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GEORGE W. GILSON, - - EDITOR

COMMERCIAL PLATES IN ORTHOCHROMATIC PHOTOGRAPHY WITHOUT COLOR SCREENS.

By STEPHEN H. HORGAN.

"If you did nothing else for the remainder of your days but advocate the use of orthochromatic plates to the exclusion of all others, your time would be well spent." This is what Mr. Edward Bierstadt said to me recently; a gentleman, by the way, who, through his researches and results on the subject, leads as an American authority.

So, then, we will begin at the beginning, and in the briefest possible way consider what is meant by orthochromatic plates, why they are not in more general use, who are the makers of such plates, and if there is any difference in their orthochromatic quality? All scientific terms will be avoided. Theories will not be considered, the subject being treated just as a professional would approach it to learn what advantage orthochromatic plates would be to him, and if there is any difference in the products of different makers.

In the first place we can consider the terms orthochromatic and isochromatic as interchangeable or synonymous, as applied to sensitive photographic plates. The one means the reproduction of colors correctly as to their brightness to the eye; the other implies the proper relative luminosity of colors on reproduction; or, in other words, the correct rendering, in a negative, of the varying degrees of brightness or luminosity in a subject, regardless of the colors it contains.

It is what wood-engravers have aimed to do, that is, to render in black and white, or monochrome, what they term the "tone values" of a painting, portrait or landscape. For this very reason the Century Company keep Timothy Cole, the distinguished American engraver, abroad, to engrave on wood before the paintings and frescoes of the masters, in order that he may record on his block the true orthochromatic reproduction of these masterpieces.

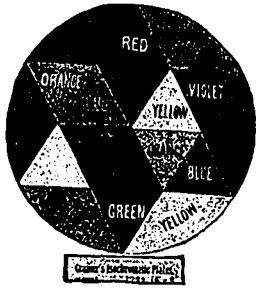
Photography can render correctly the light, shade and contour of a plaster cast, or reproduce a black and white drawing, but when the subject before the camera contains color (as almost everything does), then is there misrepresentation. We all know how the golden-haired, blue-eyed little child, or the auburn haired miss has been libeled. How bright green foliage becomes black masses in a photograph. How the blue of the sky is bleached white, until the bright, fleecy clouds passing over it are indistinguishable; and it is needless to state that this is due to the darker colors, violet and blue, operating most powerfully on the photographic film, while the brighter colors, yellow, green, orange and red, are weakest in their action. As all objects contain these colors in a greater or less degree, it is not too strong a statement to make, that a correct representation is impossible through photography with ordinary plates.

I made a tour through all the photographic stock houses in New York recently, to purchase samples of all the orthochromatic plates in the American market. From the polite young clerks in these places, I learned that the particular brand of plates they sold were "the best made." When they were out of orthochromatics, I was told (but this is confidence) that all the dry plates of the best makers were now made orthochromatic. Here was a photographic millennium. If all dry plates were orthochromatic, there would be no need of advocating their use, no others being obtainable, so I purchased four boxes of plates other than orthochromatic, in the hope that this might, in some measure at least, be true.

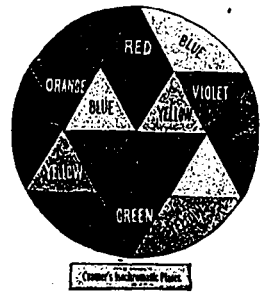
Now, to test the plates standard colors are necessary. The best I could obtain are those which Prang furnishes the schools. With Prang's standard yellow, orange, blue, green, orange red, and violet colored papers, a star 10 inches in diameter was designed. From this, negatives were made with each brand of plates. The light was that of an ordinary studio—the exposures were made in the middle of the day, as rapidly after each other as possible. An assistant developed the plates, and several trials of each plate were made to get the best time and development. The label on the end of each box of plates was photographed with the charts so that there would be no mistaking the negatives afterwards. Unfortunately the half-tone cuts herewith do not show the gradations in tone in the original negatives. These gradations have been carefully recorded in the accompanying table, so that the results can be compared:

Table Showing the Orthochromatic Properties of Various Brands of Plates when Used Without Color Screens.

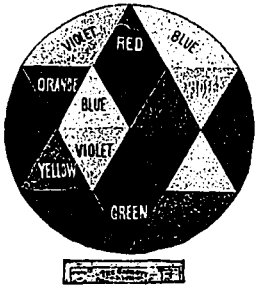
	1	2	3	4	5	6			
The Proper Color Values	Y	....	O	BG	R	V			
Cramer's Slow Isochromatic.....	Y	....	O	B	G	RV	2 points	incorrect.	
Cramer's Medium Isochromatic	B	Y	....	V	GO	R	10	"	"
Forbes' Orthochromatic.....	B	Y	V	O	G	R	10	"	"
Carbutt's Orthochromatic	B	V	Y	O	G	R	12	"	"
Wuestner's Orthochromatic	B	V	Y	O	G	R	12	"	"
Lumière's Series B	B	V	....	YO	GR	....	12	"	"
Eastman's Extra Rapid	B	V	....	YO	G	R	13	"	"
Cramer's Banner.....	B	....	V	Y	OG	R	13	"	"
Seed's Sens. 26	B	....	V	....	YOG	R	14	"	"
Hammer's Extra Fast.....	B	....	V	....	YOG	R	14	"	"



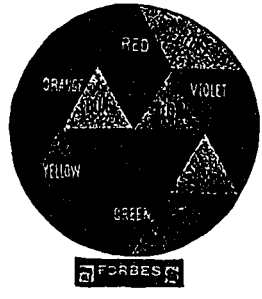
Cramer's Slow Isochromatic.



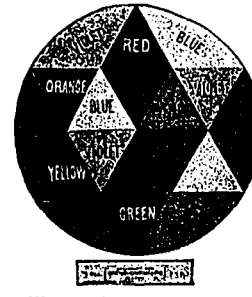
Cramer's Medium Isochromatic.



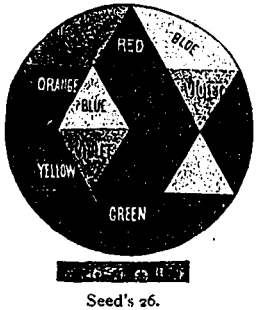
Carbutt's Orthochromatic.



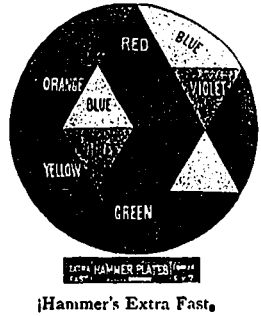
Forbes' Orthochromatic.



Wuestner's Orthochromatic.

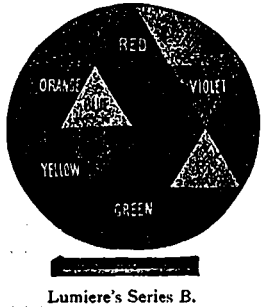


Seed's 26.

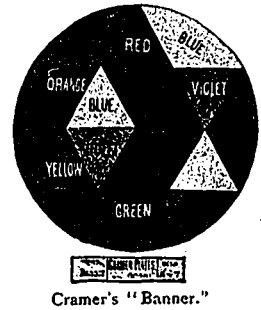


Hammer's Extra Fast.

Eastman Plate.



Lumiere's Series B.



Cramer's "Banner."

The first line in the table shows approximately the orthochromatic relations of these six standard colors, as they appear to the eye. The yellow, being the lightest, is designated as 1, and the violet, the darkest color, as 6. The orange is two shades darker than yellow, and is therefore numbered 3. Blue and green may be considered equally dark, and numbered 4, and red 5. So that an orthochromatic plate, to be correct, should, without a screen, show these standard colors in approximately the following order of brightness: Yellow, 1; orange, 3; blue and green, 4; red, 5, and violet, 6.

