ONE SHILLING.

HOW TO MAKE

Lantern Slides.

S. L. COULTHURST.

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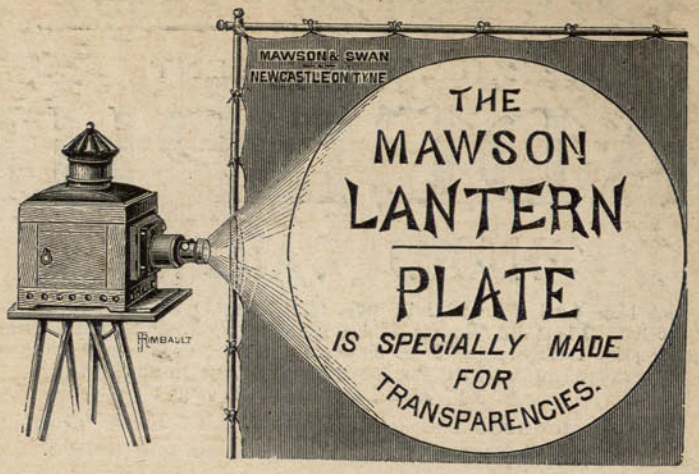

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HOW TO MAKE LANTERN SLIDES.

AN ACKNOWLEDGMENT.

MY thanks are due to the Editor and Publishers of **The Amateur Photographer,** for permission to use portions of their Copyright Lecture, "Lantern Slide Making by Contact and Reduction," which I wrote for their Circulating Lecture Series, and upon the foundation ot which this manual has been built.

S. L. COULTHURST.

HOW TO MAKE
LANTERN SLIDES

BY

S. L. COULTHURST.

LONDON:
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PREFACE.

In this little manual on "How to Make Lantern Slides" I do not wish to claim that any of the ideas or methods are original.

I have endeavoured to treat the subject from a practical standpoint rather than deal with it in a scientific or theoretical manner.

I have chosen the gelatino-bromide and gelatino-chloride processes as being those used by 99 per cent. of slide makers at the present time. The number of formulæ given are very few and are such as I have found after long trials to be eminently suitable for the development of plates by the two processes I have dealt with.

My sole aim has been to issue a practical handbook for the beginner, and those seeking information on the subject other than that sent out by the makers of such excellent lantern plates which are now on the market. How far I have succeeded my readers may judge.

HOW TO MAKE LANTERN SLIDES.

CHAPTER I

INTRODUCTION.

If I were asked which I considered the most interesting, useful, and fascinating method of producing photographic pictures for the benefit of the world at large, I should at once say "Transparencies in the form of lantern slides."

There is no better means of impressing upon the mind the idea we wish to convey than by an illustration, be it only a diagram, and that illustration presented through the medium of a lantern slide and the optical lantern.

A lantern slide may be defined as being a transparent positive image on glass, the standard size of which in England is $3\frac{1}{4}$ inches square, and the making of which brings into play the highest technical skill of the operator. There are no doubt more slides prepared by photographic methods than by any other, and it is of this method that the following pages will treat.

The artistic qualities of slides have been attacked, and there is no doubt some truth in the statement "that most lantern slides possess little artistic feeling." That a lantern slide can be, and often is, artistic, there is no doubt, but as to its being art we will not discuss—life is short, art is long. There is one thing I admire in a lantern slide and which I think every true lover of nature cannot fail to appreciate, and that is the transparency and gradations of tones a perfect lantern slide possesses.

The making of slides has been put down by many as a purely mechanical process, but with this I do not agree. I do not claim it to be art any more than I make that claim for photography. I claim that in slide making the maker has the same power of expression, the same power of control in printing, and of colour as the maker of paper prints, and if each is shown under its proper conditions, and with equal knowledge, I do not think slide-making would be looked down upon by the "upper ten" of photography; it is not my desire to invoke a controversy, but rather to show that by pure photographic means, be it faking or anything else, there is power in the hands of the lantern slide maker, if he will only use it with the same taste and judgment as the paper printer.

The making of *technically* good slides is purely one of practice, and in the production of which there are many unwritten laws which each worker will find out for himself as his experience extends.

In this small manual it is my endeavour to place before my readers the ways and means I have found to be successful during recent years of lantern work; there may be much that appears elementary to the experienced worker, but it is also my wish to be of service to the youngest tyro.

CHAPTER II.

NEGATIVES AND PLATES.

