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LITTLE MARGUERITE.

Negative kindly loaned by Mr. Falk.

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GEORGE W. GILSON, - - EDITOR

A GOOD SUGGESTION.

The rapid advance in the interest of State photographic associations and the great improvement in work shown by members who exhibit, have led me to the belief that a new departure can be made in the exhibition of photographs at our conventions which will be of interest to all members. The prize pictures are now on exhibition only for a few days to members of the association attending convention and are then packed up and returned to their owners.

Would it not be a good plan to form a league among the State associations, selecting representative

photographs from the prize winners' work and have them sent to the State convention holding its meeting at the next nearest date, and so on, until all conventions in the league had received the benefit of the exhibition? Only the gems of the different exhibits should be sent. If six State associations would make this arrangement, a large and valuable exhibition would be added to the local display, which would not only give the photographer a chance to compare work in the several States, but be an immense advantage as an art educator. The details of the exchange would be very easily arranged, and when the circuit was complete pictures would be returned to their owners by express.

Another point I wish to make is in regard to keeping up the interest in the State association during the year, and not condensing it into the two or three days of the convention.

Although the magazines so ably cover many points of interest to the photographer, there are items of interest in association work which should be maintained in some other way. We

are trying in the Michigan association the experiment of issuing a circular letter at stated intervals. For instance, at the last Michigan State convention Sunday closing was prominently before the convention. Our May letter is in regard to this important question, and is designed to secure a full and fair statement from all photographers in the State as to their views on this important piece of legislation. Several points of interest discussed at the convention and not decided on for lack of information will be taken up during the year and brought before all the members of the association by means of a circular letter.

Michigan held its first State association meeting last January and it was a great success; but we hope in 1897 to far surpass it in display of pictures and in general interest.

J. E. WATSON,

Sec. P. A. of M.

Detroit.

HOW TO MODEL THE FACE BEFORE MAKING THE NEGATIVE.*

By J. C. STRAUSS.

There is no subject that requires as much and receives so little thought as this. It is not overestimating things to say not more than one photographer in one thousand knows how to model a face. Examine their pictures, and we find the faces white with black spots for eyes, nose and mouth. Who ever saw a healthy man or woman with a white face?

Take a good look at any subject under the light. If they have on clean linen, look at the difference between the color of the flesh and the collar. There should certainly be the same difference in the color values on the plate.

One cause for this defect in the work of so many photographers is the fact that they photograph a man with a sunburned face exactly as they would a child. Now stop and think of the difference in the flesh tints—the child with a light pink complexion, the man with brown, green and yellow in his face.

To photograph the latter properly, and in order to blend these colors softly, the light should be subdued and the plate well timed. Sometimes one has a bald head to photograph. The subject has been out doors very much, and the sunburned face will photograph dark, while the top of the head, protected by the hat, will photograph light. Here is a chance to show the usefulness of Strauss modeler. With a piece of chamois leather apply to the white bald head some of this preparation. Then again we often notice the lack of perspective in the face, caused by being poorly modeled. The nose does not stand away from the cheek in relief, but looks like a flat surface. If you will place the sitter under the light for a broad light, and observe carefully the color values in the face, you will at once see that the light striking the side of the nose is the same as that on the cheek towards the light. Apply a little Strauss modeler to the side of the nose in order to make it photograph a little darker, then look at the nose,

*This article, with many others of great interest, will appear in Mr. Hetherington's new book, "The Right and Wrong of Photography."

and you will observe that it stands out from the face in good relief. Now we want a few high lights on the prominent points of the face in order to perfectly model it and bring these points out. So we touch those parts with a thick oil well perfumed. The effect of this is easily seen. The parts where the oil is placed will shine, and of course photograph much stronger. Be careful not to overdo this.

When the oil is put on the points, go over them with a soft cloth.

A man's face with the brown and yellow colors cannot be properly photographed if you use light ground, for contrast is too great; use dark ground with just enough light on the shadow side of the face to relieve the outline well. Get some copies of the old paintings, study the drawing, lighting, modeling, and you will find them a great help.

ADVICE FREE—FROM A WOMAN.

By CLARA WILSON, Maxwell, Iowa.

Now do not leave this unread because you "always did hate those people who thrust their superior knowledge upon you," but just hold your breath and "look pleasant" until you have finished.

Here it is: Do up your sun-bonnet and your last year's calico gown and go to the Photographers' Convention—the very next one within your reach. Take your husband along if he is afraid you will get lost on a street car, he probably needs a change, and he could be made an honorary member.

Why go? I'll tell you. I've just been, so I know. The P. A. of I. was to be held in Des Moines. I canvassed the question carefully, consulted my pocket-book and decided I could not go; besides, you see, I'm new in the business, and *conventions* are for those farther advanced in the art. But somehow a sudden inspiration seized me, I made a raise financially and went, went early and for business. I joined the association too, as I had the right, so I could *vote* "like a man," you know.

I found a number of other ladies as much interested as myself. I also found all willing to add their share toward a general fund of information. The presiding officer, Maxwell and Sec. Allen, did much toward the general good, and the sessions passed off pleasantly, helpfully and only too rapidly.

I would not fail to mention the benefit I received from the representatives of prominent dealers, of whom Chas. Hetherington and T. W. Rundle, of paper and plate fame, stand first.

Their school of photography, held in Webster's studio, first met my needs, posing, lighting, timing, developing, all downright practical work and within the reach of the average intellect; also toning, fixing and hints on mounting, in fact all along the line there were thoughts to gather until the wonder was whether "one brain could contain it all." Entertaining such a doubt, I made use of sketch book and pencil.

I returned feeling that I had a new lease on life. My work is a pleasure to me instead of the tread-mill

drudgery it had seemed before enjoying my rest of harvested ideas. Next year there will be no questioning in my mind. I shall attend the convention.

REFLECTION APPLIED TO PHOTOGRAPHIC LITERATURE.

By H. C. VOORHEES.

"To read without reflecting, is like eating without digesting." How well this quotation applies to the manner in which photographic literature is usually read.

A photographer subscribes to a favorite magazine, and when it arrives the usual custom is to glance hastily through it and lay it aside to be read at a more favorable opportunity, which opportunity seldom arrives.

In looking over old literature, I have frequently found many useful ideas, which, because of insufficient reflection, had not been thoroughly impressed on my mind at the first reading. For instance, a negative which has cracked without breaking the film may be made to print perfectly by painting the crack on the glass side with a thin solution of balsam of fir and turpentine, using a small camel's hair brush for the application. The balsam of fir unites with the broken edges and, being transparent, nearly obviates the shadow which the crack would ordinarily cast. Or, in photographing hollow silverware, you may fill it with ice-water and make the negative as it begins to sweat, thereby getting rid of the glistening which would otherwise

prove troublesome. Many other ideas could be mentioned, but why should we go further. Get down some of your old literature from the shelf, brush off the dust and spend a dull day or evening in a careful perusal of it; the result will surprise you.

If we photographers read more thoroughly, we would be better able to appreciate the efforts of our editors, and it would not be said of many meritorious productions "there is nothing in them." Read! Reflect!! Digest!!!

PASTES THAT MAY BE USEFUL.

The Best Way to Make Them for
Different Purposes.