Now, a glance at the table will show what relations the colors bore to one another, when photographed on the various plates, in every case without a color screen. In the first place, it should be stated that the last four brands of plates are not sold as orthochromatic, and therefore should not be compared, except with each other. The Cramer "Banner" possesses the advantage in photographing the violet one shade darker than the Eastman, but this is offset by the Eastman recording the orange one shade brighter than the Cramer "Banner," so honors are equal. The Seed and Hammer plates are identical, and photograph the yellow so dark that they can be called non-orthochromatic.

Of the six makes of orthochromatic plates interesting differences in quality will be found. Cramer's Slow Isochromatic plate leads the others so far in orthochromatic properties, that, as was said in the first international yacht race, "there is no second." Still it must be noted that this plate is still two points incorrect. It photographs the green and red in each case one shade too dark; this can be said in its favor, however—as well as in the favor of all the other plates—that Prang's standard green is too dark in color for a green. If this plate were a trifle more sensitive to the red, it would be a perfect orthochromatic plate for use without a color screen. The other orthochromatic plates all photograph blue as the lightest color. Cramer's Medium Isochromatic and Forbes' Orthochromatic give yellow the second place. Cramer in his plate again puts violet back one shade nearer its proper position, while the Forbes photographs orange the lightest, which leaves both plates still ten points incorrect. Wuestner's and Corbutt's possess like properties; violet, the darkest color, photographs lighter than yellow, the brightest, leaving these plates hardly deserving the title of orthochromatic. Lumière's Series B, advertised as specially sensitive to red and yellow, is the next plate. It is the only one that photographs red at its proper value. In every other respect it is no better than the others.

From a study of the table, the value of orthochromatic or isochromatic plates can be readily seen. Speed was not considered here, because in photographing a painting, a costume rich in colors, or a landscape, that question is not as important as the proper rendition of color values.

If any additional interest is drawn to the value of orthochromatic properties in dry plates by this article, it will not have been in vain.—Photographic Bulletin.

SUGGESTIONS FOR DEVELOPMENT.

BY C. F. STANLEY,
Stanley Dry Plate Co.

Stock Solution No. 1—

Pure water	80 fluid oz.
Sulphuric acid, c. p.	1 drachm.
Pyro, E. A. preferred.	1 oz. Troy.

No. 2—

Pure water	80 fluid oz.
Carbonate of soda ..	6 oz. Troy.
Sulph. of soda (crystals)	6 oz. Troy.

These solutions will keep for a long time. For use mix equal parts of No. 1 and No. 2. Temperature, 60° to 70°.

The negatives become more intense after the first if the developer is used the second time, so that to develop a plate on which a short exposure has been made, fresh developer should be used, and for long exposures old developer will give better intensity. An excellent method of working where the exposures are nearly uniform, is to use the old and the new mixed, say three parts old to one part new, or to mix old and new in different proportions, as the exposures vary. In that way the intensity of the negative is under perfect control.

One Solution Eikonogen Developer.

Sulphite soda (crystals)..	8 oz.
Carbonate " " ..	3 oz.
Distilled water	80 oz.
Eikonogen	1 oz.

Hydroquinone Developer.

No. 1—

Water	50 fluid oz.
Hydroquinone	1 oz. Troy.
Sulphite of soda	6 oz. Troy.

No. 2—

Water	60 fluid oz.
Caustic soda	1¼ oz. Troy.

For use mix equal parts of No. 1 and No. 2. Temperature, 60° to 70°.

The stock solutions will keep indefinitely, and the two solutions, after combining them, will retain their developing energy for a long time and can be used repeatedly. It thus becomes a very economical developer.

Have the developer filtered clean and the developing tray clean and the negative will be clean.

After the plate is developed, wash carefully under the tap and then immerse in the following fixing bath:

Hypo	2 lbs.
Pulverized alum	2 oz.
Water	4 qts.

This solution should be mixed and allowed to stand until the precipitate formed by adding the alum has settled to the bottom. Then decant or siphon off the clear liquid. If it is necessary to use it immediately the solution should be agitated while the plate is fixing, otherwise the negative is apt to be mottled.

Allow the negative to remain in the fixing bath at least five minutes after it becomes transparent. Then remove and wash in running water for fifteen or twenty minutes, or longer if convenient, as the negative will turn yellow if not washed thoroughly. The fixing bath can be used as long as it will fix the negative quickly and thoroughly.

Transparent spots, or "pinholes," are caused by scum on the developer when it is old, by air bubbles, or by insoluble impurities in the developer, or by dust particles adhering to the plates, which should have been brushed off with a soft brush.

Remedy.—Dust the plates carefully before exposure, have the developer carefully filtered, and the negative will be clean.

DARK-ROOM MANIPULATIONS.

By W. E. A. Drinkwater.

It needs a certain amount of temerity to venture on the oft-trodden ground of giving a formula for development, etc.; but, judging by the Inquiry Column each week, there are numbers who still thirst for formulæ and details of working. "Find a good formula and stick to it," is sound advice, but the result of such a procedure too often is that one is always "finding" and never "sticking." We are never entirely satisfied. Recently I had the pleasure of taking over a

dark-room and its contents from another photographer, and the bewildering array of bottles on the shelves was enough to make the hair turn grey. Bottles full, half full, and empty; bottles labelled and unlabelled—mainly the latter; or, if labelled, such insufficient markings as "Pyro," "Quinol," or "Soda," and not a word to denote strength of solution or whose formula. If asked for information the former owner could only say: "Oh! I tried So-and-so's formula. That's the pyro solution diluted. No! I think it's the stock—or else it's What's-his-name's accelerator. I'm not sure." Of course a clean sweep had to be made of the lot, and the place of those fifty or sixty bottles is now occupied by five mixtures only. Of which, more anon.

A Standard Developer.

The simplest way to work in a dark-room is to have a shelf just over the sink which shall not be allowed to contain anything but our measures and the solutions which we use for developing when our standard developer is in use. This standard developer should be the one we know best and can depend upon to produce certain results; and, until we have proved a newer formula and are certain that we can do better work with it, the best-known one must still occupy the premier position immediately over the sink, and the bottles so placed that we can lay hands on them in the dark at the call of emergency. Above this shelf we can conveniently place another which may contain small bottles made from such formula as are on trial from time to time. A third shelf, still higher, may be the receptacle for solutions other than developers, such as intensifiers or reducers. Another shelf, or, better still, a cupboard, for keeping our stock of chemicals should be on another wall of the dark-room. Saturated solutions of hypo and alum are conveniently kept on the floor in big, wide-mouthed jars, with a footless wineglass or small gallipot for each one. By this means we can measure out from either jar and dilute to the strength required. Saturated solutions are uncertain things, variable with the time of year and the temperature of the room, and in no other case should they be depended upon; but with both hypo and alum there is a very wide latitude allowable as to working strength.