Our first consideration in the making of lantern slides is the negatives from which we desire to make slides; these, it is presumed, the reader has. In lantern slide making, as in all other photographic printing processes, certain kinds of negatives give the best results, and there is not a shadow of doubt that the best slides, by whatever process, are from perfect negatives This opens up the question as to "What is a perfect negative?" For our purpose the perfect negative is one full of detail and without great contrasts, with delicate gradations from high lights to shadows. For the general purpose of slide making it will be found that the negative which will give a good print on P.O.P. will yield a good lantern slide, although it is possible by great care and skilful manipulation to obtain passable results from even very poor negatives, and having the choice of various kinds of lantern plates it makes our path somewhat smoother.

Before proceeding as to the choice of lantern plate, let us consider further the negative upon which so much depends; these are oftentimes far from perfect, so it is advisable that all negatives should be examined and prepared previous to use.

Pin holes are a great source of trouble to many. If they appear amongst clumps of trees or any other dark masses, it does not matter much and they may be left; but should they appear in the sky or other important portion of the negative, it becomes a serious matter and they should be stopped out; a neat spot of colour (opaque) from the point of a fine hair pencil will do all that is required. Should however the defects exist in delicate half-tones, clouds, or soft distance, it is not so easy a

matter, and great care will be required to make it a success. With such cases it is recommended to apply a little retouching varnish over the defective portion, and with a medium hard lead pencil, pointed quite sharp, make a number of fine dots or marks with the pencil on that portion of the negative requiring it, and so add a deposit on to the negative in a great number of fine spots, and so cover up the defects. In this way figures that have slightly moved, trees and reeds that are wind blown, may be helped somewhat, but in this a great deal depends upon the skill of the worker in the use of the pencil. Under-exposed negatives rarely give satisfactory results, and should as a rule be rejected; the same may also be said of negatives that have been developed very harsh and hard.

If halation be present in a negative (such as one often finds around the window of a church interior) it must be remembered that its effects will be greatly and most unpleasantly magnified when the slide is thrown upon the screen; how a slide from such a negative may be improved will be dealt with under the chapter on exposure.

If the negative be of a landscape subject and there be no clouds present, the sky should be opaque, or made so by painting out or masking (if we desire to afterwards add clouds), or if the clouds that are present in the negative be of an unsuitable character, they should be treated in a like manner.

It is not a difficult job to do this, and it is one that every photographer should be able to accomplish.

Having now prepared our negative, we want a lantern plate upon which to copy the image. There are so many excellent commercial lantern plates on the market, packed up in dozens all ready for use, and of such uniform excellence, that the slide maker cannot do better than use the commercial article. These plates may be roughly divided into two classes—bromide plates and chloride plates—and I feel sure that no one can go far

wrong with any of these. There are other processes by which lantern slides may be produced, such as the Carbon, Albumen, and Wet Collodion processes, but these are processes in little use by the general run of slide makers of the present day, and I think I am not far wrong when I say that the finest slides at the present time are those produced upon bromide or chloride plates as commercially made and sold at such reasonable prices. This being so we will confine our attention to these two classes of plates.

Most makers put on the market a "Rapid" and "Slow" series of lantern plates, each having the qualities as its name implies; some however only issue one speed more or less slow, as may be seen from the table of speeds included in the chapter on exposure; for our purpose we recommend these slow plates such as are marked up to 6 or 8 on the list, as with them more latitude is allowed in exposure, and a greater variety of colours are to be obtained upon them by giving different exposures. Also they are equally suitable for the contact or reduction method. Although it is advisable to use the "slow" bromide plates for our general work, there are cases where the use of a "rapid" plate is a distinct advantage. If we have in hand a rather hard negative, a "rapid" plate will often give a much better result than would be obtained on a "slow" plate. It being well known that in ordinary work the range of densities is not so great in "rapid" as in "slow" plates, and as our negative is already too hard and harsh, we may to a great extent overcome this by the use of a "rapid" plate. Not only in this direction are "rapid" plates of service: we may require slides produced by the daylight reduction method during the dark days of the winter months, and here the worker will find a distinct gain in the reduction of time of exposure.

