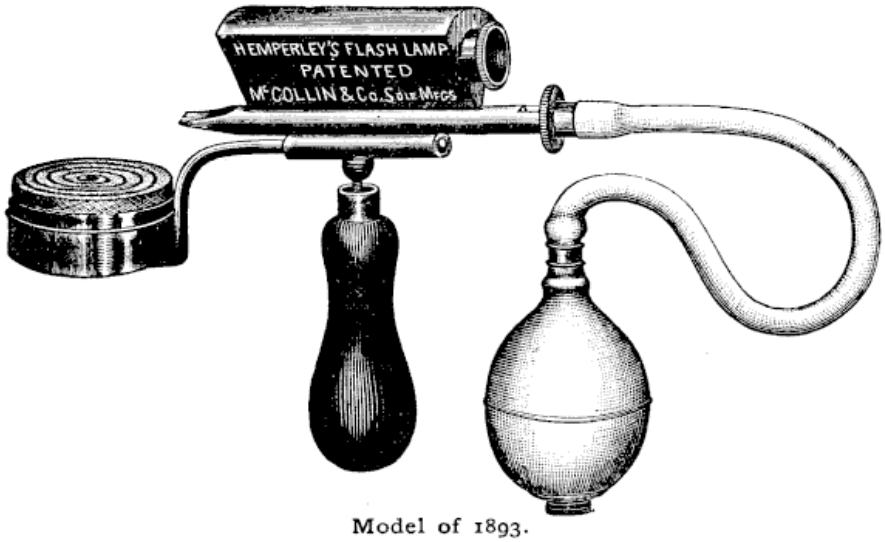
These are our own manufacture, and we use only the best quality No. 1 cards.

6 x 7 . .	$1.00
7 x 10 . . .	$1.35
10 x 12 . .	$2.25
11 x 14 . . .	$2.50

For those who desire to have foreign or other views mounted, we would state we do this work in the best manner. Send for estimates.

THOS. H. McCOLLIN & CO.,

1030 ARCH STREET, - - PHILADELPHIA



Model of 1893.

HEMPERLEY'S MAGAZINE FLASH LIGHT.

SELF LOADING.

For Use With PURE MAGNESIUM POWDER Only.

Manufactured Under the HEMPERLEY PATENT.

In offering our New Magazine Flash Lamp to the Photographic Fraternity both professional and amateur—we do so believing it to be the best article of the kind yet placed on the market.

Each lamp is supplied with a patent rubber bulb, *with a valve*, which prevents any of the powder being drawn back in the hose or bulb, and in time clogging the air passage.

If you have failed with other Flash Lamps, try our Model of 1893, for a trial will convince even the most skeptical that it is the simplest and really the best form of Lamp yet produced.

Price of Lamp, complete, - - - $2.75
Magnesium, Fine Ground, per oz., .40

All parties are notified that we control the Patents under which this Lamp is manufactured, and propose to protect ourselves against all infringements.

FOR SALE BY ALL DEALERS.

THOS. H. McCOLLIN & CO.,

SOLE MANUFACTURERS,

1030 Arch Street, - - - - Philadelphia

CLUB RATES.

YOU can get the AMERICAN JOURNAL OF PHOTOGRAPHY for 1894 at greatly reduced rates by taking advantage of our club arrangements with the following magazines:

	Regular subscription price.	Rate FOR BOTH if sent with American Journal of Photography.
American Amateur Photographer	$2 00	$3 00
Anthony's Photographic Bulletin	3 00	4 00
The Photographic Times, weekly, illustrated	5 00	6 00
" " " monthly, not illustrated	3 00	4 25
The Eye	2 50	3 75
The Century Magazine	4 00	5 50
St. Nicholas	3 00	4 50
Lippincott's Magazine	3 00	4 00
Scribner's Magazine	3 00	4 50
Popular Science Monthly	5 00	6 00
Littell's Living Age	8 00	9 00
Illustrated Christian Weekly	3 00	4 50
Outing	3 00	4 25
Forest and Stream	4 00	5 25
Harper's Magazine	4 00	5 25
" Weekly	4 00	5 50
" Bazar	4 00	5 50
" Young People	2 00	3 50
American Field	5 00	6 50
Wilson's Photo Magazine	5 00	6 00
Overland Monthly	4 00	5 00
Cosmopolitan Magrzine	1 50	3 00
Leisure Hours	1 00	2 00

Write us for rates on other Magazines.

THE TERMS on club-rate subscriptions are *absolutely cash with order.* Each magazine subscribed for will be sent to you regularly from the publishers, the same as if your subscription were sent to them direct. In receiving subscriptions from other magazines we can only be responsible for safely forwarding them to the respective publishers.

Send in your subscription at once.

Thos. H. McCollin & Co.

PUBLISHERS,

1030 Arch Street, Philadelphia, Pa.