Now for those five bottles previously mentioned. The standard developer in use in my dark-room is very closely allied to a certain "Standard" advertised by the Imperial Company. As given by them it is a very energetic developer and gives splendid results from snap-shots; but it seemed to lack adaptability to all classes of exposures, certain and uncertain. Hence the modifications which I, naturally, consider to be improvements. One alteration is the use of pure soda carbonate in place of washing soda, and the addition of some soda sulphite to the accelerator. The Imperial Company claim that washing soda is preferable, presumably on account of the color of the image given by it. But, as will be afterwards shown, just as much color can be obtained by the use of soda carbonate, if desired, with the added advantage that it can be kept out of the negative if the class of image resultant on development should prove more suitable to a grey color. Also, it must not be forgotten that washing soda has a decided tendency to make the image much coarser in grain than soda carbonate would. The soda sulphite in the accelerator is inserted with much the same idea—control of color. Should a negative, when partially developed, show itself to be under-exposed, the addition of a solution of plain washing soda as an accelerator will cause an exceedingly

yellow image which will, in effect, increase the harshness of the negative. By using soda carbonate and soda sulphite for this purpose a much greyer image is formed, which does not print so brilliantly as would the yellow one. And this is as it should be, because the accelerator is not only added to increase shadow detail, but also to prevent the great contrasts that so often exist in under-exposed negatives.

Another modification of the "Standard" formula consists in keeping the pyro and metol in separate solutions instead of in one. The original reason for this departure was that pyro and metol mixed did not seem a suitable developer for bromides or lantern plates. In use another advantage cropped up—viz., the additional power obtained of suiting the developer to the exposure by increasing or decreasing the amount of pyro without altering the proportion of metol—or vice versa. Two bottles are simpler and easier to handle than three, but the little extra trouble is amply repaid by the additional advantages conferred. The fourth bottle is, of course, ten per cent. potassium bromide, and the fifth is hydroquinone to use with the metol for lantern slides or bromides when additional contrast is required.

THE STOCK SOLUTIONS.

Shall we proceed to make up these five solutions? Large quantities are here given, but they are easily divisible for experimental work, and, if adopted as our standard developer, the quantities are not too large, as the solutions seem to keep indefinitely. In each case dissolve in the order given.

Pyro Solution.

Water	80 oz.
Potassium metabisulphite	¼ oz.
Potassium bromide	¼ oz.
Pyro	1 oz.

Metol Solution.

Water	80 oz.
Metol	1 oz.
Soda sulphite	½ oz.

Warm water is almost a necessity to dissolve the metol.

Soda Solution.

Water	80 oz.
Soda sulphite	6 oz.
Soda carbonate	14 oz.

Bromide Solution.

Potassium bromide	1 oz.
Water up to	9¼ oz.

Hydroquinone Solution.

Water	80 oz.
Soda sulphite	½ oz.
Citric acid	40 grs.
Hydroquinone	1 oz.

It will be observed that with the exception of the bromide and soda solutions all are of the same strength, and that a mixture of equal parts of each of the first three will give us a developer containing 2 grains of pyro, 2 grains of metol, and 28 grains of soda to each ounce. This is based on the supposition that the ounce of 480 grains has been used, but if the commercial ounce of 437½ grains is used there is no material difference in the behavior of the developer. It is a trifle weaker, but not enough to upset the formula.

We can safely claim that with this set of solutions, apparently complicated but in reality very simple, it is within the power of a thinking photographer to produce a good class of image from any plate, film, or paper that has had a developable exposure. Of course, no developer yet known will make a negative from a grossly under-exposed plate; but, at the same time, it will be found easier to develop up printable negatives from such short exposures as would be hopeless with developers that at one time we

thought all that could be desired. And we have at hand also at least equal control in the region of over-exposure to what we previously had.

Let us see how it works. Equal parts of pyro, metol, and soda form a very good normal developer for time exposures out of doors. It has, however, one peculiarity that must be borne in mind, and that is its great tendency to produce yellow negatives. Repeated experiments have proved that there is a large amount of control over this yellow color, and that it has a direct proportion to the amount of washing that takes place between development and fixation. Prolonged washing causes a great accession of color, and vice versa. Therefore, with such a developer as we are now considering the washing should be cut short—ten seconds is ample.

For instantaneous shots and portraiture a more suitable developer is one part each of pyro and metol with two parts of soda. This is an exceedingly energetic developer and will be found to be very closely akin to the Imperial "Standard" in its action. It does not, of itself, give such yellow negatives as their formula, but if the subject is one that requires a brilliant printing negative the color can be allowed to accumulate under the tap whilst we are developing another plate. This will occupy two to two and a-half minutes (it is a quick-acting developer) and by that time the first plate should be ready for fixing. Another advantage from the presence of the soda sulphite is very noticeable. The developer retains its energy for a considerable time. I have developed as many as thirteen plates one after the other in four ounces of solution, but must, in justice, say that the last three were slow in development and wanting in quality after fixation. Probably six to eight is the reasonable limit. The normal developer composed of equal parts of each deteriorates much more rapidly, and two or three plates are as many as can be managed before the solution gets too muddy.

In cases of extreme under-exposure (that are known to be so beforehand) it is advisable to lower the quantity of pyro to one half or even a quarter of the normal, and make up the deficiency with water, keeping the quantity of metol and soda constant. Or, as an alternative that will doubtless suggest itself where only one such plate has to be treated, put a small quantity of pyro in a separate measure and omit it entirely from the developer. Flash up the image with this metol and soda solution, and when all detail has appeared, add the pyro and allow the image to build up density. This again will be provocative of a grey image, and copious washing should be given to get as much color as possible before we fix.

The case of over-exposure will call into use the fourth bottle containing bromide. We can ring the changes according to the amount of over-exposure known or suspected. Pyro, metol, and soda, one part each, with the addition of 20 or 30 minims of bromide solution, is one step in the direction of a restraining developer. Increase the pyro to two parts with the others at normal is another step. Then we can reduce the metol, and finally omit altogether, and so work up to a plain pyro-soda developer. Each increase of pyro or decrease of metol will tend more and more towards yellow negatives, so washing must be cut short. Some washing is always necessary or our hypo will become a bath of pyro and hypo, and increase instead of decrease of color will result. If on account of extreme over-exposure the development has been very prolonged, probably we should not do any harm by soaking the plate in a saturated solution of soda sulphite before fixation.—Photographic News.

LANTERN SLIDES.

The following method is given by J. Bartlett in an exchange :

Presuming that you will strengthen after fixing, I proceed. First, wash out very completely all hypo from the film, then place the slides in a bath composed of

Perchloride of iron	4 grs.
Chrome alum..	2 "
Citric acid	4 "
Water	1 oz.

This solution not only clears up the slide wonderfully by taking off every trace of fog from development, but also removes the last grip of hypo. It also gives a good color.

The dish containing the solution should be rocked to prevent the formation of a network on the film, which will show itself if you neglect this precaution.

Do not let it be in the iron solution for more than a couple of minutes, until a slight bleaching is perceptible.

After removal wash well under the tap, and then flow it over with the following solution. Do not lay it in the dish, but flow the solution over it, pouring the solution back into the graduate to flow again, as in wet plate practice ; otherwise one would be apt to stain the plate and also get a dense deposit of silver on the back.

A.

Gallic acid (best quality).	80 grs.
Alcohol (95°).....	1 oz.

B.

Nitrate of silver	40 grs.
Water (distilled)	1 oz.

Take one drachm each of A and B, and three ounces distilled water.

When the plate has built up to your satisfaction, wash it thoroughly and dry it.

Lantern slides so made are quite brilliant, and so look very much like wet plates.

The fine quality is obtained by the gradual and slow action, giving such a fine deposit of silver as cannot be equalled by mercury.

Care should be taken in the manipulation not to touch the film with the fingers. I say this because developers of gelatine plates are apt to rub their fingers over the surface to brush off any impurities. I would even recommend this method to commercial-slide makers, but they, doubtless, would tell me "Collodion is cheaper."

I also employed Mr. Cassebaum's mixture of hydroquinone as a slide-intensifier.

STOCK SOLUTION.

Hydroquinone	60 grs.
Nitric acid.....	2 drops.
Water.....	6 oz.