The other class of plates we will consider are those known as chloride plates, several excellent makes being on the market, such as Premier (England's), Cowan's, and

Alpha (Chloro-Bromide). The appearance of the surface of these to the novice in the dark room is perhaps a little confusing, the emulsion being so smooth and transparent that it is often difficult to distinguish the coated side. They are, however, usually packed face to face; if any difficulty is found, take a pin and scratch the extreme corner of the plate and the coated side will easily be found. These chloride plates are as a rule much slower than the bromide plates, and in them the lantern slide maker has a powerful friend. They may be used for general work if desired, and are especially useful if negatives are being used that are little more than "ghosts." In fact, slides can be made on chloride plates from negatives which would yield a slide by no other process.

There is one point, however, which must not be overlooked—they should be used fresh to ensure the finest results, it being a plate that does not keep so well as the bromide plate.

In purchasing them from your dealer make sure that he has not had them on the shelf for twelve months or more, or your results will be far from satisfactory. It is, of course, necessary that, whatever make of these lantern plates you use, they should only be opened and developed in the ordinary photographic dark room; but as lantern plates are much slower than ordinary negative plates, much more light can be used; in fact, it is advisable to use a good volume of orange light, as this is very comfortable to work by. Yet it is not in any way compulsory and any ordinary dark room lamp may be used.

CHAPTER III.

METHODS OF PRODUCTION.

We have considered the negatives we wish to copy and make into lantern slides, and also the kind of plate we shall use, and we are brought face to face with the question how our slides shall be made.

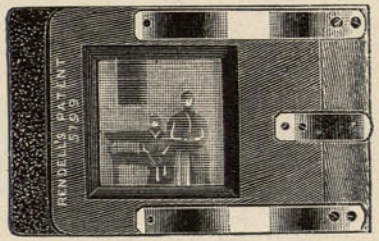
The methods of production of lantern slides are known as "by contact" and "by reduction." Some workers assert that contact slides are *never* so good as those made by reduction; a little may be lost in sharpness if care is not used in making by contact, but perhaps much of what is put down to superiority is not so much the technical qualities as the artistic shape of the reduction slide. During our years of lantern slide making we have failed to detect any difference between a slide made by contact and one made by reduction *if the exact portion of the negative was shown in each case.*

The reduction method, however, does lend itself more easily to artistic treatment. It places in our hands the power of coping or reproducing all or any portion of the composition of the negative, and thus the final result may show a more pleasing effect. To some extent this power may be carried out by the contact method, but not so satisfactorily as by reduction.

It is recommended to make slides by contact where the artistic proportions of the resulting (masked) picture will allow. Perhaps the best system for the beginner will be for him to select such of his negatives as can be used for contact work, and, having mastered this, the simplest method, he will be better able to travel out into the field of reductions.

First let us briefly explain the two methods.

BY CONTACT is meant—as its name implies—by perfect contact with the original negative which is to be reproduced as a slide; the sensitive or coated side of the lantern plate touches the film side of the negative, just as in printing a paper print. By making by contact it will be readily seen that we can only reproduce that portion of the negative the lantern plate will cover; allowance must also be made for masking, so that it will be found best to use only those negatives in which the picture to be reproduced is not more than $2\frac{3}{4}$ inches square. But to be practical, we will take, say, any ordinary $\frac{1}{4}$ plate printing frame, and in it place our negative



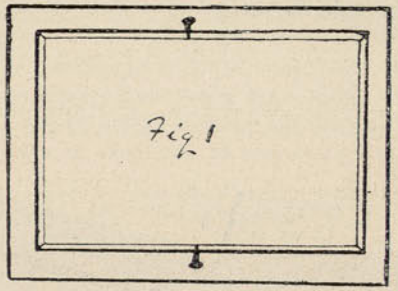
LANTERN SLIDE MAKING FRAME.

(which, if contact is used, must not be larger)—or, better still, one of the several excellent special slide making frames now on the market.

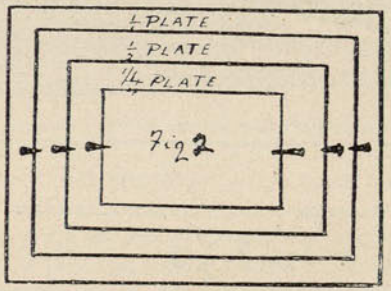
These special frames are very useful, especially if the negative is at all out of square—as the hand camera sometimes turns out—for by its aid we may correct this defect, or it may be we may wish to take a bit out of a larger negative.

Now take the negative and place it in position in the printing frame, as if for paper printing, and on the top place the lantern plate so that the two films come together; put a pad of dark material over the back and fasten up the frame and it is then ready for exposure to actinic light.

