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Canadian Photographic Standard

Vol. III. July, 1895. No. 7

THE first half of eighteen hundred and ninety five is gone, and I think on the whole photographers can congratulate themselves that business has been fairly good, every one seems to have held their own which is counted good these times and as there has been during the past few weeks a more hopeful feeling in all branches of business. I think we can with confidence look forward to a gradual improvement from this time on, the crops promise well in nearly every section of the country, prices are higher than they have been for a long time. So, that there must be more money floating around this fall than for many years past, all that it requires is to have cheerful faces, and the long depression is bound to clear away.

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STANLEY DRY PLATES.

A writer in a recent article in the BRITISH JOURNAL OF PHOTOGRAPHY, wisely says. "The process of manufacture of both plates and paper has been brought to such a degree of perfection, both chemically and mechanically, at the present day, that it is almost impossible to charge any glaring defects to the producers of either kind of film. That accidental faults may crop up at more or less rare intervals is only to be expected, but that serious defects should prevail any individual manufacture for a sufficient period to cause general complaint is ALMOST BEYOND THE BOUNDS OF MODERN POSSIBILITY."

These remarks are just as applicable to Stanley Plates as any other, and why a few still hold on using imported plates for a mere whim, when they can get just as good plates, home made, at a much lower price, Solomon would have said " Vanity of Vanities."

ILO.

There is no Ilo selling, perhaps not, just ask your neighbors all around you, and you will find how generally it is being used, also give it a careful trial and you will readily understand why they are using it, and after all that is being said its three prominent features cannot be refuted. Easiest to manipulate: Gives finest results. Prints positively permanent.

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The output of the Rochester Optical Company, whether in View or

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It is difficult to discriminate where all is excellent, but we rather lean toward their folding Premos as the very acme of photographic genius and skill. Don't fail to look at the Premo.

PHOTOGRAPHY AS AN AID TO EDUCATION.

BY ELLERSLIE WALLACE, M. D

ANY attempt to definetely settle what is necessary and what is not, in general schemes of education for the ordinary man of the world, is of course impossible. But, nevertheless, it frequently happens that things very useful to know are learned during the pursuit of objects irrevelant to one's chief calling in life ; or even in some cases the secondary employment will become the educator in chief, while the principal matter falls off owing to bad instruction, unfavourable environment, and many other causes.

I am well satisfied that, among the great armies of amateur photographers now actively pursuing the art, there are many who find themselves constantly learning new, useful, and curious things. I also know well the lessons, and hard ones too, that the plodding professional man has to learn and lay to heart. " In the sweat of thy fade shalt thou eat bread " is at least as applicable to the active pursuit of photography as to any other calling, I care not what it may be.

Among my own experiences in the art, which date back to early collodion days, I have found that I have unconsciously formed habits of order and method in any kind of manual labour in which I may be engaged—not only when working with the camera—but the habit of photographic neatness is carried over, so to speak, into other things. If I am to work at all, I *must* have my implements in good order, and kept about me in an orderly manner. Dark-room cleanliness sticks to me in spite of everything ; nothing is so disagreeable to me as the sight of dirty glass or china ware. In fact, if I were asked what means to adopt with a child who had difficulty in forming orderly habits, I should recommend his or her being made to do some photography just for the sake of teaching how much depends upon order and neatness as opposed to slatternly carelessness. Order is " heaven's first law," as we have before heard.

It almost goes without saying that such habits go hand in hand with *patience*, which is another most valuable trait of character. If we pause long enough to consider the literal meaning of the word patience (suffering or enduring), we learn another lesson from photographic manipulations, which certainly require this quality of mind or disposition in a high degree. I have had almost every variety of failure known to the photographic workman—at least those traceable to my own shortcomings. But I never have gone so far as to journey to Alaska or all around the world on a photographic trip, and bring back several thousand exposures, from which not so much as a presentable picture resulted. But I have stood by the operator in the dark-room who was developing nothing but failures caused by a leaky camera or defective films which had been transported by some wealthy and untrained amateur on long trips, such as I mention. I am glad that I was not present when the piles of spoiled tissue were presented to the amateur traveller as the result of his photographic labours when far from home. The *verbum sapienti* here is to see to the cameras and holders before starting, and be also sure of the films and of the exposures required.