One-half ounce of this stock solution to two ounces of water, and one drachm silver solution (forty grains to one ounce water).

The slide should be first bathed for a few minutes in acid and water (twenty grains citric acid to four ounces water).

The tones are a rich black and the high lights clear, but I prefer the tone of the gallo-silver.

Window transparencies made with it are particularly fine.

Perhaps this last method will recommend itself to beginners, as it does not require so much care as the former ; but this acknowledgment does not imply that you are not to exercise all due care and cleanliness. This reminds me to give a word or two of advice in the development of gelatine lantern slides before intensification.

Did you ever look at a Levy lantern slide and delight yourself with its beauty? There is albumen in the plate, and thanks to Mr. Carbutt for his excellent gelatine albumen slow plates—use them by all means—the Levy slide is made by the so-called Taupenot process, and the development is very slow with alkaline pyro,.

all details showing first, after an acid pyro developer is applied which builds up or intensifies the image somewhat like the gallo-silver intensifier. The grain in both is very fine. Use slow plates, give full time, and develop with solution much weaker than you would employ in negative development, and gradually build up with the gallo-silver intensifier.

On looking over a large collection of lantern slides, I became interested in examining their keeping qualities. A great many of the gelatine slides showed deterioration. Some had indeed fallen in the "sere and yellow leaf," due, no doubt, to defective fixing or insufficient washing, and might have happened to collodion slides if hypo were as hard to eliminate from it as from gelatine. Some, both gelatine and collodion, were jaundiced by mercury. I remember some of the collodion slides toned with mercury, which at the time of their genesis delighted me with the beauty of their tone. Now how abject, how fallen!

The collodion slides toned with bichloride of palladium were still brilliant. This is perhaps the most delightful toner of wet slides. If you use it, employ it in a very dilute solution and let the toning proceed very slowly.

Among the most durable were wet slides toned with a weak hot solution of sulphide of potassium. The tones are a bluish-black, too cold for most tastes, mine included.

The slides made according to the method here given, despite the predictions of practical photographers, showed not the slightest change; they are about eight years old. Strange to say, some experimental gelatine slides retained their pristine qualities although they had been toned with bichloride of mercury before fixing. I attribute this to the bath of chloride of ammonia to which they were subjected after the mercury and a good washing after fixing, the ammonium taking up from the film the unappropriated mercury. This might suggest the bathing in chloride of ammonium of mercury-intensified negative before fixing, if you must use mercury.

Slides in the collection, not toned at all, were amongst the most brilliant, perhaps on account of the greater thickness of the film. They were varnished; perhaps that contributed something to their permanency.

AN ENERGETIC DEVELOPER.

L. Mach, who assisted E. Mach in photographing projectiles, sound waves, etc., gives the following method of developing very much unexposed plates by which good negatives with intense black and clear shadows may be obtained. During development the plate should be protected absolutely from any light, and should be examined quickly by means of a dark-red light.

SOLUTION A.

Water	200 parts.
Sulphite soda crystals.	40 "
Pyro	4 "

SOLUTION B.

Water	25 parts.
Carbonate soda crystals	25 "

Hot water is evidently meant, as the carbonate would not be so soluble in so small a quantity of cold water.

Mix 20 parts of A with 20 parts B, with 150 parts of water, with 15 to 20 drops bromide of potassium solution 1 : 10. The temperature of the developer should be about 55° Fahr.; after ten minutes examine the plate. If it shows traces of an image, replace the developer with another containing less bromide, and 1½° to 3° higher in temperature, continue this treatment for 1½ to 3 hours, until the image shows from the back of the plate, raise the temperature of the developer until at the end of an hour it is 65° Fahr., and diminish the bromide until it is not more than seven drops to

200 c.c. of developer. If the image is quite strong enough at the end of ten minutes, renew the developer about every five minutes. After fixing in the acid bath, the plates were washed for thirty-six hours. It is said that the exposure in some cases did not exceed $\frac{1}{500000}$ second.

BLUE TINT FOR TRANSPARENCIES.

M. Suter, of Basle, Switzerland, showed before the Society Francaise de Photographie transparencies which surpass all others in their blue color, and which are obtained in the following manner.

The plate, developed in the ordinary way, is well washed, and immersed in the following solution:

I.

Solution of nitrate of uranium, 10 to 100 = 10 c.cm.; distilled water, 100 c.cm.

II.

Solution of ferricyanide of potash, 10 to 100 = 10 c.cm.; distilled water, 100 c.cm.; glacial acetic acid, 10 drops.

(These are prepared separately, and then mixed.) In this toning bath the transparencies obtained a brown, sepia, and, finally, red color. After taking the plate from this bath and washing it for two or three minutes, it is put into a solution of sulphate of iron, 25 to 100, in which it obtains a blue or green tint. The color depends on the degree of toning; the redder the transparency the bluer will be the image.

CARBON PRINTING.

By "Rae."

The above process, besides being one of the most permanent, has the advantage of being able to adapt itself to the subject by using the most suitable color, the tissue being made in a variety of colors, such as sepia, red chalk, brown, black, blue, etc., and is supplied in packets, sensitized or not. The negative most suited is one of medium density without great contrasts. If it is important to preserve the natural position, the negative must be reversed, or the print made by "double transfer," which will be explained later. The negative requires to have a "safe edge," by running a strip of lantern-slide binding, about ¼ inch wide, around the outer edge on glass side, or Bates' black varnish may be used. Single transfer is the most simple, and can be used for lantern slides, window transparencies, and for prints which do not suffer by being reversed. The tissue can be bought ready sensitized, or the unsensitized tissue can be sensitized in a bath of

Potassium bichromate. 1 ounce.
Ammonia .880..... 5 minims.
Water .....20 ounces.

Immerse for three minutes, drain and lay face downwards upon a sheet of glass, and squeegee lightly with a soft rubber squeegee all the superfluous solution; it is then allowed to dry in a cool room, face uppermost, upon a sheet of blotting-paper, being carefully protected from light. The tissue is exposed under a negative in the ordinary way, but as no image can be seen, except, perhaps, in the lighter pigments, an actinometer must be used, or, what is simpler, another negative of about the same density, having under it a piece of silver paper, and is exposed simultaneously. When the silver print is fully printed the carbon print will be ready for development. The tissue is immersed in water at 60° F. until it uncurls, immersing at the same time a slightly larger piece of "final support," supplied by the makers, the gelatine side of which is brought in contact with the gelatine surface of the carbon tissue; the two are carefully squeegeed

together, taking care no air bubbles are between; they are then placed between blotting paper under pressure for ten to twenty minutes. The actual development is conducted by means of water at 90° to 120° F. The final support carrying the exposed tissue is immersed until the pigment begins to ooze from the edges; the paper of the tissue is then carefully stripped off, leaving the gelatine and pigment on the final support. Water is carefully dashed over this, and the picture will emerge from the mass of gelatine and pigment. Should the print be over-exposed, the temperature of the water should be increased, and vice versa if under-exposed. If very over-exposed the print may be saved by adding ammonia to the developing water. When fully developed—viz., until no more pigment can be washed off—the print is placed in

Common alum..... 1 ounce
Water.....30 ounces

and left for about ten minutes, or until all the yellow stain of bichromate has disappeared; it can then be dried and mounted in the usual way.