BY REDUCTION is the only way to make lantern slides if we have negatives larger than our lantern plate and desire to include the subject they contain. Let



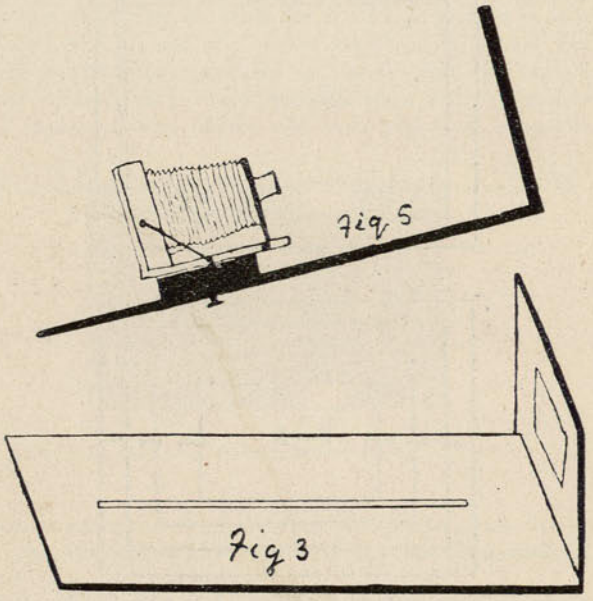
A SINGLE CARRIER.



A SET OF CARRIERS "NESTING" INTO EACH OTHER.

us suppose we have large negatives—say, whole plate ($8\frac{1}{2} \times 6\frac{1}{2}$ inches)—and it is our desire to include the whole of the subjects they contain on to a lantern slide $3\frac{1}{4}$ inches square. To attain this we must reduce the larger to the smaller. To do this we require to set up the negative in some position where some form of even lighting can be directed through it. The negative being

in position, the camera must be brought into play and the negative image focussed the size of the lantern plate upon the ground glass, and then it must be photographed as any ordinary view or portrait. This, then, is the principle of the reduction method, and we must consider how it shall be carried out. The first factor we must consider is the light. We must have this in some form to pass through the negative, and as daylight is cheap



and free to all we will give that first place. The bulk of my own work for several years past has been carried out with a simple form of apparatus made up as follows:—

Make or get made a nest of rather stout carriers capable of taking all the sizes of negatives you are likely to use; diagram Figs. 1 and 2 will show you more clearly what I mean.

Each one of these carriers, you will notice, "nest" into each other, and so form one block. Now take a strong board, three feet in length (or longer if long focus lenses are to be used). This must be perfectly true, and broad enough to allow the nest of carriers to be screwed down at the end. In this board cut a slit or opening so that the ordinary camera can be screwed down and moved along to any part of the board, as shown in diagram Fig. 3.

Next take two strips of wood—say, two inches broad and one inch thick—and screw them down each side of the slit, the object being to bring the lens of the camera into the centre of the nest of carriers or negative. It

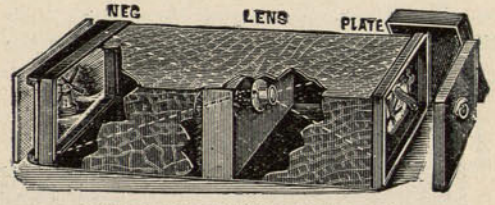
"KORESCO" ENLARGING OR REDUCING CAMERA.

will be readily seen that these strips must vary in thickness according to the size of the camera to be used; thus a whole plate camera would perhaps require no strips at all to get it into the correct centre. In using a large camera the dark slides will also require filling with a carrier to take the lantern plate. It will perhaps take a longer screw than that used for the tripod to fasten the camera down, but one of suitable length can soon be obtained from any dealer. The diagram Fig. 5 will show how I intend the apparatus to be used.

Cover up the distance between the carriers and the camera with the focussing or other cloth, and fasten with drawing pins from point to point.

This, then, is the principle upon which all the daylight-reducing cameras are made, and if the reader of this manual prefers a more elaborate arrangement than in the one described he will find full scope for satisfying his requirements at the nearest photographic dealer's; but note that whatever form is chosen it should be capable of copying all or any portion of the negative at will.

"The Koresco" is an apparatus for enlarging or reducing by daylight, and a very excellent one it is.



FIXED FOCUS LANTERN SLIDE CAMERA.