The following are some useful recipes for making pastes of various kinds: Paper to wood—Gum arabic, $\frac{1}{2}$ ounce; powdered gum tragacanth, $\frac{1}{2}$ ounce; water, $1\frac{1}{2}$ ounce; acetic acid, 20 drops. If the paper is good this paste will not stain it. Give it one or two coats of gum arabic as a varnish.

Perpetual paste, or paste that will keep several months, is made by dissolving a teaspoonful of alum in a quart of warm water. When cold, stir in flour to give the consistence of cream, beating out all the lumps. Then stir in as much powdered resin as will lie on a dime. Have on the fire a teakettle of boiling water. Pour the boiling water on the mixture and stir constantly until it assumes the consistence of molasses. This will occur in a few minutes. Pour out into an earthen vessel to cool, then

cover and put in a cool place. When needed take a portion and dilute with warm water.

Paste for scrap-book—Equal quantities, say a small lump of each, of glue and alum, are dissolved in water. Beat up with flour until the mass is incorporated together and quite smooth, then add boiling water and stir well. This will keep a long while in a cool place.

Postage stamp paste—The paste or mucilage used by our Government for gumming postage stamps is made as follows: Two parts gum dextrine, one part acetic acid, and five parts water are added together and put in a water bath, dissolving the gum, after which one part alcohol is added. English postage stamps are gummed with a potato starch paste.

Ordinary starch or flour paste.—It is best to prepare paste by triturating the starch or flour with cold water until no lumps remain, and not too thick a mass is formed, and pouring into this boiling water very slowly, with rapid stirring, until the paste begins to form, as indicated by the increase of transparency, and then rapidly adding the rest of the water (boiling) necessary for the paste. Boiling the paste is very injurious, rendering it less adhesive and liable to peel off. Rye flour gives a more adhesive paste than starch or wheat flour, but it is too strong or hard to spread for paper-hanging; it is of a grey color also. The addition of a little alum to the water with which the paste is prepared renders it more permanent, and the use of boiling lime water instead of pure soft water adds to its adhesiveness. An aqueous ex-

tract of decomposed gluten, however, affords the best paste with starch. By incorporating with the paste a quantity of turpentine equal in weight to half the starch employed, and stirring while the paste is still hot, it will be rendered more impervious to moisture and at the same time more adhesive.

A paste, very brilliant and adhesive, and said to be superior to gum arabic, may be made by dissolving caseine (precipitated from milk by acetic acid, and washed with pure water) in a saturated solution of borax.

A label gum that only requires moistening with saliva to affix to objects is made from eleven parts (by weight) of good glue, previously soaked in cold water until soft; seven parts of gum arabic and a little rock candy, in fifty-six parts of water, subjected to a gentle heat, with continued stirring until the mass is uniform.

There are several substances useful for adding to paste to keep it sweet. Among these may be found essence of wintergreen, hydronaphthol (dissolved in a little alcohol), oil of cloves, oil of sassafras and carbolic acid. Alum also helps to keep it, besides hardening or stiffening it. Oil of pennyroyal added will keep the flies away. Two grains of hydronaphthol is sufficient for each pint of paste. The oil essences may be objectionable sometimes, being liable to grease delicate paper, but they give an agreeable perfume and keep the paste from souring.

Glutol added to common paste gives a fine strong paste that keeps well and is much used by paper-hangers in this manner.

THE USE OF DOUBLE COATED PLATES.

By O. W. HODGES.

In compliance with your kindly invitation to hear from me on photographic subjects, I herewith present you a few remarks regarding double coated plates. These plates are considerably more than non-halation, the under one slow and the top one rapid; permits of a very wide range of exposure, and in all cases where they are used, at least double exposure should be given to that of single coated plates. This is necessary in order to in a measure reverse the top film in the extreme highly lighted parts, and thereby get it clear on the lower film. In developing these plates care should be taken to have the developer weakened down with cold water to about half the usual strength, and as a rule one-third to one-half less pyro should be used, leaving the sulphite and alkali as per formula. A few drops of a ten per cent. solution of bromide of potassium added to the developer is always in order for double coated plates, especially where full exposures have been given. Generally speaking, from fifteen to twenty minutes' time in developing these plates produces the most perfect results. The fixing bath should be double strength of freshly dissolved hypo-soda. The washing should be carried on much longer than for single coated plates. In very hot weather, where the films show a tendency to soften, a clear alum bath should be used after development and before fixing, letting the plate remain in the alum solution one or two minutes.

Before placing the plate in this alum bath, be sure the developer is well washed off; also wash the alum well off before fixing. An electric or water motor fan is an almost indispensable machine in a photograph gallery for drying negatives in summer time, especially as negatives dried quickly are much finer in grain than otherwise.

COLOR IN NEGATIVES.

The great recommendation of our more modern developing agents is generally held to lie in the immunity from yellow color or stain attained by their use. I think it is pretty well admitted on all sides that pyrogallol will do very nearly all that amidol, metol, rodinal, et hoc genus omne, can accomplish. Our old friend, though, arrives at his results by a somewhat different method. For instance, if we wish to get all possible detail out of a plate suspected of under exposure, we naturally keep the pyro very low, so that the high lights may not acquire undue density. This involves protracted development, and, as a general sequence, a considerable amount of yellow stain in the negative. Supposing the same plate were to be developed by the agency of metol, there would be no occasion for the dilution of the developer; rather should we strengthen it, because a concentrated, unrestrained metol developer will flash up all detail at once, and only take on density very gradually, enabling us to stop development at the right moment.

If two such negatives are compared, a great difference will be apparent.

The metol-developed plate will be of an even grey color in the greater deposits of the high lights that will make it very acceptable to the eye, especially when the total absence of deposit or stain in the deepest shadows is taken into account as well. Altogether, it will present a great and pleasing contrast to the pyro-developed plate. This latter will, on comparison, have an almost objectionable appearance, entirely arising from the difference in the color of two deposits and the stain over the whole surface of the gelatine.

But negatives are not made to look at; they are simply a means to an end; they are an unfortunate necessity on our way to produce finished prints. Therefore, the two negatives shall fulfil their mission, and shall yield us prints—for simplicity's sake, silver prints. The pretty-looking grey negative will soon be printed deep enough for toning; but we shall have to wait for the yellow one. When it is done, we may proceed to finish them in the usual way; but already, before they are put into the first washing water, there is a very noticeable difference, and the boot is on the other leg now. The prettier-looking negative (as far as color is concerned) does not give the better-colored print of the two; quite the reverse, in fact; and, when toned, the difference is still more pronounced, because the slower-printing negative gives a print that takes on an entirely different range of tones to the other one. The experiment will probably end with a decision on your part that there is still a deal to be said in favor of pyro as a developer.

I do not say that this little experiment is theoretically and scientifically correct. It can be argued, with a good show of reason, that the personal equation had not been eliminated; that, for comparative purposes, the two negatives should have been developed in such a manner that the opacity of the highest lights was similar in each one by measurement, and not by judgment; and that the metol-developed plate was, in reality, under-developed. Exactly so; but theory is not practice. In the dark room, when developing our beloved snap-shots or less lovable, but more remunerative, studio exposures, the personal equation is the all-important factor. We cannot use an apparatus for measuring densities during ordinary development, we are obliged to use our eyes; and, finally, most metol-developed negatives are under-developed by reason of these things.