In double transfer the tissue is first developed on "flexible support" obtainable from the same place. This support is of insoluble gelatine, it is only temporary and can be used again and again. It is first waxed by rubbing over with a flannel rag—

Yellow resin..... 6 drachms
Bees' wax..... 2 "
Turpentine .....20 ounces

and polishing off with another rag. This is immersed and squeegeed as with the single transfer, the development being the same. When dry, the support is soaked in water together with a slightly larger portion of "double transfer" paper, and when both are limp are placed face to face and well squeegeed. The two are then allowed to dry spontaneously, when the transfer paper will split off, carrying the picture. Care should be taken not to force the process. The picture can be transferred to opal by either process; if rough, squeegeeing on and allowing to remain under pressure and then developing as with the paper, by double transfer. The opal should be coated with a solution of Nelson's gelatine made sherry-colored with 10 per cent. solution of potassium bichromate and exposed to light, the "temporary support" is squeegeed on to this and allowed to dry as with the "double transfer" paper; it should be soaked in alum to remove the bichromate. Lantern slides can be made by developing upon the glass direct, as reversal makes no difference; also window transparencies by the same process; being backed up with ground glass and bound with lantern-slide binding. To save a small amount of time, the carbon tissue can be printed to about one-third the proper depth and then allowed to stay in a damp, dark place for some hours, when the action will have continued to about the proper depth; this shows that development should take place soon after exposure is completed. Prints for transparencies should be taken double as far as for ordinary prints or special "transparency tissue" should be used.—The Photographic News.

BY-PATHS OF EXPERIMENTAL PHOTOGRAPHY.*

It has seemed to me that the circumstances and the occasion of this address warrant its being cast in a comprehensive, rather than in a particularized, form. My predecessor, Mr. E. J. Wall, supplies me with a precedent for this course; for, if I remember aright, he devoted his inaugural address to an examination of the advantages of specialistic

* President Thomas Bedding's address to the Hackney Photographic Society.

A POSE BY PLACE & COOVER, CHICAGO.

photography, enumerating the various branches of work that may be taken up, and recommending the individual photographer to select one of those branches and acquire a mastery of it, in preference to dabbling in several. Society activity is about to recommence, and indoor work will again receive more attention than it has received during the past three or four months, so that the opportunity is, possibly, a favorable one for an address of this nature, which, if it possesses, in some persons' estimation, the disadvantage of being technical and not artistic, may, I hope, balance that defect by the quality of being intelligible.

The Encouragement of Photographic Research.

In a paper that was recently read before one of the societies, it was sought to ascertain in what manner, and by what means, photographic societies could benefit photographic art. Opinion has also been expressed that photographers in conclave do not give much attention to art subjects; and some photographic extremists even appear to think that discussions on technical matters are entirely superfluous. I can well sympathize with the section of photographers that laments the neglect to which art is subjected by photographic societies; for, paradoxical as it may sound, I entertain the converse feeling that photographic societies do not by any means attempt or achieve enough for technical photography. It is quite true that facilities for the reading of papers, and the holding of discussions thereon, are abundant; but the ultimate benefit to photographic progress would probably be greater were original experimental work and research singled out for encouragement by the hundreds of photographic societies in the United Kingdom.

That the need for some such extraneous encouragement has been observed and felt is evident from the action of the Photographic Convention of the United Kingdom, which has set aside a portion of its capital and income for the institution of a fund to be applied in aid of research. It is permissible to hope that occasion may shortly arise for the expenditure of some of this money. In the meanwhile, it is of interest to note that independent photographic investigation reposes in the hands of but very few men. To mention Dr. Hurter and Mr. Driffield, Captain Abney, Mr. Bothamley, Mr. Haddon and Mr. F. B. Grundy, is to name probably all those who have recently undertaken independent and original experimental work of the first-class. The number appears extremely small, but it must be remembered that such investigations as these men take in hand demand an amount of time and an extent of knowledge and application such as few persons possess, or, if they possessed it, would care to expend gratuitously. It is no secret that Messrs. Hurter & Driffield's work in the determination of the speed of plates extended over a period of several years; that Mr. Bothamley has been following up the action of color-correct sensitizers for a very long period; and that the beautiful experiments in ascertaining the extent to which silver prints really need be washed after fixation, which look so simple on paper, cost Mr. Haddon months of time and work.

Wanted—A Substitute for Hypo.

With the suggestion that photographic societies might well co-operate in a concerted effort to provide the means for the greater encouragement of photographic research, I may next be allowed to point out that there still remains a wide field open for investigation work of a minor nature, which either individual photographers or societies might undertake at comparatively little cost of time or money. Take, for example, the question that has from time to time cropped up as

to the replacement of hyposulphite of soda by a less troublesome but equally efficient fixative for negatives and prints. You are, doubtless, aware that the silver salts are more or less soluble in the alkaline chlorides and bromides, in the sulphocyanides, in sodium sulphite, and in ammonia. In the very early days the first-named were used for prints, but did not answer satisfactorily, as they were said to be not perfect solvents. Potassium bromide was used with more success, although its action was slow, and the addition of strong ammonia to the hypo bath has been, and is, occasionally recommended to facilitate fixation. Sodium sulphite has been found to be a too weak solvent. The drawback to the employment of potassium cyanide for negatives and prints is that, being a fairly powerful solvent of metallic silver, it must be used weak and carefully, otherwise your half-tones are likely to suffer; but the sulpho-cyanides have been used as fixing agents, though they are somewhat inferior in power to hypo for the purpose. The greater solubility of silver chloride in these and other reagents suggests that, for paper prints, it might be possible more readily to displace hypo for fixing prints than for negatives. Probably the sulphocyanides, according to the stated solubility of the silver haloids in them, give most hope of success for the double purpose; but the entire subject is one that awaits exhaustive experiments, and is well worth taking up when we consider that, notwithstanding its excellence as a solvent, hypo has many well-known drawbacks, of which few of us are without experience. I suggest the subject as being well within the reach of individual experiment, as the work required is obviously not of a very complex character.

Orthochromatics.

The very interesting subject of orthochromatic photography demands in its higher branches—such as the effect and action of various dyes on gelatino-bromide of silver, and the determination of the spectrum sensitiveness of the preparation — an amount of care and close attention that the ordinary member of a photographic society is, as a rule, unable to bestow upon it; but there is one division of the matter that has recently come into prominence in which many are well qualified by time and endowment to take part. I allude to the alleged orthochromatic properties of sensitive plates not specially corrected for color. You are aware that it is held by many that by the use of suitably selected colored screens an ordinary plate may be made to yield an orthochromatic effect, but that the practicability of such a result is denied by others. Such a point as this—which appears to conflict with the theory generally held with regard to orthochromatic photography, viz., that the use of a colored screen on a non-color corrected plate merely increases the exposure without imparting to the plate sensitiveness to the less refrangible spectrum rays, is one well within the power of a fairly skilled worker to refute or confirm. On the other hand, the theory I have referred to frequently receives, in the experience of all of us, a very rude shock, for, no matter what color of glass or fabric we use in our dark-room lamps, are we not always careful to keep the light as much as possible from our plates, and do we not often find that some amount of exposure to that light produces fog? I myself have found this to be the case even with glass that has been guaranteed to cut out the actinic rays, and the experience is one that seems to contradict the theory of the non-sensitiveness of ordinary plates to yellow and red. But the conditions governing the reproduction of objects in color-correct values not only deserve more study than they receive, but it

is quite certain that color-sensitive plates are not used so much as they ought to be. This is more especially apparent with the growth in use of half-tone blocks. These always strike me as having a tendency to degrade the color values of the originals, which might frequently be obviated by the employment of color-sensitive plates in the taking of the negatives.

Developers, etc.