Here we have another commercial daylight-reducing camera, and one which has proved itself very popular with slide makers. It is of "fixed focus" so that it is only necessary to put the negative at one end and the lantern plate at the other and then expose. There is no trouble about finding the exact focus, it is all done, and these cameras are so handy that they can be carried from the dark room outdoors to give the exposure, stood upon ends, or directed to the sky in a room in every conceivable direction. If the reducing camera be any other than one of these "fixed focus" cameras, they all work upon one principle, which we will briefly describe.

Take the negative and insert it (upside down) in the right size of carrier at the end of board, film towards the camera, and fasten it in with the turn buttons. Now proceed to focus the negative into a space 3¼ inches square on to the ground glass of the camera. The making of a slide by this method is simply photographing a negative by means of transmitted light—that is, the negative

takes the place of the view or group, and the light passes through the negative to the lens of the camera and then on to the sensitive lantern plate in the dark slide. It is not a difficult matter but is one in which the beginner often fails.

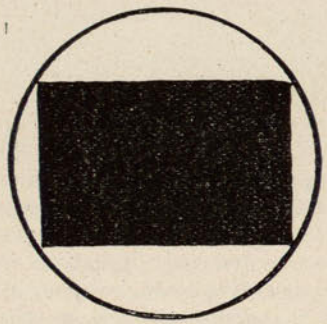
In the case of paper printing, the tyro may and often does think that because he has a certain amount of subject on his negative he must print the lot. Here he makes a mistake, for he ought to trim down his prints (if they require it) until he has the best portion of his subject, and so it is with the reduction of negatives for slides—reduce that portion of the negative which is *the picture* and no more.

As a guide to getting the image in the centre of the ground glass, paste upon it a cushioned-shaped lantern mat (you will use them later), and into this space focus your negative to be reduced. Now cap the lens, place the dark slide (with lantern plate) in its proper position, as in taking a view, and draw the shutter. Now tilt up the whole of the apparatus (negative end first) against the middle division frame of the window, so that the whole points to the clear sky, or it may be arranged to be fixed there permanently and only negative and dark slide changed. The apparatus must, however, always be tilted so as to avoid all chimneys, trees, or other obstruction, for if these be in the field of view the result may not turn out to be a success; above all, do not point towards the sun.

If obstructions are in the field of view and cannot be avoided, a reflector of white cardboard fixed at an angle of 50 degrees should be used so as to throw all clear light on to the negative. This being ready, we are prepared for exposure, which question will be treated upon in a special chapter.

REDUCTION BY ARTIFICIAL LIGHT.—In reducing by artificial light the same rules hold good as in reducing by daylight, as just described, except that some illuminant other than daylight must be chosen. To do this

successfully without properly arranged apparatus is not an easy matter, and if the worker is compelled to use artificial light he should see that his arrangements are perfect. Let us for a moment, then, consider how and why this is. Let us suppose we have, say, whole plate negatives to reduce, and to do this we require some means of evenly illuminating the whole of the negative. It is most important that this should be so, or the resulting slides will be anything but a success. As an experiment, hold a negative just before a candle flame and you will, of course, only get a small portion of it illuminated; then try a gas flame and you will get a larger portion

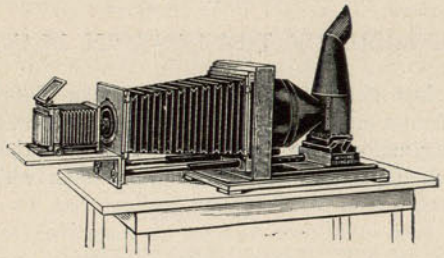


HOW A CONDENSER SHOULD COVER THE NEGATIVE.

illuminated, but still not large enough; now try two, three, or four, and you will find the light far from being evenly distributed. The best, and in the end the cheapest, means of getting the even illumination we are seeking is in the use of condensers, which collect the rays of light and throw them on to the negative with evenness. The condenser should be of such a size as will completely cover the negative such as is shown in the above diagram.

If this is not so the negative will not be fully illuminated.

If the reader has an enlarging lantern made to take the size of negatives he desires to reduce and the condenser's cover, as the last diagram shows, he may utilise it in the manner as shown in "the cantilever" here illustrated.



The writer has made many hundreds of slides by this camera, used in the above manner.

There are many other forms of apparatus for reduction by day and artificial light, but these it is not our desire to discuss, but rather to show the principle of the reduction of large negatives to lantern slide size. For artificial light in these various lanterns, either oil, gas, or limelight may be used, as suits the pocket and other conveniences of the worker. It is a subject well left to his own choice.