But, given two negatives which shall be measured and proved of equal opacity in the highest lights, and with equal range of gradation throughout—one of which shall have the familiar pyro stain and the other be totally free from it—I have yet to be convinced they will yield prints identical in color, richness and quality.

Now, after all this, you will be somewhat surprised, perhaps, to hear that I use metol frequently, but I put it into the pyro developer, where its good qualities are utilized without the drawbacks mentioned.

There is moderation in all things (there should be, at least); certainly it is so in the amount of yellow stain permissible or advantageous in a negative. For this reason I never

had a great affection for pyro-ammonia. I do not care for a negative that takes a week to print in winter and a good hour or hour and a half in brilliant summer sunlight. True, the use of sulphites will control it, but, just when the action of sulphites in the developer was beginning to be generally understood, I took a great liking to the use of carbonates as accelerators. I have never lost that liking, and have only used ammonia when really driven to it.

It is more particularly to the power that exists of moderating and controlling the amount of color in a negative developed by pyro soda or pyro potash that I wish to call attention. I will presume that a developer is in use composed as follows:—

Pyrogallol	2	grs.
Potassium bromide. ½ "		
Soda carbonate.	14	"
Soda sulphite.	9	"
Water. up to	1	oz.

Modifications of this developer will act in a similar way, but it will simplify matters if I name a standard and explain its actions. The modifications referred to may be the addition of further bromide or the omission of it entirely; the addition of metol or amidol, as taste may suggest, or the substitution of an equivalent quantity of potassium carbonate in place of soda carbonate. I may also say that, although I have not tested the reactions subsequently mentioned in the case of pyro ammonia (plus sulphite) developer, I believe they would be much the same.

And now a word or two about compounding the above developer. I entirely agree with the dictum laid

down by a manufacturer as to the function of a sulphite in the developer. It should not be used as a pyro preservative, but is simply present in the developer for the purpose of controlling the amount of color that shall be present in the finished negative. Therefore, in practice, I make up two solutions, one containing pyro and bromide, the other carbonate and sulphite. As to preservative, a few drops of nitric or sulphurous acid may be included in the pyro stock solution if necessary, but this is not often in my case. I find that if an ounce of pyro be dissolved in forty ounces of water, it will not keep above a couple of days; but, if you dissolve half an ounce of potassium bromide in the water first, and then add the pyro, it has much greater keeping qualities. It is always fit for use at the end of a fortnight, and I have used it three weeks old without finding any noticeable loss of energy. The solution certainly requires a slight brown tint, but it does not become muddy, as a plain pyro solution does. (I do not remember having seen or heard any reference in the photographic press to this preservative property of the soluble bromide, but it is a fact, nevertheless.) So you see it will depend on the amount of developing you are likely to get through. If you are so constantly at it that an ounce of pyro will not last you much more than ten days, the acid is not necessary; if you only do a little developing now and then, it will have to be used; but omit it if you can, as it has a slight restraining action.—W. E. A. Drinkwater, in the British Journal of Photography.



Engraved by GILL ENGRAVING CO.,
New York.

A POSE BY FALK.

CHAUTAUQUA CONVENTION.

All arrangements now completed—railroad, hotel, and general information.

Railroad Rates.

The railroads have given the P. A. of A. '96 unprecedented rates as follows:—West of Pittsburgh and Buffalo, one fare for the round trip. East of Buffalo and Pittsburgh, one fare and one-third.

The regular fare east of Buffalo and Pittsburgh is much less per mile than west of these points, so that one and one-third east is as good a rate per mile on the average as one fare west.

East of Buffalo and Pittsburgh every passenger must secure a certificate at the time of purchasing his or her ticket from the ticket agent in order to secure the reduction. For instance, in New York full fare of \$9.00 for one way is paid at the time of purchasing a ticket, and the certificate entitles you to return for \$3.00, or \$12.00 for round trip.

West of Pittsburgh and Buffalo certificates are not necessary, a special ticket being given for the round trip; but these tickets will be on sale only for two days, June 21st and 22nd, good to return any time before June 30th.

Important to Remember.

If you live east of Buffalo and Pittsburgh, be sure and secure a certificate on purchasing your ticket. Be sure and secure your ticket on Saturday if you leave on Sunday, as no certificates are issued Sunday at railroad offices.

If you live west of Buffalo and Pittsburgh be sure you leave on

either Sunday or Monday, June 21st or 22nd, as these are the only days on which one fare rate tickets are sold.

Special parties are organizing to leave from all the important cities. Look this up and join one of these parties, as these trains will have special through cars without change, and it will be more comfortable and agreeable than travelling by yourself.

The following are the rates from some of the principal cities. Special trains will leave from nearly all of them; enquire about them.

Fare and a third on certificate plan.

FROM.	RATE ROUND TRIP.
Boston	\$14 20
Providence	14 20
Albany	9 53
New York	12 00
Philadelphia	13 07
Baltimore	15 20
Washington	16 80
Toronto	5 55

Regular excursion rate.

Buffalo	2 75
Pittsburgh	7 00

One fare

Cleveland	4 25
Columbus	8 40
Cincinnati	11 00
Dayton	9 80
Louisville	14 50
Detroit	6 75
Grand Rapids	11 58
Chicago	12 00
Indianapolis	12 48
St. Louis	17 75

Hotels.

The large summer hotels have given a rate of \$2.50 per day, smaller hotels and cottages \$1.50 to \$2.00 per day. The principal hotels are located at Lakewood and Greenhurst.

If you have not secured rooms write immediately to C. E. Snow, Jamestown, N. Y., Chairman Hotel Committee. Tell him how many rooms you desire, the number in party, and the rate you desire to pay. He will locate you as near as possible in conformity to your wishes, and notify you where to go before leaving home.

Entertainments.

All of the Committee on Entertainment have reported fine progress, and the three evening entertainments given by manufacturers, dealers and demonstrators, are now assured successes. Each night will eclipse the other if possible.

The natural advantages and attractions of Celoron Park and Chautauqua Lake are too well known to comment upon. Without any extra entertainment these alone would satisfy and make a week's stay only too short.

Education.

A school of photography conducted every afternoon in a building especially modeled for this purpose, with modern light and furnished with complete apparatus and accessories, with seating capacity for a large number within sight and hearing of everything that transpires under the light, will afford opportunity for practical work never before attempted at a national convention.

The officers feel gratified that their efforts with railroads and preparing entertainment and educational advantages have met with such favorable final results, and are confident of satisfying every attendant that the money invested for the trip to Chautauqua has been well expended, and prolific of profitable returns.

J. WILL KELLMER, *Sec.*

ARISTO PLATINO AND PLATINUM TONES.

By H. M. FELL.

To produce beautiful carbon effects on Aristo Platino paper, proceed as follows:

Printing.—Print very deep. Let the deep shadows bronze and have a good tint to the high lights.

Washing.—Flatten prints as you would any collodion paper and then wash through five changes of cold water, handling prints over each time, then tone in the following bath to a purple (not a blue):

Water 60 oz.
Borax (sat. solution) .4 or 5 drops.

Gold, 1 grain, or enough to make speed of bath eight to ten minutes.