There is, again, the apparently simple but really complex question of development. This, it is true, receives a vast deal of attention at photographic society meetings, which, however, is seldom of a nature to make any reliable addition to our knowledge. For what are known as the newer developing agents, all sorts of advantages and properties have been claimed that have been admitted by some, and denied by others, on far from complete evidence. It is really a difficult matter to convince most old workers that for negative work pyro ammonia and pyro soda, and for bromide paper ferrous oxalate, are excelled by more modern compounds, and that this is not surprising when we consider that no attempt has been made to demonstrate by scientific means wherein the practical advantages of the newer reagents are supposed to lie. This is a branch of investigation eminently adapted to be taken in hand by photographic societies, for it would be a simple matter to lay down uniform conditions of working, within the limits of which any photographer of ordinary intelligence could keep himself. It is questionable, however, whether the matter is now really worth taking up until a problem of much greater importance has been solved. I allude to the nature and constitution of the latent or undeveloped image, a subject that appears to have been lost sight of during recent years. It may be fairly conjectured that, when this fascinating but elusive secret of science has been unlocked, development will enter upon a new phase, and that therefore we are at present dealing with an unknown product, which leaves us very much in the dark as to what development really is—I mean, of course, the precise action that takes place in the reduction of the exposed surface.

In determining the merits and properties of a given printing process, or for making comparisons between various papers, so far as their power of rendering the scale of gradation contained in our negatives is involved, or, indeed, for arriving at the actual scale the paper is capable of depicting, the members of a society, all working under determined equalized conditions, might accomplish some really valuable work. It is matter for surprise that comparative experiments of this kind should be virtually neglected, and mere individual expressions of opinion or solitary experiences relied upon in preference. This suggestion is obviously typical of others in which advantage might be taken of the circumstance that a number of workers, as represented by a photographic society, could avail themselves of the opportunity of studying a subject concurrently, and of subsequently comparing results.

Societies as Agencies for Research.

These illustrations, indicative of the existence of easily traversed by-paths in experimental photography, are merely typical, and might be almost indefinitely increased; but those I have chosen serve, I hope, to prove my point: that there is a wide field open for research work of a minor kind. Nevertheless, I am appealing less to individual photographers than to members of societies collectively to divert a portion of their efforts in this direction. The difficulty of filling a season's programme is one experienced and complained of by nearly all honorary secretaries; but that difficulty, I venture to suggest, arises from the habit they have of too often

looking away from home for men and material. Most societies nowadays include within their membership one or two men of more or less chemical and physical knowledge, and few are without several of proved photographic ability. Would it not be possible, then, for these societies, utilizing the knowledge possessed by such members, occasionally to depart from the beaten track of set demonstrations, papers, discussions, or lantern evenings, and systematically to undertake and report on the investigation of some of the innumerable little chemical and other problems which modern photography still offers for solution? A great deal of useful knowledge, even of a negative character, might be gained in this way. In their collective capacities, societies hold exhibitions and excursions, and they undertake surveys, the publication of journals, and so forth; so why not a little serious work in the shape of research? Of course, one always thinks the most of one's own ideas, and I fancy I discern in the one I am tendering you the germ of what possibly might prove to be a valuable movement; for assuredly a combination of some three hundred societies, all willing to aid in research work, could be made a powerful factor in photographic progress.

It is, perhaps, of use to remark that one of the drawbacks to individual experiment of research is to be found in the circumstance that confirmation or verification of one's results is not always to be had. This difficulty is one that vanishes in the case of a society possessing several members competent to undertake such work, and is another argument in favor of my suggestion.

Suggested Exhibition of Pure Photography.

All that I have hitherto said is a plea on behalf of constituting photography a craft or science of precision. Photography, as an "art," is already well looked after. We have it on unimpeachable authority that it demands little or no photographic knowledge, and therefore it does not exact precision of aim or application. It demands imagination, and in recent years, at any rate, it has had it to such an extent that humble mortals like myself have occasionally been driven to conclude that the authors of many so-called art photographs have relied too much upon their imaginations, or have exercised them when they are in a condition of disease or decay. It is time, I venture to submit, that the technical photograph had its share of popular attention and applause. We have exhibitions, occasionally of a peripatetic character, devoted to pictorial photography, in which photography, "qua" photography, plays a part of relatively small importance; do you not think, therefore, that an exhibition exclusively devoted to technical photographs would come as a welcome change? The Royal Photographic Society might consider the idea; for it is said that during the last four years its annual exhibitions have been so excessively well patronized by "pictorial" photographers—the competition to be hung in Pall Mall has, in fact, been so keen—that for lack of accommodation a number of disappointed would-be exhibitors have been compelled to take refuge elsewhere, and in neither place has pure or technical photography received that share of attention which is clearly its due.

COMMENDABLE DODGES.

By W. S. REVNAD.

In these days, when nearly every camerist of note has painstakingly written on pictorial photography, it would seem superfluous to add anything on this important subject in the way of elucidation. There are many little dodges or tricks practised, however, which are, perhaps, purposely

held back, or, to be charitable, omitted. Few of our front rank people tell how they achieve results that really make the pictures which cause so much admiration. Many of these clever effects in views are not the result of spontaneous thought, but rather of deliberate study and well-planned effort, even though the ensemble appears accidental. A view man, not long ago, told the writer that it took two of them three hours to push a boulder into position so as to enhance the foreground effect in a waterscape, and it certainly repaid the laborers; though I doubt if there are many others, even if enthusiasts, who would go to this trouble to obtain a good foreground for any picture. Another worker in the genre class, it is related, walked an old colored man at a brisk pace for thirty minutes in order to obtain a "perspiration" effect. Other funny stories are told of the composition of photographs that have become famous. These are dodges; artifice, if you choose to call it so. One of the best studies the viewest has to master is where to place the animate among the inanimate, whether it be biped or quadruped; and no labor should be considered too arduous to the realization of something beyond the ordinary in pictorial effect. A picturesque brook, or pool, with shade trees, having cows or horses grouped in the water cooling themselves in the hottest part of the day, certainly gives a motive to what, without them, would otherwise be a meaningless view. Cattle are refractory, and ignore head rests; thus entailing not only patience but ingenuity on the part of the camerist. When all is ready a lusty voice or a shrill sound will call their attention your way, and often gives you your opportunity, as far as cows are concerned, while horses respond readily to the crack of the whip. Sheep are a shifting lot to deal with, and likely to tire your patience and try your pedestrian qualities, even though you have the best hand-camera in the market. If you are ever caught in the dilemma of grouping sheep for pictorial effect, try scattering a few ears of corn on the ground and driving them up to it—you will then get all the exposures you desire unless you are inordinately clumsy. The writer struggled into the hours one summer day at a country cross-road to obtain a picture of horses and colts, but without effect; a countryman divined the situation and, after having his palm greased with a quarter of a dollar, he sought the nearest farm house, and came back with a smile of superior knowledge upon his face. Calling the horses up to the corner of the fence he rubbed some salt upon the rails; this seemed to tickle the palates of the coterie, and I was enabled to get a fairly good picture. The salt did it. Cows are best taken in the evening, horses in the early morning, and sheep at midday.

I quite agree with Robinson as to the figure in landscape. If it is there to give life and spirit to the scene, it is good; if not, then 'twere better out of it. The amateur has much the better of it when it comes to viewing. He has no gallery to close up, or leave to the other hands, consequently he can spare time for artistic effect. Comparatively few photographers, studio men, make good views; and fewer yet make good pictures of interiors. It requires as much skill to photograph views as to photograph children, and a good view is always a pleasure to the taker. Apart from the pleasures attending viewing are the strongly unsurmountable difficulties to be overcome, and which afford untold delight when the aim sought for is achieved. Reason should have full sway; the best camera and lens ever made cannot, of itself, enter into the composition of a picture; the

trained eye, the educated brain, produces the natural results. Vision requires cultivation. "We must see clearly and perceive truly to depict forcibly and justly," aye, and act quickly. The landscapist has no time for dreaming when he is on the scene—he must act as quickly as comes thought, if he would avoid mechanical productions. Not many would carry a plank for two miles to build up a foreground for a water piece that looked flat without some such obstacle being placed, yet I know of an enthusiast who did it, and the result amply repaid the trouble. And why not resort to such little trickery? True nature rarely needs a setting, no matter how simple; yet there are times when a rock, boulder, plank, weed, tree limb, considerably enhance the effect and heighten the beauty of many a pretty spot. Think, think, when you are taking views and you will produce less uninspiring, uninteresting pictures. If you seek running streams, take enough string along to anchor a branch or pile of brush, just where the water space is monotonous. If you want cattle, sheep, horses, or fowl, take something that will attract them to you. You may not need these "dodges," but should the opportunity occur they will be at hand and your profanity spared.