CHAPTER IV.

EXPOSURE OF THE LANTERN PLATE.

In the last chapter we left the lantern plates in the printing frame and in the dark slide of the reducing camera waiting exposure. Upon the exposure of the lantern plate much depends, and it is a point upon which little written instruction can be given, seeing that we are dealing with such unknown factors as negatives and light, much more may be learned from a practical experiment with half-a-dozen lantern plates exposed upon the same negative than pages of written instruction can impart. It must be remembered that a true positive of the negative can only be obtained by a correct exposure for the developer we are using. Yet much may be done by modification, when learned in the science of slide making. These are points of which the tyro however is ignorant, and only experience will teach him. Exposure will vary with different plates and developers, but by using one make of plate and developer the royal road to success will soon be reached.

First of all I would recommend all workers to follow these three rules—

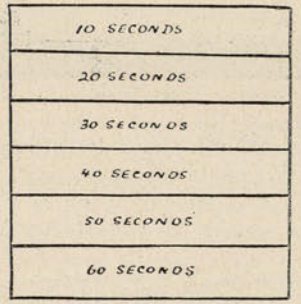
1.—Sort all negatives into three or four lots, according to their densities, and make each lot of negatives up into slides before touching the next. In this way you soon find the exposure for the lot and the risk of failures will be much reduced.

2.—Make a series of trial exposures on one negative of each lot. Give, say, six exposures on one lantern plate, as shown in the next diagram, and development will soon show you the correct exposure for the developer you are using.

3.—Make a standard distance from the light for exposing all your average negatives made into slides by contact. Thin negatives may be exposed further from the light and dense ones much nearer, with great advantage.

These three rules will go a long way towards helping to make your work a success, and it will soon be found that an approximate exposure can be fixed upon at the sight of the negative for the lantern plate and developer you are in the habit of using.

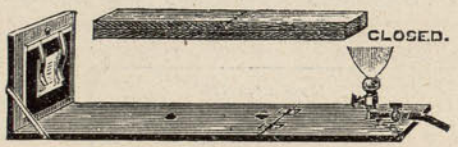
Experienced workers always use one light, and know their developer fairly well. They take up a negative,



look at it, and say, "I'll give this 20 seconds," and as a rule they are not far out. This, of course, only comes with long practice.

For contact exposing, gas will be found the most useful and convenient illuminant, yet one is not restricted to its use. Many prefer oil light or magnesium ribbon, and this latter perhaps forms a more consistent form of illuminant than the others, if much of it be burned in a confined space, such as the average dark room, the air is apt to become charged with fine dust, and the fumes are not altogether agreeable.

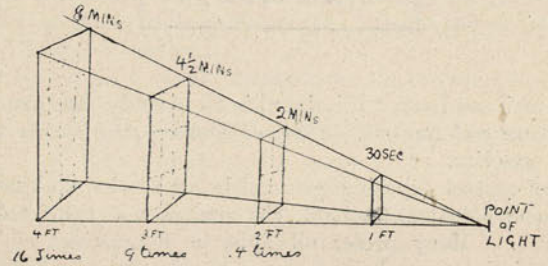
If gas be used a burner with a by-pass is advised, so that it will not require relighting for each exposure. The size of the flame should be carefully noted, for if the pressure of gas at the time be low, the burner may only give half the light it would yield were less gas in use in the neighbourhood and the pressure consequently greater. By using the same light and exposing the frame at the same distance from it each time, identical results may always be expected. For this purpose mark a scale of distances upon the wall near the gas jet, or, better still, have an exposing board of this character—



"PRIMUS" EXPOSURE BOARD.

The theory of exposure may be briefly illustrated as follows:—

The intensity of illumination on a given surface is inversely as the square of its distance from the source



of light. This means that if at a distance of one foot from a gas jet or candle light an exposure of 30 seconds is correct, and should the distance be increased to two

feet, the corresponding exposure will be two minutes, and so on, as the above diagram clearly shows. So far, this is all right, and it may be taken for a standard to work upon, but there is this difference in practice—the light has less power to penetrate the dense portions of a negative as the distance increases and, as previously stated, for this reason dense negatives are best exposed near the light and weak ones farther away; the less the distance between the source of light and the negative the less the contrast between the high lights and shadows in the resulting transparency and *vice versâ*. Thus it will be seen that little practical help can be rendered as regards exposure, but a few trials on the lines set out above will soon put the worker right. Let him start with, say, an exposure of 30 seconds at 2 feet from a No. 6 Bray burner, and increase or decrease as required.