Place prints from this toning bath in salt water, 1 ounce of salt to 1 quart of water. This is important.

Wash prints out of salt water in two changes of clear water by handling prints over, then tone in the following platinum bath:

Water 60 oz.
Aristo platinum 3 drams.

Prints should tone in this bath from eight to ten minutes. If necessary, add more platinum. Too slow toning in this bath will generally cause yellow whites. Prints should tone in this platinum bath till all traces of purple or warmth disappear in the deeper shadows. When prints are toned, place in clear water and wash in two clear waters by handling prints over. Then fix in hypo bath 18 grains strong (hydrometer test) for ten minutes. Final washing one hour in running water.

NOTE 1. It is very important to wash prints thoroughly after they come from the gold bath, to wash off any free gold that may be on the prints, as gold precipitates platinum, and unless prints are well washed your platinum will be precipitated on the bottom of the tray and not on the print. Again, never use the regular gold toning tray for platinum bath, as all such trays have more or less gold deposited on the bottom and sides, and this will precipitate your platinum also.

NOTE 2. The character of platinum tones are controlled in the gold bath. If prints are taken from the gold bath a chocolate brown they will be a beautiful olive tone. Prints toned to a purple will make black tones, and prints toned to a blue will make blue-black tones.

NOTE 3. The great mistake photographers have made in toning Aristo Platino with platinum is that they have not toned long enough in the platinum bath. When prints first go into the platinum bath the whites get muddy and the shadows become harsh. In a short time the whites clear up and the shadows become clear and transparent, and by toning in this bath until the purple or brown is out of the deepest shadows, by looking through the print you will get a detail in the deepest shadows. Do not be afraid of the platinum bath.

NOTE 4. When prints come out of the platinum bath, it is very important to wash them thoroughly before fixing, because the platinum bath is extremely acid, and it is absolutely necessary to wash the acid out of the prints before fixing, for if

you do not you carry this acid in the hypo and produce sulphuration and yellow whites.

NOTE 5. Some waters are heavily charged with foreign matter, and when this is the case a small pinch of ground alum in the hypo bath will help to precipitate the foreign matter and keep your whites clear.

NOTE 6. The gold bath must be alkali enough to turn red litmus paper blue in three or four minutes, and works best when made up a couple of hours before use, or one-half old and one-half new, is better still.

NOTE 7. A platinum bath can be used over and over, strengthening with fresh platinum each time.

NOTE 8. All baths should be tempered in cold weather to about 70 degrees with warm water.

THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

Chautauqua Convention, June 22,
23, 24, 25, 26, 27.

This is not to be a "rush" convention; we are going to take our time, a full week of business and pleasure. The mornings devoted to matters photographic, with the afternoons and evenings given up to recreation and social enjoyment.

You cannot afford to miss any of the good things prepared. Come early and stay the whole week out.

Are you a member? If so, please send in your annual dues (\$2.00) to the Treasurer, C. M. Hayes, Detroit, Mich., now and avoid the rush on the opening day. If you are not a member, send \$5.00 (\$3.00 initiation fee

and \$2.00 annual dues) to the Treasurer and you will be regularly enrolled. Employees only \$2.00, no initiation fee. This should be attended to at once. Do not put it off until the last moment.

"Everybody should send an exhibit."

By a special division of territory, every photographer who is capable of making good clean work has a fair chance of winning a medal in one of the numerous classes. Get together the best work of the year and enter it at once in the class you feel most at home in. Canadian photographers are specially invited to compete, and we would urge them to make a creditable display.

Entertainment and Recreation.

The manufacturers will give an excursion on Lake Chautauqua with proper embellishments. One evening's entertainment will be in charge of the dealers and will be in the nature of a moonlight excursion.

On Thursday evening the demonstrators will give a ball at one of the large hotels, which will be a very swell affair. There will be a band concert every afternoon and evening at the Convention Hall. Fine bathing with water toboggan and numerous attractions and entertainments.

Instructive Sessions.

Besides the regular papers and interesting talks on photographic subjects at the Auditorium, there will be a school of photography, a model operating room, with daily demonstrations in lighting and posing by leading operators of the United States, also instructions in retouching, printing, etc. "You cannot afford to

miss it." It will be in competent hands, and will be one of the features of the convention.

Accommodations.

By special arrangement room and board can be had for the whole week from \$6.00 a week up. Write to the Committee on Hotels, Clarence E. Snow, Jamestown, N. Y., and secure your rooms in advance.

Just one word more: There has never been such an opportunity for improvement and general benefit derived, combined with recreation and a thoroughly enjoyable vacation, as this convention of the Photographers' Association of America, at Chautauqua, 1896.

R. P. BELLSMITH,

Pres. P. A. of A.

MY FAVORITE DEVELOPER FOR NEGATIVES.—METOL AND HYDROQUINONE.

By JOHN RUSSELL.

All developers would probably be capable of bringing out the same amount of detail with a given exposure, but the time required and the quality of the resulting negatives would certainly vary considerably. Each developer has qualities and faults peculiar to itself, and in making a choice we must endeavor to ascertain which possesses the most virtues with the fewest faults.

Our old friend pyro is an exceedingly valuable developer, with, however, a tendency to give too dense a deposit in the high lights before the half-tones are well out; it also stains the hands and plates, giving slow-printing negatives, and sometimes

produces color-fog. Hydroquinone, though excellent in many respects, frequently gives exaggerated contrasts, and in cold weather works so slowly as to inconveniently prolong development. For correctly exposed plates amidol works splendidly ; but with full exposure fails to give printing density. Metol is, perhaps, the most powerful developer we possess, and comes nearest to pyro as a density-giver, its only fault being a tendency towards over-soft results.

Efforts have been made to combine developers of opposite characteristics. A good developer is :

Metol	80 grains.
Hydroquinone	45 "
Sodium sulphite	640 "
Sodium carbonate	640 "
Distilled water	20 ounces.

The metol and hydroquinone should first be dissolved in hot water ; when cold the other ingredients may be added.

Though this is a so-called single-solution developer, it can be modified to suit any requirement by dilution and the employment of a 10 per cent. solution of potassium bromide.

For very short exposures it should be used full strength. For normal exposures it may be diluted with an equal bulk of water, plus 1 grain of bromide per ounce. Further dilution, with still more bromide, will be necessary for over-exposure. Dilution gives contrast ; concentration gives power and density with reduced contrast. The same solution may be used for several plates, and development must be continued until the apparent density is much greater than is usual with pyro.

In the hands of careful workers the convenience, power, and ease of working with this combination, and its capability of giving excellent results, will always make it a favorite developer.

HOW TO MAKE A SATURATED OR STANDARD SOLUTION.

Take hot water (not boiling), add the chemical salt slowly, stirring constantly. Do not add more salt until each addition is perfectly dissolved. Continue the operation until water refuses to dissolve more of the salt. Test for temperature with thermometer. When solution has cooled to 65 degrees Fahrenheit, test with hydrometer for specific gravity. Keep standard solutions in well-stoppered bottles and in a dark place. Thermometers.—Use a Fahrenheit hot water thermometer. Twaddle hydrometers.—

No. 1 Twaddle marks	from 0 to 25 degrees.
No. 2 Twaddle marks	from 24 to 50 "
No. 3 Twaddle marks	from 50 to 80 "
No. 4 Twaddle marks	from 72 to 106 "
No. 5 Twaddle marks	from 100 to 136 "

It is well for the photographer to own a complete set of hydrometers, but if your operations are confined to two or three salts, it is only necessary to purchase the hydrometer which will cover your work, and it can be easily selected from the above table. —Walpole Chemical Co.