For those numerous classes of persons who have a fondness for mechanical pursuits, I can think of nothing more pleasant than the planning and construction of cameras, tripods, and other photographic apparatus. This is not the place to give instructions in the matter, but I may say that I have passed many a restful hour from severer labours in working at the cabinet-maker's bench to enrich my stock of photographic sundries. Chemists who delight in accurate analyses will find enough to keep them fully occupied if they take up the study of dry-plate manufacture. I do not mean, of course, to do such a thing on the large scale; but it is easy to fix up a drying closet in the dark-room and arrange a levelling-stand for the coated plates out of the marble top of an ordinary bureau or wash-stand. The journals devoted to our art will furnish any number of good formulæ for preparing the emulsion slow or rapid, and thus long winter evenings may be profitably spent in learning the "true inwardness" of photography. When I look back to my own early experiments, I can truthfully say that I greatly enjoyed them, and benefited from them, even in spite of numerous failures. I think that our modern amateurs would really enjoy themselves more if they did more of the work with their own hands. This would teach them *practical photography;* and if failures occurred they would know how to search for the causes in a more intelligent and scientific manner. The time spent in such experimenting is not lost.

Among my numerous photographic friends I have one who actually fitted himself out with a machine for *lens grinding*. He made himself various combinations of lenses, and is an authority on photographic optics. I mention this just to show what a clever man can accomplish in the more recondite paths of those sciences which are allied to photography.

Turning to the more artistic sides of the matter, there is an unlimited field for those who are fond of the "pictorial make-up" of the picture rather than the mechanical. A photograph may or may not be a picture in the artistic sense, and it will easily be seen who is the artist and who is not when work is exhibited before societies or in public. Almost every principle of practical art may be applied to photography.

—PHOTOGRAPHIC TIMES.

Substitutes for ground class and improvements thereon.

IN course of a series of optical experiments begun some months ago, and not yet finished, it appeared evident that something better than even the best ground glass that can be procured in commerce would greatly facilitate our work. A finer grain than that afforded by any ground glass in the market was desirable, and further a ready means of marking, on the translucent surface, lines that would be clearly visible at the time of focussing was a desideratum, because the experiments referred to involved the use of a somewhat complicated geometrical diagram on the surface of the glass itself. Pencil lines can, of course, be used, for work of this kind, but they are not easy to work with. They are not at all clear in looking on the ground glass using a focussing magnifier. What was wanted was evidently clear lines on the translucent surface. Possibly such a set of clear lines could be got by the sand blast, but the sand blast was not available for producing the surfaces wanted, even were the surface the best possible for focussing on, which it is not.

It appeared evident that some kind of coating applied to clear glass, which coating could be scratched with a sharp point, was what was wanted. There came, just handy, at the time that we were looking about for what to use, a communication to the columns of this periodical, which gave us enough information to direct our experiments. The communication was on substitutes for ground glass. Of various substances that might be used to coat clear glass so as to give it the appearance of ground glass, that which seemed to us to be the most promising was one suggested by Mr. Carey Lea, and consisted in a gelatinous emulsion of sulphate of barium. Sulphate of barium is well known as precipitating, even in water, in so fine a state of division that there is great difficulty in filtering the precipitate, and the presence of gelatine would tend to a still finer state of division, whilst gelatine itself forms an unexceptional vehicle for any kind of emulsion to be applied to glass.

The instructions were somewhat indefinite, A few grains of chloride of barium to the ounce was to make one solution, of sulphate of sodium the other, some gelatine was to be added to one solution, and, when the gelatine had soaked, both solutions were to be warmed, and mixed with stirring, when a creamy emulsion that could be applied to glass resulted.