The following list of speeds of lantern plates has been prepared by Mr. A. Watkins, to whom I am indebted for permission to reprint it. The speeds given are relative and approximate only: the speed of different batches of the same maker's plates often vary. The figures given are no guide to the quality of the film.

TABLE OF SPEEDS OF LANTERN PLATES.

Thomas	2	Edwards' Spec.	3
Ilford Spec.	6	Hill Norris Col.	8
Eastman	6	Carbutt A.	18
Cadett	3	Paget Rapid	15
Imperial Spec.	15	,, Slow	6
,, Slow	4	Cowan Chloro-Bromide	8
Barnet	12	Queen	12
Mawson	2	England Rap. Chloride	2
Sandell	¼	Beernaert (Chloride)	¼

LOCAL EXPOSURE OF THE NEGATIVE.—If the negative is very uneven as regards density, such as an almost clear glass shadow and a very dense high light, it will perhaps be somewhat difficult to obtain a satis-

factory result. In such cases it is advisable to shade the less dense portion during a part of the exposure by the aid of a piece of paper or cardboard roughly cut to shape and kept moving between the negative and light over that portion of the negative requiring it. Care must be used to avoid showing a hard line; use the shield as a vignette. If a church window is rather hard or is troubled with a little halation, it may be helped somewhat by cutting a hole of suitable size in a piece of cardboard and giving the window portion a larger exposure, taking care to keep the cardboard moving. Much may be done in the way of shading weak portions or giving extended exposures to parts of the negative requiring it, but each of these must always be treated upon its merits, for no general rule can be laid down for their treatment.

Expose your lantern plates either by contact or reduction, and in the next chapter we will consider their development.

CHAPTER V.

DEVELOPMENT OF SLIDES.

The development of the lantern plate is the same for either the contact or reduction method of reproduction. Development of slides is very similar to that of negative developing, yet there is this one point to bear in mind—a little density more or less does not make much difference to most of our negatives, yet in lantern slides it is *the* most important point. However, a little practice on set lines as shown in this manual will soon enable even the beginner to turn out passable results. To the beginner I would say, "Beg, borrow, or——get hold of" a good slide as a sample—one that has been tested in the lantern and by an expert worker, if possible. Study it well as regards its density, for this is the point which causes so many failures in lantern slide making.

There are hundreds of formulae for the development of lantern slides, and they are ever on the increase. Each maker gives a special formula for his own particular plates. There are, however, two or three well-known developers which will be found to work well with most plates on the market. Such is my own experience, and I do not think anyone will go far wrong by their use. The first one I especially recommend as being clean, simple, and one with which the finest results may be obtained.

No. 1.

Hydroquinone 80 grains.
Sulphite of soda 1 ounce.
Citric acid 40 grains.
Bromide of potassium 20 grains.
Water (distilled preferred) to make up 10 ounces.

No. 2.

Soda hydrate 80 grains.
Water to make up 10 ounces.

Be careful to see that No. 1 of this developer is carefully made up as follows:—Dissolve the sulphite of soda and citric acid in about 6 or 7 ounces of water and then add the other ingredients and make up to 10 ounces with water, as stated. It is advisable to always shake up these two solutions before use.

Hydroquinone will almost refuse to act in cases where it is used at a low temperature, and many failures at slide making occur through neglecting to see that the temperature of the developer has not fallen too low. It should be of a temperature not less than 60 deg. F., especially in winter.

For use take ½ oz. No. 1, ½ oz. No. 2, and 1 oz. water—total developer, 2 oz.

For the development of slides a glass developing dish will be found of great service. It can be held up to the dark room light and the process of density judged without handling the plate. Whatever dish is used care must be taken that it is always perfectly clean, or stains may occur. Place the plate in the dish and flow over it in one even sweep the developer we have prepared, and if exposure has been sufficient the image should appear in about one minute and development be complete in two or three minutes. It should develop up strong and clear, yet without harsh contrasts. If slower in coming up, it indicates under-exposure, and prolonged development will result in stains.