THE THORNTON-PICKARD MANUFACTURING CO.

Few of the many users of the famous shutter made by this firm ever give a thought to the immense establishment necessary to the production of the quantity sufficient to supply the demand. Through the courtesy of the company we are

at the works in the form of large boards, and is stacked in the wood stores till in thoroughly dry and good condition. When taken from the stores, it first goes to the circular saw, where it is cut up into long pieces of the exact width for the portion of the shutter for which it is to be used. Then it passes into a planing machine,

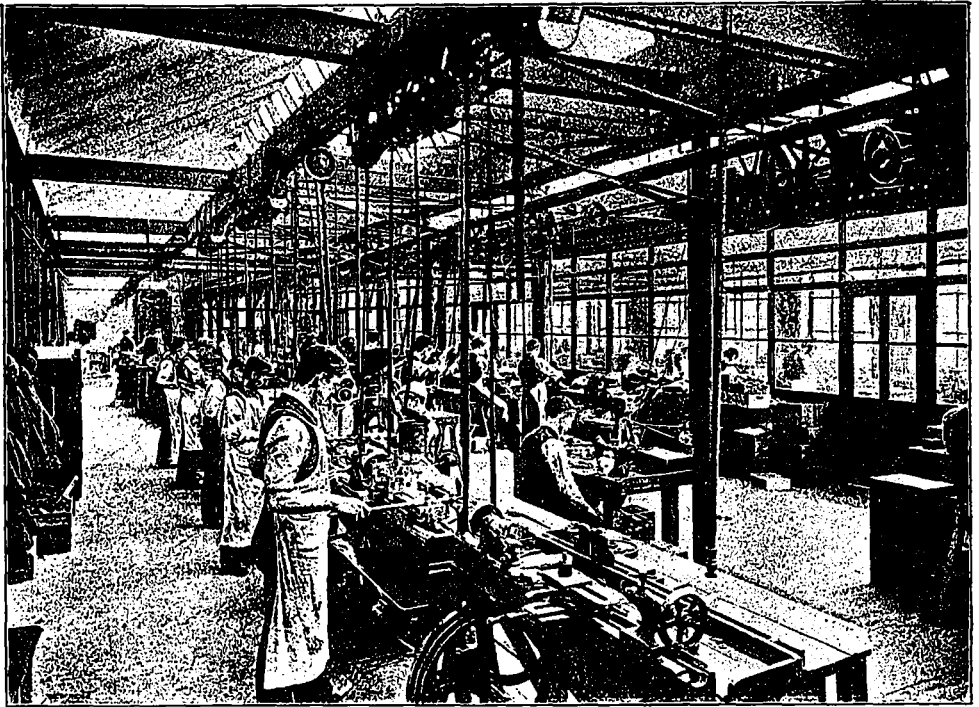


FIG. 1.—GENERAL VIEW OF MAIN SHOP.

enabled to give our readers a short illustrated description of the Thornton-Pickard works.

In viewing the various processes which have to be gone through before the finished shutters are placed in stock, we naturally commence with the woodworking department. Briefly the operations here may be thus described. The mahogany, which comes from Central America, arrives

which gives a smooth surface to the wood, and at the same time reduces it to the necessary thickness. The lengths thus prepared are next cut up into small pieces, of the required size for making up. The portions which form the box-like body of the shutter then undergo the process of "plain dovetailing," the notches being cut out at one operation by a special machine. These pieces are then

glued together in their box form. The boxes when put together are placed in a press until the glue sets to ensure the joints being square and sound. Each box is sawn in half, thus forming two shutter-bodies. The next process is that of sandpapering. Special machinery is employed for this purpose. From sandpapering the bodies pass to the drilling machine, where the necessary holes for the working parts are bored.

The back portion of the body, into which the lens fits, is turned out from a solid square piece of wood by a very ingenious lathe in a manner as effective as it is quick. The wood portions of the shutter then pass to the polishing shop, where they receive the finish which adds to their handsome appearance.

Passing from the woodworking department to metalworking tools,



FIG. 2.—WOODWORKING SHOP.

we see the capstan lathes making the pinions, the nipples and the other small turned parts by the gross, the milling machine with an attachment for cutting the eccentric ends on the speed-setting spindle, the machine for cutting the teeth of the small brass wheels, and the punching presses for stamping out the sheet-metal parts. The various parts are produced in large quantities at a time and then passed into the stores, from whence they are taken out as required.

It is in the fitting shop that is seen to the fullest extent the care and attention which is bestowed upon the Thornton - Pickard shutter during the various stages of its manufacture. Although the individual parts are all made to exact standard sizes, yet the



FIG. 3.—FINISHING SHOP.

satisfactory working of the finished article is very largely dependent on the accuracy and care with which the various pieces are fitted together. The qualities of reliability and durability which have gained for the "Thornton-Pickard" so excellent a reputation owe their existence very largely to the careful fitting up. The shop in which this important work is carried on, though in the main building, is separated from the principal workshop by a glass partition. The various items composing a shutter are selected from the stores and given out in lots of a dozen, so that each man has twelve shutters of a kind in hand at once. Perhaps the most important part of the shutter is the blind, and considerable care is taken to ensure that each one shall be accurately fitted. In the first instance an examination is made to see that it is correct as regards size and aperture before it is given to the fitter-up. Then a second test is applied, when the blind is fixed in place, to see if it is square and in its right position, and finally, when the shutter is completed, a further scrutiny is made by the head of the department before it can be passed as correct.

Shutter-making does not constitute the only work upon which the factory is engaged; "Ruby" cameras, automatic tripods, and the "Thornton-Pickard" plate-holders are made as well.

The firm are just adding a new wing to the works, which will increase the capacity by about fifty per cent.

The American agents for this firm are Messrs. A. J. Lloyd & Co., Boston, Mass.