We soon found that, if the expression "a few grains" were intended to mean what it would generally be supposed to—say four to six—an emulsion resulted that gave a film that was beautiful whilst wet, but that became far too thin on drying; moreover, there was great difficulty in drying it at all, and, when dry, it would become tacky in damp weather.

After several experiments we arrived at that following formula:

A.

Chloride of Barium..........	200 grains.
Hard gelatine.....	200 "
Water up to......	5 ounces.

B.

Sulphate of Sodium	140 grains.
Water up to..................	5 ounces.

The quantities of chloride of barium and of sulphate of sodium are approximately such as will leave no excess of either after double decomposition.

When the gelatine has become softened, the two solutions are raised to a temperature of about 120° Fahr., and are mixed with much stirring, when a rich creamy emulsion results. Half an ounce of methylated spirit is added to facilitate coating.

This emulsion is spread on glass, the quantity needed being two to two and a half ounce to each square foot, Those who are accustomed to coating plates with bromide of silver emulsion will have no difficulty in coating with this sulphate of barium emulsion, but those who have not had practice in the hand coating of plates in the orthodox fashion will find the following method the best.

The plate to be coated is levelled, and the measured quantity of emulsion is poured on the surface, and is evenly spread by the aid of a glass rod, or even of the fingers. In cold weather the glass should be warmed. Should the coating appear even, good and well ; should it, in spite of manipulation with the glass rod or the fingers, still appear uneven, the plate must be lifted and gently rocked a little from the horizontal, first in one direction, then in another, till the film appears even, when it must be returned to the level stand or slab.

The plate is left for, say, half an hour, till the gelatine sets firmly, when it must be washed, just as a dry plate is washed after development and fixing, but with great care not to injure the film, which at this stage is very delicate. Air bubbles are sure to adhere to it, and these must be removed with a very soft brush or a feather, using much care.

This washing is necessary to make the plate dry without tackiness. It need scarcely be said that were plates of the kind described to be produced on a large scale, it would be better to wash the emulsion than the plates.

The plates are dried in the usual way, the film, which at first of remarkable opacity, becoming wonderfully translucent during drying. The best density of film for focussing purposes appears to be such as will just permit of the outlines of objects at some distance being distinguished, looking through the glass held in the hand.

Any lines required can be scratched on such a film, with a strong steel point or stylus, such as that know to engineers as a "scriber." A needle point appears not to be strong enough, generally breaking at the first line that is attempted, if pressure enough be put on to cut through the film.

During our experiments, emulsions in gelatine of various other insoluble substances were tried. Amongst these was bromide of silver, produced by emulsifying nitrate of silver with bromide of potassium, the latter salt slightly in excess.

At first sight it might appear that bromide of silver is about the least likely substance to be successful as a film to take the place of ground glass. In the first place, it is sentitive to light, and this in itself would seem to be enough to condemn it. yet it is far from being unsuitable. True, bromide of silver is sensitive to light, but if it be produced in presence of excess of soluble bromide the change that takes place, even after a very long exposure, is, without the aid of a developer, but a slight one, and the light grey colour that results is not at all a bad one for focussing on. In fact, we have more than once, having broken a ground glass, made a substitute by taking one of our unexposed plates, dissolving off the film with hot water, and recoating with only a part of the emulsion.

As to the expense of bromide of silver ground glass substitute, it is trifling, for sufficient opacity results from the use of an extraordinary small quantity of the salts, if there is no boiling of the emulsion or treatment with ammonia.

The bromide of silver plates are indeed excellent. They are much to be preferred to most samples of commercial ground glass, but the sulphate of barium plates, being still better, were naturaly preferred.

Another substance experimented with was carbonate of lead — the white-lead used as a pigment, when mixed with oil.