I have studiously avoided advertising any special lens, shutter or camera, for I believe that any good lens will accomplish creditable work in good hands. Cameras are much of a muchness; lightness and light tightness are chiefly desirable. Any shutter at not less than one-hundredth of a second will be found fast enough, except for very rapidly moving objects. Shade for the lens is most desirable for viewing, and I am surprised that so few people use them; especially when a good, serviceable cone to shield the lens from strong light can be made out of an old cardboard boxlid.—St. Louis and Canadian Photographer.

EFFECTS OF BICHROMATES ON THE SKIN.

Questions are frequently asked at demonstrations of the carbon process, and in the photographic press, as to the ill effects the bichromate salt is likely to have on its users. As carbon printing is rapidly extending amongst amateurs, as well as professionals, this seems a proper subject to be dealt with in Autotype Notes. I am one who has suffered somewhat severely from the bichromate, as well as seen its effects, and non-effects, on others. It may here be mentioned that its injurious effects are comparatively rare, for I have many friends who have worked the carbon process for many hours daily for twenty years and more, and have experienced no inconvenience whatever, while others, after a few months, have suffered severely. In no instance, however, have I known any trouble to arise where the process is worked only on an amateur scale.

The pernicious effects of the bichromate may be experienced in two ways, each distinct from the other; that is the opinion of Dr. W. B. Richardson, who has gone somewhat deeply into the matter, and my unpleasant experience quite confirms it, The first form is from the use of cold. strong solutions, such as those used for sensitizing carbon tissue paper for photo-lithography, etc., the other from warm, dilute solutions, such as result from the continuous development of carbon prints in the same water. The former is only likely to cause trouble when there is an abrasion of the skin. The the salt causes a smarting, may set up inflammation, cause festering, and ultimately, perhaps, ulceration. This latter often results in a deep and painful wound, exceedingly diffi-

cult to heal. The second trouble takes the form of a skin disease, and has been termed the "bichromate disease."

The first symptom of that is an irritation of the skin at the back of, and between, the fingers, slight at first, but, if neglected, increasing later with the appearance of minute watery pustules. The skin then becomes dry, and afterwards exfoliates in bran-like scales. In the more acute stages of the disease mattery pustules form, the skin dries up like hard leather, and cracks into painful sores, particularly on the joints when bent. The skin then peels off in thick scales not unlike the shell of a shrimp. At this stage the itching is almost unbearable. It is, however, consoling that the bichromate disease is quite a local one, as it does not extend beyond those parts that come into direct contact with the solutions—the hands, wrists, and forearms, and there only where the skin is thinnest. I have never known the palms of the hands to be affected. In some phases of the disease it closely resembles a form of psoriasis, and has, before now, been mistaken for it.

REMEDIAL MEASURES.—In the first form of trouble, bathing the part in warm water, to which is added a little ammonia, followed by bread and water poultices; if taken in time, this treatment will usually effect a cure. If, however, it does not, and there is an appearance of ulceration, a doctor should be consulted without delay. With regard to the cure of the cutaneous disease none is known to the medical profession. There is, however, a simple and efficacious one, namely, to avoid further contact with the bichromate, and nature herself will quickly work a cure. This may be done by working, in future, in india-rubber gloves.

PALLIATIVES.—If, at the first stage of the disease, the affected parts have a little of the strong nitrate of mercury thinly applied, though well rubbed into the skin, and future contact with the bichromate be avoided, us rule, no further inconvenience will be experienced. In the more advanced stages of the disease the following lotion will be found to greatly allay irritation:—Alcohol, five ounces; carbolic acid (crystallized), 40 grains; glycerine, half ounce. If the skin is much cracked, this lotion may cause considerable smarting, in which case it may be diluted with water, or a dilute solution of subacetate of lead may be used instead. When the hands are washed, a carbolic oil soap is preferable to all others, as it allays the irritation, and at the same time softens the hard skin.

PRECAUTIONARY MEASURES.—After sensitizing tissue, always wash the hands, before exposing them to a strong light, in water to which a little liquor ammonia has been added, and afterwards in warm water. The ammonia will take the stain out of the skin and nails. If there happens to be an abrasion of the skin, a smarting will be felt; then, after the washing, the place should be well sucked for a few minutes, and, if further pain is felt, the part must be poulticed at bedtime. After finishing development wash the hands and arms if they have been in contact with the developing water, in warm water, using a carbolic oil soap and a hard nail brush.

When these simple precautions are taken, and the old proverb, "Prevention is better than cure," is kept in mind, there is little, if any, fear of ill effects from carbon printing even when it is practised continuously and on a large scale. I speak feelingly on this point, as the total neglect of them for a long period entailed very serious inconveniences on myself.—E. W. Foxlee, in Autotype Notes.

TO SAVE AN OVER-EXPOSED NEGATIVE.

At this season of the year we can well imagine this or that one returning from a sojourn by the sea or out in the bright open country with treasured exposures to develop, finding many of them hopelessly, as he supposes, over-exposed, and the scenes of which a photograph is so desired now too far away for the exposure to be repeated. In a communication made by Herr H. Schmidt, of Berlin, and which is reprinted in the American Journal of Photography, a method by which such plates may be saved and converted into negatives of proper printing density is given, which will be welcomed by many.

The rescue of the over-exposed plate; and its restoration to a healthy and vigorous condition, is to take place during development and before fixing; hence we recommend that this column be cut out, pasted on a piece of cardboard, and hung up in a dark-room ready to be referred to in the hour of need.

All are probably familiar with the performance of the greatly over-exposed plate in the developer—the image flashes up quickly, is flat and devoid of contrast, and then gradually or rapidly disappears in a grey fog; and it is at this point that Herr Schmidt's method comes in.

The plate is to be taken immediately from the developer and well washed, and is then placed in a bath consisting of nitrate of silver 5 grs., distilled water 100 c.cm., where it is allowed to remain for several minutes.

The purpose of this is, that the gelatine film shall absorb a certain amount of the silver nitrate.

The plate is now lifted and held in a horizontal position, and in that position redeveloped by pouring the developer on a corner of the plate and allowing it to spread evenly over the rest of the plate in precisely the way as adopted for coating a wet plate, this method being adopted in order to prevent the film from parting with any of the silver nitrate recently absorbed; hence only sufficient developer should be poured on to spread and cover the surface, but not to flow over the sides.

The image will now be seen to gradually gain strength, and as soon as sufficient vigor is deemed to be secured, action is stopped by washing the plate and fixing as usual.

Herr Schmidt explains the condition of the plate, and the physical and chemical changes which have taken place, as follows: During exposure and subsequent development the sensitive film has undergone, first, a change consisting of a chemical dispersion, and, secondly, has also developed the peculiar property of a physical development, in so far that the exposed parts show an affinity for the metallic silver in a reducing solution of argentic nitrate, whereby the film darkens in proportion to the relative action of the light, or in other words, the high lights are strengthened while the shadows are not affected.