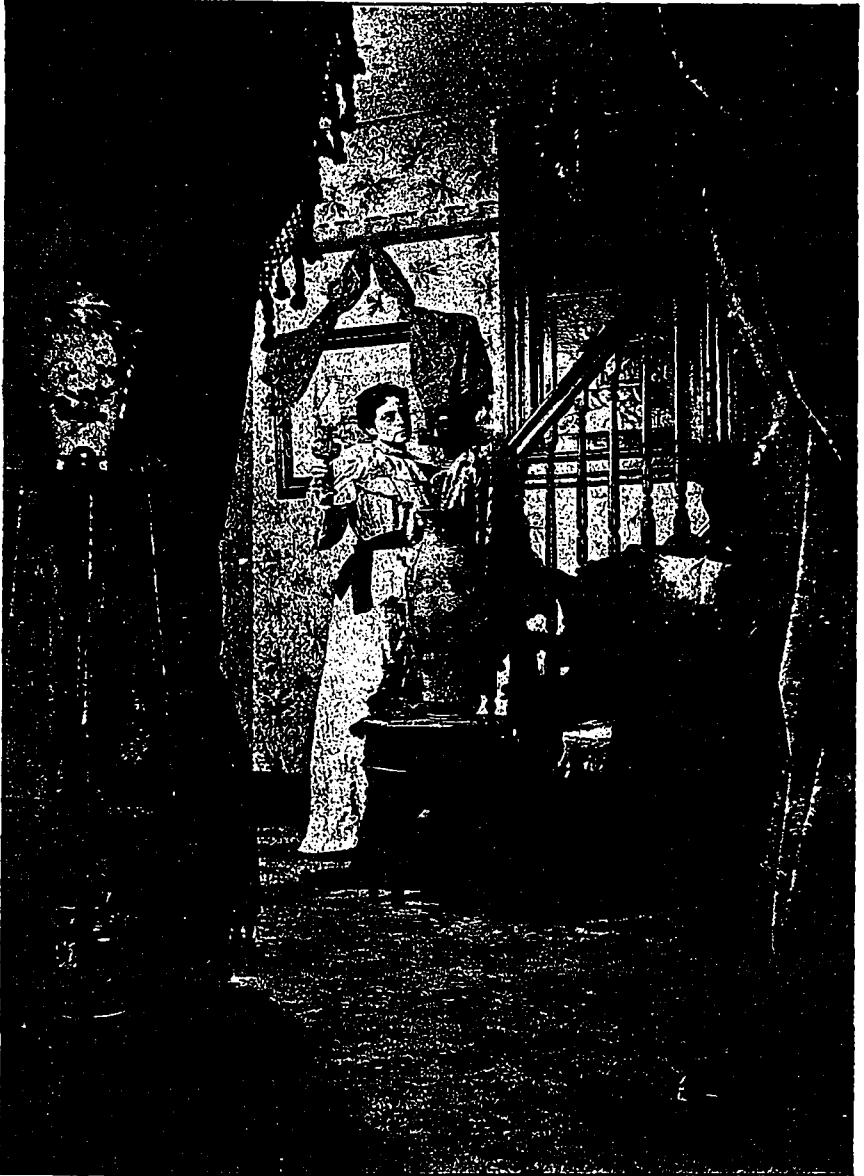
HALIFAX CAMERA CLUB.

An Instructive Lecture by Dr. McKay.
Dr. Reid's Remarks on X Rays.

The first regular meeting of this organization was held in the club rooms on April 16th. A large number of enthusiastic amateur and professional photographers were present, and a thoroughly pleasant and interesting evening was spent.

After the reading of minutes of preliminary meeting of 19th March, the President, W. A. Henry, announced that up to the moment of speaking there were forty names on the list of membership. The standing committees—house, library and lantern slides—had been nominated and were all hard at work in their respective fields. The club competitions, including a silver medal already offered by a prominent member, were in course of arrangement. The club had received valuable donations of periodicals, and other photographic literature, which would be found on the table for the use of members. Hereafter regular club meetings would be held fortnightly, the next being on Thursday the 30th inst., at which the members would be regaled with a lantern slide exhibition.

On the conclusion of the President's remarks, the club listened to a masterly and most instructive lecture by Dr. A. H. McKay, Superintendent of Education, on the "Fundamental Laws of Light in their Application to Photography." After congratulating the club on its successful inauguration, and expressing the pleasure it gave him to become a member, the lecturer introduced his subject by explaining, so far as the indefinable was susceptible



Flashlight made with
SUNART CAMERA Co.'s
Folding "Vici"

of explanation, the nature of the molecule and the molecular theory. This wonderful theory might, he said, be a scientific chimera with no more solid basis in fact than "the baseless fabric of a vision," but it certainly was a most useful working hypothesis to explain a vast array of observed facts, and deduced laws in physical science, and until a future generation demonstrated its falsity we were quite safe in assuming its truth. By its means we were enabled to form more intelligent and coherent ideas of light, heat and electricity than through any other process of reasoning or ratiocination.

He next, by the aid of diagrams made on a blackboard with different colored chalk, showed the effect of passing a ray of light through various media. In passing through a transparent prism the ray is not only refracted but also split up into its primary colors owing to the different refrangibility of its elements, the violet rays being the most refracted or bent and the red the least. Outside these visibly limiting colors were at the one end the actinic rays, and at the other the heat rays, both invisible, but which could by certain means, which were explained, be detected and made to do work.

A lens was simply a modification of a prism, and the passage of light through it was governed by the same laws. He explained by simple diagrams the nature and positions of the principal and conjugate foci of lenses, and showed how the convergence of the rays after passing through the photographic lens caused the image to appear with distinctness, but re-

versed, upon the ground glass and the sensitized plate. Owing to a segment of a true sphere, which was the form to which lenses were ordinarily ground, being not theoretically the exact proper form, it was necessary to exclude the rays from the edges of the lens, allowing them to pass through the central portion only. This was practically accomplished in the camera by "stopping down," as it was called.

He graphically explained and illustrated the nature and construction of achromatic lenses, and how advantage was taken of the different dispersive powers of crown and flint glass to obviate the halo or fringe of color that would otherwise surround the edges of the image and prevent a sharp picture from being produced.

Brief reference was made to the action of light or actinic rays on certain salts of silver, and emulsions of them; this being the chemical discovery upon which was built the whole beautiful superstructure of the art-science of photography.

Dr. A. P. Reid, Superintendent of the Victoria General Hospital, who followed Dr. McKay, in a few well chosen remarks also felicitated the club on its formation, and was very glad to become a member. He then gave a short but exceedingly lucid resume of the absorbing topic of X ray photography or radiography as it was also called. In view of this extraordinary discovery of Prof. Röntgen, it almost looked as if the hitherto useful and universally adopted molecular theory was in great danger of being knocked into a cocked hat. The mysterious X ray, which was

well named, for it was indeed an unknown quantity, seemed to ignore or transcend the laws that had been so laboriously laid down for the guidance of light, and to strike out a new path for itself. As for light in general, though he had been of it a diligent student for half a century, he had to confess that he knew very little about it. It was one of those numerous things, facts or forces of nature regarding which the most poor feeble man could hope to do was to discover and take advantage of some few of the laws governing its action. Of its ultimate nature or essence we must ever remain in ignorance.

The branch of photography that had chiefly engaged his attention had been microphotography, whereby with a combination of the microscope and the camera we were enabled to represent, magnified from 1,000 to 10,000 times, various tissues and organisms of the human body. This branch of photography was of surpassing interest and importance. Its value to the physician and the pathologist could not be over estimated.

Prof. Kennedy, in the chair of chemistry in King's College, Windsor, had great pleasure in joining the club. He was about to commence a series of experiments in photography with the Röntgen rays, and hoped to be in a position at some future day to give the club some notes regarding them. The chemistry of photography was of peculiar complexity and interest, this too would engage his attention.

The President supplemented his former announcements by saying that Dr. Sinclair had promised the club a

lecturette on lantern slide making, and also on dry plate making, in both of which subjects he had done excellent work.

A hearty vote of thanks was passed to Dr. McKay for his able lecture, and also to Dr. Reid for his lucid and interesting remarks on X rays.

Before the close of the meeting a number of gentlemen signed the rolls of membership, and the Treasurer gathered in a goodly pile of shekels in entrance fees and dues.