As a gronnd-glass substitute for fine focussing, the substance proved successful, but inferior to both sulphate of barium and bromide of silver. The rich creamy nature of the film. in many ways when dry more beautiful in mere appearance than the dried sulphate of barium film, suggested that it might serve as a substitute for ground glass, or even of opal glass, for some of the various uses to which these two kinds of glass are put in connection with photography, and we were not disappointed. We found a plate coated with an emulsion of carbonate of lead a great improvement on ground glass for backing transparencies when these had to be placed in certain lights, the diffusion being more complete with the carbonate of lead plate than with the ground glass. With thick coatings an excellent imitation of opal glass was produced, but we have not made any application of this. We attempted to develop a carbon print directly on the film, first rendering the latter insoluble in hot water with chrome alum, but got an ineradicable yellow stain, doubtless the insoluble salt chromate of lead.

It has, of course, to be borne in mind that what lead is liable to blacken on exposure to sulphurated hydrogen' and it is therefore likely that it would not be advisable to use it, except where the film can be enclosed between two plates of glass, but in this condition we have no doubt that it is secure from blackening.

The emulsion of carbonate of lead in gelatine was compounded as follows :

A.

Acetate of lead (sugar of lead)...	130 grains.
Hard gelatine..........	200 "
Water up to.................... ...	5 ounces.

B.

Carbonate of soda in crystals ...	100 grains.
Water up to.....................	5 ounces.

Emulsification is performed exactly as for the sulphate of barium emulsion, and, as in that case, half an ounce of methylated spirits is added to the finished emulsion.

According to the thickness of coating given to plates, any effect between that of particularly translucent ground glass and of opal glass can be had.

The plates must be washed, as in the case of sulphate of barium plates.

W. K. B.

METOL.

Threatened men, it is said, live long, and if this saying holds good for inanimate objects. pyrogallol has a long lease of life as the most popular and most widely used of developers for gelatino-bromide plates. Many are the assailants that have sprung up during the past few years, and many have been the attacks made on its position, but it may still be said, without fear of contradiction, that the great majority of photographers of large experience will admit in their confidential moments that, although they have tried some, if not all, of the newer developers, there is as yet " nothing to beat pyro."

We will at once admit that, according to our own experience and opinion, there is only one of the newer developers that is at all a serious rival to pyro, in its general qualities, and in its applicability to all-round work, and that one is metol.

Metol, as a matter of fact, differs considerably from pyrogallol in its chemical constitution, and its chemical and physical properties. According to Hauff, who introduced it. it is the sulphate of methylparamidometacresol. Like pyrogallol, it is a benzene derivative, and, like pyrogallol, it belongs to the group of compounds known as phenols, but it is a monohydric phenol, whereas pyro is a trihidric phenol. Unlike pyrogallol, it contains an amido group, and its developing power is due to the presence of this amido group and a hydroxyl group (which is characteristic of all phenols) in union with the benzene nucleus, which the compound also contains. This fundamental difference in constitution would lead us to expect corresponding differences in behaviour, and we shall see presently that this expectation is justified by the facts. Moreover, metol differs from pyrogallol in another very important respect ; it contains what the chemist calls " side chains " (in this case methyl groups). and as a consequence it behaves differently when subjected to the action of oxidising agents. It is obvious. therefore, that since the developing power of the metol depends on its reducing action, the presence of these side chains will indirectly influence the developing properties.

The most obvious physical difference between the two compounds is in their relative bulks. Metol is a crystalline substance, which goes into comparatively little room without being compressed, whereas pyrogallol, as is well known, forms, in its ordinary condition, very bulky feathery crystals, an ounce of it seeming to fill a bottle capable of holding a pound of water. This lightness of the pyrogallol makes it very troublesome to weigh, and the crystals are easily blown about. In convenience of manipulation, therefore, metol has decidedly the advantage.