The chemical changes of the haloid salts bear no relation to the physical ones. Thus it appears that of argentic chloride, bromide, and iodide, the former surpasses all the others.

In other words, the greatest changes of argentic chloride have not been reached when the chemical reduction is complete. Consequently when the chemical development has resulted in a flat negative and is then subjected to a proper physical development, we obtain a secondary image showing all the characteristics of an under exposure.

Both these images being now upon the same plate, one upon the other in exact register, we produce a combination which gives a normal positive print.

Such is the system of "physical development" which Herr Schmidt

recommends, but as the alternative to it we are inclined to advise what may be a less scientific but more familiar method of saving our over-exposed negatives.

Probably the mistake which most make is to stop development as soon as the plate is quite suffused with grey and rapidly blackening fog; the image comes up quickly, pale and contrastless, and then, often quite suddenly, a darkening over the whole image takes place, and every trace of image is submerged, and at this point, fearful of going further, the plate is too often hurriedly taken from the developer, washed, and transferred to the fixing bath with feelings of disappointment, and as much philosophical self-consolation as we can summon up.

If, however, instead of transferring the plate to the hyposulphite fixing we lay it aside in a clean dish whilst we mix up a fresh developing solution containing a great excess of pyro (or other reagent), or an abnormally large proportion of restrainer (bromide of potassium), and a very little of the alkaline ingredient, and put the plate in that, covering the dish over, and letting it remain with an occasional rocking whilst we proceed with the development of the next plate, that over-exposed negative may yet give us satisfaction and a good print.

Let this highly restrained and slow development proceed until the plate is perfectly black, all but a solid black, when viewed by the dark-room lamp, and then wash and fix as usual.

If such an opaque condition is not easily arrived at, a few more drops of alkali may require to be added, and after fixing we shall find we have a negative which would probably take a week to print.

The plate must now be submitted to the usual reducing solution of hyposulphite of soda and ferricyanide of potassium, the action of which, as may be imagined, is to reduce and remove most of the "fog" and some of the density of image of which we have plenty to spare.

The ferricyanide reducer suggested by Mr. Howard Farmer consists of a few drops of the ten per cent. solution of ferricyanide of potassium added to the ordinary hyposulphite of soda solution as used for fixing.

When used in this proportion the action is slow and gradual, and the gradations and half-tones are not destroyed by increasing the proportion of ferricyanide. However, the action is not only more rapid, but the shadows appear to lose density more rapidly in proportion to their depth, and greater contrasts are secured. This is a point to be borne in mind in negatives such as we are describing, in which lack of contrast, owing to over-exposure, is the chief evil.

All the foregoing advice, however, will come too late for those finished negatives which we have by us already too weak for printing. Having tried them with gelatino-chloride papers, or better still, the new "Rembrandt" paper and still failing to get satisfactory prints, we must proceed to first reduce with the normal reducer of Mr. Howard Farmer just given, so as to remove the "fog" as far as possible, and then repair any undesirable loss in the image itself by intensification.

For this purpose the ordinary mercury formula will serve:

Perchloride of mercury,	2 parts
Hydrochloric acid....	1 part
Water	100 parts

followed, after thorough washing, with an immersion in an ordinary hydroquinone developer, or in liq. ammonia, one part to water ten parts.

Perhaps a cleaner and in some respects a safer method of intensification is one given by Herr Schmidt in the same article as we first quoted from.

His instructions are as follows: The carefully-washed plate is flowed

with a sufficient quantity of the following solution:

1.–Pyrogallol	10 gr.
Alcohol, 96 per cent.	100 c.cm.
2.–Argentic nitrate ...	4 gr.
Citric acid	6 "
Distilled water	200 c.cm.

For use, take of No. 1 4 c.cm. and distilled water 100 c.cm., and immediately before use add an equal volume of No. 2. The diluted solution will not keep. When the intensification is seen to have progressed sufficiently far, the plate is to be fixed in the usual manner and well washed.—Amateur Photography.

BOOK REVIEWS.

Conscious of the value of the exceptionally rich and important contents of the October number of the Art Amateur, the publisher makes the generous offer of sending to any of our readers who quote this notice, a specimen copy of the magazine, together with a copy of a valuable little manual, entitled "Practical Hints for Beginners in Painting," post free, on receipt of 25 cents, the usual price of the magazine being 35 cents a number, or $4.00 a year. Such a chance should be seized upon at once, for we certainly do not remember to have seen a number of the Art Amateur packed so full of papers of practical value to the artist, art student, and industrial art worker, as is the October issue. A series of papers on Flower Analysis, by J. Marion Shull, begins a capital course of object lessons, and Mr. Knaufft's article on Measurements of the Human Figure is clear and instructive; his series of Suggestions for Teachers of Drawing is carried a stage farther. Articles on Painting Flowers and Still Life and Landscape Painting are full of invaluable working suggestions, giving color schemes, palettes, etc. Practical hints for beginners, hints to young illustrators, and another instalment of Miss Hallowell's excellent talks on Elementary Drawing, together with the usual clear and workable treatments of the color and other supplements, represent the more strictly educational section of this issue. Under the heading of "The Art Schools" will be found some piquant notes about the Art Student's League—and there is an interesting contrast of the methods of teaching of Messrs. Blum and Chase. The China Painting department is unusually rich in illustration and suggestion for China and Glass Decorators, while Needlework, Embroidery and Woodcarving have ample space allotted to them. The department devoted to the House is rich in suggestion for the treatment of nooks and corners, descriptive of new upholsteries, and of the uses of leather (Cuir Bouilli) for interior decoration. The Note Book —that unique feature of the magazine in which the editor gives from month to month treasures from his inexhaustible storehouse of art and picture lore—is more than usually varied and attractive. The Color Supplements given free are a charming sea piece by C. H. Bogert, entitled "Waiting for the Tide," and a Dutch scene by Charles Volkmar. There is also a full-page Charcoal Study by George H. Boughton. 35 cents a number, or $4.00 a year. (Montague Marks, 23 Union Square, New York.)

NOTICE BOARD.

Watson, of St. Thomas, is again cutting prices. See his advertisement.

Messrs. Percy Lund & Co., Ltd., publishers of The Practical Photographer, Process Work and The Printer, The Junior Photographer, will in future be known as **Percy Lund, Humphries & Co., Ltd.** The constitution of the company remains exactly as before.

A GOOD BUSINESS DODGE.

Rumor says that a certain chemist, who deals in lantern and photographic goods, lately hit upon a novel dodge for increasing his business. A well-known lady in the village was about to be married, so he circularized the place to the effect that he would give three guineas to the person who would take the best photograph of the bride as she was leaving the church door. Also that he was prepared to hire out hand cameras ready charged for use, and would at a moderate figure develop the films or plates and make lantern slides from the same. Needless to say he did a roaring trade. In a few days he announced that these slides would be projected by the lantern at the —— Hall, admission 1s., at which the public should decide which picture was worthy of the prize. The net profits, after giving the prize, amounted to £83 5s. 4d.—Optical Magic Lantern Journal.

Talk about Yankee tricks.—St. Louis and Canadian Photographer.

Test for Hypo (Walpole).

One of the simplest tests for the presence of hyposulphite of sodium is the permanganate one. In a pint of distilled water one grain of permanganate of potash and ten grains of potassium carbonate are dissolved. This will give a pink solution. A little of the water in which the prints have been last soaking is poured into a clean white glass bottle, and to it is added four or five drops of the permanganate solution. If the slightest trace of hypo be present the solution will assume a light green tint; otherwise it will be of a faint pinkish tinge. The bottle should be shaken and allowed to stand ten minutes or so before examination.