OUR LONDON LETTER.

The general public seem to be losing interest in the Röntgen rays, which have now run their course as a nine days' wonder, and it is left for the experimentalists to develop the discovery into one of practical utility. It seems almost heresy to say so, but up to the present I cannot help thinking that their usefulness has been very much over-estimated. At any rate, beyond showing the presence of needles and bullets in the hands and arms which were before known to exist there, and the position of which, unless I am much mistaken, could have been ascertained without them by any surgeon worth his salt, they do not appear to have had any practical value whatever, so far. Whether they will ever be enabled to depict the condition of organs buried in a mass of tissue which prevents their examination otherwise, such, for example, as the heart or the kidneys, seems very doubtful, while their use to ascertain the contents of suspicious packages has obviously been conceived without reference to

the nature of their source. The passage of a powerful current, as is required by the Crookes tubes, sets up in bodies near it an electrical tension which is quite sufficient to, and frequently does, cause sparks to pass from one metal plate to another near it, and it is therefore probable that it would be less dangerous to open a parcel suspected of being an infernal machine, than it would be to photograph its contents by the "X rays," unless this were done at a distance from any experimenter.

The Camera Club here has just issued its balance sheet for the year 1895. It seems strange that in the metropolis of the British Empire such an institution cannot be made to pay its way, but the last year shows that the annual deficit, which was £253 in 1892, £495 in 1893, £392 in 1894, has increased to no less a sum than £1,005 in 1895, but some of this latter is due to a robbery since detected and punished. The Club Conference has just been concluded. This is a name given to a series of meetings on consecutive evenings, at each of which one or more, generally more, papers are read and discussed. This year the papers have been select rather than numerous, the most interesting having been one by Lord Rayleigh, in which he dealt with the various methods by which he had been able to copy diffraction gratings by photography. For the benefit of those of your readers to whom a diffraction grating is a name and nothing more, I might mention that it is a term applied to a piece of glass or metal with a highly

polished surface, upon which there has been ruled with a diamond point a series of parallel straight lines, equidistant from one another; three thousand or more such lines being included in each inch. These have been ruled by Nobel in Germany, and more recently and with much greater fineness by Rutherford, of New York, and Professor Rowlands, of Baltimore, whose dividing engine has made gratings having over forty thousand lines to the inch. Six thousand lines is, however, a serviceable number, and Lord Rayleigh stated that he had successfully reproduced gratings of this degree of fineness by printing in contact onto finely surfaced glass, coated with bichromated gelatine. He mentioned also that he had been successful with dry collodio chloride as well as with albumen and had latterly obtained good results by means of bitumen, although he found it difficult to get rid of the turpentine necessary for development without also causing the disintegration of the film. In the course of the discussion, Lord Crawford observed that he had tried to cast copies of gratings in Spence's metal, as suggested by Mr. Warnerke, but with disastrous results to the original.

Messrs. Wellington & Ward are now putting upon the market here a new film, the invention of Mr. J. B. B. Wellington, which has novel features. It is composed simply of gelatine, and is coated on paper, the separation of the film bearing the negative image being effected after development and fixing by simply pulling them apart.

after which the stripped film is laid down upon a sheet of glass to dry.

Professor Roberts Austen, the head of the Royal Mint, gave an interesting address upon the measurement of high temperatures by means of photography, before the Royal Photographic Society, a few days ago. The most interesting part of the lecture was, however, undoubtedly that devoted to the non-photographic portion of the Professor's researches, in the subject of the diffusion of solids into one another.

He showed how a diamond placed upon the top of a block of pure iron gradually diffused itself throughout the mass of the iron, if sufficient time were given, the diamond disappearing and the whole of the iron becoming more or less carbonized. He also mentioned that a gold disc laid upon the end of a bar of pure lead a foot long gradually diffused itself throughout the lead if the surfaces of the metals where they were in contact was perfectly smooth, and if they were kept fairly hot, but not hot enough to melt either.

The photographic portion of the lecture was devoted to the description of recording instruments intended to show fluctuations of temperature in, for example, the air driven into a blast furnace. This is effected by a thermopile, or an instrument consisting of wires of two dissimilar metals soldered together at a certain point. On heating such a junction, a current of electricity is set up in the wires, the strength of which varies as the temperature of the point of junction alters. This varying current deflects a mirror which, reflecting a beam of

light, records its movements on a sheet of sensitive paper.

The Photographic Convention which meets in July at Leeds is already forming the subject of conversation here. Growing in popularity yearly, it is not likely to be otherwise than successful on this occasion, under the presidency of the genial Mr. H. P. Robinson. We are promised a list of good papers, and what is more to the purpose, the excursions are expected to be of a particularly attractive kind. The papers read on such an occasion are attended by a proportion of conventioners which is sufficiently large to speak highly for their sense of duty, but whether it is policy to expect the members, after a trip of some fifty or sixty miles by rail and a hard day's pleasuring, to turn up in the evening to listen to a dissertation on, say, Lippmann photography, or the "fading of silver prints," is open to question. This objection cannot apply to the President's address this year, which we are told is to deal with "the action of acids upon mathematics."

The past month has seen the birth of a number of truly awful names, compounded from Greek and other dead tongues, to describe the different inventors' instruments for showing moving pictures with the lantern. Mr. Bert Acres opened the ball with the "Kineopticon," and was closely followed by Lumiere's Cinemetograph, etc., etc., which is drawing big crowds at the Empire Music Hall. The effects are striking, the arrival of a train at a station and the waves at Dover being most successful,

but there is still room for much mechanical improvement if the idea is to be more than a curiosity.

M. Lippmann has been visiting London, and lectured at the Royal Institution upon his method of color photography. He also read a paper upon the same subject before the Royal Society, but this contained nothing that has not been previously published. The lecture was, however, very successful; the lecturer, who spoke in English, being well received by a crowded and enthusiastic audience. Some of the results were shown upon the screen.

The so-called "new art" invented by Professor Hubert Herkomer has been the subject of some severe criticism by Mr. Bolas, who points out that it is little more than a process invented some fifty years ago by Palmer, and called by him Electrotint, from which it only differs in being less perfect.

Captain Abney has drawn attention to an application of fogged celluloid films which is likely to be very useful. It consists of sensitizing them with bichromate, printing in contact with a negative—the celluloid side being against the negative—and subsequently developing in hot water. The finished print obtained in this way is then blackened in an amidol or other developer and by this means a transparency results which is far more vigorous than the original negative. From this transparency a negative still more vigorous can be made in the same way, or the transparency can be employed for other purposes.

R. CHILD BAYLEY.

London, May 5, 1896.

LETTERS TO THE EDITOR.

TO THE EDITOR.

SIR,—Will you do us the great favor of allowing us to ask your readers for their assistance in making Photograms of '96 worthily representative of the present position of photography? This is the only annual attempt to reproduce the best work of the year, and we are anxious not to miss seeing anything that is really meritorious. Unfortunately, the gentlemen who last year undertook to represent us in the United States and Canada were both prevented from carrying out their undertaking so fully as we wished. Hence, from no intention of ours, American work was practically unrepresented—a defect in the book which we trust to fully remedy this year.

Yours faithfully,

The Editors,

H. SNOWDEN WARD.

BOOKS AND PUBLICATIONS.