On the other hand, metol is not very soluble in water, whereas it is one of the great advantages of pyrogallol that it is extremely soluble, and can be obtalned in very concentrated solutions. Metol, however, is sufficiently soluble for practical purposes, and the greater volume of liquid that is necessaryis in part compensated for by its much smaller liability to change through the action of the air.

An aqueous solution of metol alters much less rapidly than a similar solution of pyrogallol, and the alteration is of course still slower when the liquid also contains a sulphite. Some time ago we made some experiments to ascertain what proportion of sodium sulphite is necessary to prevent discolouration of the metol solution, both with and without alkali, and some of the preliminary results were descrlbed in a previous article,

We found that when a simple aqueous solution of metol containing one part in a hundred was exposed in a thin layer to the air for twenty-two hours, it acquired only a pale brown colour, whilst if the solution also contained two parts of sodium sulphite per hundred, the colour acquired in the same time was only a very faint brownish tint. It is obvious that to expose the solution to the air in a thin layer for so long a period is a very severe test indeed.

When an alkali was present the alteration was, of course, much more rapid. Without any sulphite the solution after several hours became dark chocolate-brown, and a precipitate was formed. The presence of two parts of sulphite in a hundred, with one part of metol and two and a half parts of potassium carbonate, was sufficient to prevent the appearance of more than a very pale brown colour at the end of an hour, but four parts of sulphite per hundred were necessary for efficient protection if the exposure to air was prolonged to twenty-hours. Even after continuous exposure in a thin layer to the air for so long as fourteen days, a solution containing in one hundred parts. metol one part, sodium sulphite four parts, and potassium carbonate two and a half parts. showed only a deep orange brown colour, without the formation of any precipitate. With six parts of sulphite instead of four there was no marked difference,

It is obvious that metol solutions containing sulphite have quite unusual keeping qualities, even when mixed with alkali. Without alkali a metol and sulphite solution may be kept for many months without any appreciable discolouration or any loss of developing power.

Another advantage of metol is its small tendency to produce general fog. It is often claimed for the various newer developers that they require no addition of bromide, and will work "perfectly free from fog." our own experience is that in no case, with the possible exception of glycin, can this statement be accepted as generally true. In the case of metol, although the tendency to produce fog is small, the addition of some bromide is necessary to obtain really clear negatives with the more sensitive kinds of plates. The action of the developer is not, however, materially retarded by a quantity of bromide quite sufficient to keep the unexposed parts of the film clear.

It has been urged against metol by some workers that it exerts a markedly injurious effect on the fingers, and Mr. Corbould has described a case of dermatosis which he attributes to the use of this substance. Others contend, however, that the injurious effects are really due to the alkali. Potassium carbonate is generally used with metol in somewhat large proportions, and it has unquestionably a somewhat powerful caustic action. It is very desirable that this point should be carefully investigated. Similar statements were made concerning quinol, but in the end the bad effects were generally attributed to the use of caustic alkalies, although, as a matter of fact, the question was never satisfactorily investigated. In this connection we may express our opinion that the proportion of alkali used with metol is often much larger than is really necessary.

One point worthy of notice is that (so far at least, as our own experience goes) the character of the deposit given by metol is decidedly different from that given by pyrogallol. It is much bluer in colour, and, consequently, for an equal degree of opacity to the eye, it has much less photographic opacity, or, in other words, allow more active rays to pass through, and, to adopt the ordinary phraseology, is much less "dense" for printing purposes The practical point is that when using metol, development should be carried further, so far as the eye can judge, than is necessary in the case of pyrogallol.

Of the various formula that have been proposed for metol, we prefer, at this point, to say very little. A tabular statement of them will be found on page 330 of *Photography* for last year. On the whole, it may be said that for ordinary purposes none of the subsequent formulæ are any real improvement on the formula given by Hauff in 1892, and recommended by Eder, except that the addition of a small quantity of potassium bromide, about one grain per ounce, is usually advantageous.

C. H. B.