The May double number of *The Practical Photographer* is entitled *Photography of the Past*, and is almost entirely devoted to matters concerned with the birth, rise and progress of photography from its inception to the present day. Although historical matters are usually deemed dry, the present case may be regarded as an exception, for the subject has been dealt with broadly and pictorially, no less than ninety-five illustrations being given.

W. P. Buchanan, whom everyone knows as the leading dealer of Philadelphia, sends us his illustrated catalogue for 1896. It is quite the

most complete photographic price list that we have seen. It is prepared with great care, handsomely printed and abundantly illustrated. All should have a copy of this catalogue for reference and as an aid in purchasing. To professional photographers it is sent free. Amateurs may secure a copy by forwarding twelve cents to pay postage.

The Year Book of Photography. And Amateur Holiday Guide for 1896. London, Eng.: The Photographic News.

This valuable annual is of great interest this year, containing a great collection of helpful articles by practical photographers. The book is well illustrated and will be particularly interesting to amateurs. English price, one shilling.

Photography for Artists, by HECTOR MACLEAN. Publishers, Percy Lund & Co., Memorial Hall, London, England. English price, 2 shillings.

The author says he has given brief and useful information respecting the many uses of photography in various walks of the pictorial and allied arts. After a thorough reading of this interesting book, we quite agree with the statement of its information being useful, and find that it loses none of its helpfulness to the artistically inclined worker by being written in concise language. The book is nicely bound, contains 150 pages of reading matter, and an appendix of sixteen pages of illustrations taken from work done by leading artists. It is just such a book as artists have wanted, and we predict for it a large sale.

Photographers' Pocket Book for 1896. Publishers, the Shashin-Sowa, Tokyo, Japan.

This is the first photographic annual published in Japan. It contains considerable information of a photographic nature printed in Japanese, and is nicely bound in leather. Among the advertisers we notice a number of American houses. It will evidently be a good advertising medium for Japan.

Photographic Surveying. Including the Elements of Descriptive Geometry and Perspective, by E. DEVILLE, Surveyor-General of Dominion Lands. Published by Government Printing Bureau, Ottawa, Ont.

The author has given this subject the same careful preparation and personal tests and experiments as is shown in his other writings, and the result is a masterly and exhaustive treatment of the subject, forming the only complete book on photographic surveying and its necessary branches on record.

A LETTER FROM PRESIDENT BELLSMITH.

THE NESBITT PUBLISHING Co.

GENTLEMEN,—Permit me to compliment you upon the exceedingly bright and thoroughly enjoyable number of the CANADIAN PHOTOGRAPHIC JOURNAL just received. Every article is interesting, and couched in such simple language that everybody can understand them. Please enrol me as a regular subscriber. Yours sincerely,

R. P. BELLSMITH,

Pres. P. A. of A.



OBJECT LESSONS IN POSING.

NOTICE BOARD.

TO THE FRATERNITY:

The destructive tornado which visited St. Louis on the evening of May 27th, carrying ruin and desolation in its path, took off part of the roof of our factory, and the rain, pouring through the opening, damaged a considerable portion of our stock. Fortunately no one on our premises was either killed or injured. We are having repairs made with all possible despatch, and as our machinery and plant are still in good order, we expect to be in shape to resume work in a few days, and take this public method of thanking the many kind friends who have inquired in regard to our safety and have extended their sympathy to us.

Yours truly,

G. CRAMER DRY PLATE WORKS.
St. Louis, June 1st.

**THE TEACHING OF
PHOTOGRAPHY.**

By C. F. SEYMOUR ROTHWELL, F.C.S.

Lecturer on Photography at the Municipal
Technical Schools of Manchester
and Rochdale.

There is considerable difference of opinion with regard to the advisability or usefulness of this detailed instruction in the various trades in schools, many people going so far as to condemn the system as a whole. It would, however, be out of place in an article of this nature to discuss the pros and cons of the technical education question, and we will merely give our own opinion as to the advisability of teaching our special trade or profession in these schools.

There are enthusiastic educationalists in this country who apparently believe that the time-honored apprenticeship system will eventually be swept away by the extension of technical education; who believe that a boy will be able, direct from the technical school, to take a situation as a journeyman in the particular trade he has studied; but the opinions of such persons are not, as a rule, shared either by craftsmen or those practically engaged in imparting technical instruction. We do not believe that technical education, as it will ever be possible to teach it in schools, will supplant the apprenticeship system of learning trades, but that it will, and does, materially assist in the education of our younger hands, and will supply many of the deficiencies of the apprenticeship system, we are convinced from our own observation and experience. Take the case of our profession, for example: A youth is apprenticed to a photographer, and while he is serving his time gradually manages to acquire a practical efficiency in the working of the special plates, papers, and processes that happen to be practised. He may become a capable operator, but he is generally a mere "rule of thumb" man, understanding nothing whatever of the optical and chemical principles of the processes he is working, and is usually completely lost, for a time at least, when required to work under altered conditions. Again, in some of the larger establishments the division of labor is carried out to such a degree that he may merely acquire a knowledge of some special part of even the limited work done

by one photographer. Such a man is fortunate if the special branch he has become proficient in is one commanding fair wages, but for the larger number there is only the prospect of starvation wages when he becomes older, or, we are very sorry to say, dismissal "because a lad at ten shillings a week can do your work." The case is all the more pitiful when it is considered that the number of firms able to engage such a man in constant work are limited in our profession. We may be accused of painting in too sombre colors, but we daily come in contact with cases as bad as those named.

This condition of things, we believe, technical education will completely alter, if those in the profession will only take advantage of the opportunities which are now offered of obtaining, at any rate, some practical knowledge of most of the photographic processes that are worked on commercial scales, and in order to more thoroughly understand and apply them, under the very varying conditions obtaining in their commercial application, supplement this knowledge by at least an elementary knowledge of the sciences upon which our art-science is based, as, for example, chemistry and optics. The art side of photography should also, of course, receive careful attention, but this question we will leave to abler pens than ours.

We have confidence in the future of photography, both in its artistic and commercial applications, but a professional photographer in the future will be compelled, if he is to make his profession pay, to be

one thoroughly trained in the principles of his craft, and the sciences related to it, so as to enable him to avail himself of the various improvements daily introduced, or even to effect improvements in the various processes himself. Such knowledge does not necessarily prevent, or even hinder, the production of artistic photographs; in fact, it should be a help, to some extent, in their production, giving him the ability or command over the materials used for obtaining results suitable to the picture in hand. It is, we consider, a mistake to suppose that it is necessary for a man to be ignorant of science if he desires to produce artistic pictures. This idea is still held by some people, but it is merely a relic of the time when it was considered essential for an artist to wear long hair and a velvet coat; artistic feeling surely lies deeper than either of these. But this is a digression.

There is another purpose for which these classes in photography are often used, and is largely availed of where they are conducted. We are alluding to the case of the professional photographer, or assistant, who, although acquainted with the ordinary processes in universal use, like negative making and silver printing, desires to know how other processes which are not used in his ordinary business routine are worked. We know of several instances where photographers have, after attending the classes, taken up a branch of photography previously neglected by them, with considerable advantage to their business.

[TO BE CONTINUED.]