The making of technically good slides is purely one of constant practice. When to stop development in slide making is always *the* most difficult point, especially to the beginner, yet only experience will teach us the lesson as to what is the correct density. It is, however, advisable to develop until, when looking through the slide, it appears a little overdone. If the plate comes up satisfactorily as stated, all that is required is to wash well

under a good flow of water and fix as will be described at the end of this chapter.

It is almost certain that your first plates will be other than perfect. The most common faults are those of under and over-exposure. The former will give you a slide clean, bright, and brilliant, lacking in detail, and what might be described as chalky; sometimes a slide is only just under-exposed, yet it gives that snowy appearance which takes away its real beauty. If development be carried further, it will only make the shadows more heavy still. Under-exposure in slide making is thus an undesirable feature. If the slide is flat and muddy looking, free from vigour and altogether unpleasing, it indicates over-exposure (or, maybe, a too strong developer). It is possible to save even such a slide if over-exposure is discovered as soon as the developer has been put on and development only just started. To do this several drops (according to amount of over-exposure) of bromide of potassium should be added to the developer, which will act as a restrainer; this will, however, alter the colour of the slide and make it much warmer.

The development of the lantern plate, as set out above, will result in slides of a pleasing warm black.

It is an undoubted fact that at the present time many pleasing slides are produced of a much warmer colour than black, and it is purely a question of good taste as to what colour we shall make our slides, many slides are utterly ruined by the unsuitable colour in which they are presented. I think that the most satisfactory colour for all round work is a warm black, and by its use one cannot go far wrong.

It is not a difficult matter to obtain sepia, brown, red, or even orange by the modification of the developer recommended above, with the following addition:—

No. 3.

Bromide of ammonium 1 oz.
Water, to make 10 oz.

It is much easier to get colours by development from a good negative than those of a weak and washy character. The same negative as we exposed 30 seconds at 2 feet for black tones we expose 60 seconds at the same distance to obtain a rich and pleasing brown, admirably suitable for landscape work, and make up a developer as follows:—

½ oz. No. 1, ½ oz. No. 2.
2 drams No. 3, water 1 oz.

The development will be much slower than in the case of black tones, and will take five or six minutes. In the case of brown tones the density or deposit on the slide does not require to be as heavy as with a black slide, it being more opaque. A grand selection of colours may be obtained by adding more or less of No. 3 and increasing the exposure; the more No. 3 added and the greater the exposure, the warmer will be the colour and longer will be the time taken in development. For warm colours guard against fixing the plate too soon.

I cannot too strongly recommend this simple and easily understood developer. It is surprising how easily one will fall into the way of working it, and have little difficulty in turning out good slides by its use. Many writers have recommended the addition of carbonate of ammonium to the developer for the production of warm colours. This it certainly does, and gives satisfaction so far as colour is concerned, but in the writer's experience the slide is not permanent after a year or two; the colour fades and alters and presents a miserable appearance. The use of carbonate of ammonium is therefore not included in any formula presented in this manual.

PYROGALLIC ACID DEVELOPMENT.—For those who prefer an alternative method of development I can recommend the following:—

MAWSON AND SWAN'S DEVELOPER.

A.

Pyrogallic acid 20 grains.
Ammonium bromide 20 grains.
Potash metabisulphite 50 grains.
Distilled water to make 10 oz.

B.

Liq. ammonia .880, 70 minims.
Distilled water to make 10 oz.

For use mix equal parts.

The tones given by this developer are very good for showing on the screen. Development is rather slow in commencing, but proceeds with regularity.

EDWARDS' DEVELOPER.

A.

Pyrogallic acid 1 oz.
Sodium sulphite 4 oz.
Citric acid ½ oz.
Water to make 16 oz.

B.

Ammonium bromide 1 oz.
Liq. ammonia .880 5½ drs.
Water to make 16 oz.

For use mix ¼ oz. of No. 1, ¾ oz. of No. 2, and 1 oz. of water.

Both these pyro developers yield results of the finest order.

Whatever developer be used, when the point of sufficient density is arrived at, the plate must be subjected to a good wash and fixed, which is the same in all cases. The following acid fixing bath is recommended for this purpose. It will brighten up the slides and remove any slight veil that may have been caused by the developer:

ACID FIXING BATH.

Sodium sulphite ¼ oz.
Water 1 oz.
Hydrochloric acid 30 drops.
Sodium hyposulphite 4 oz.
Water 20 oz.

The chemicals must be mixed in the order given in the formula—that is to say, the sulphite of soda must first of all be dissolved in five ounces of water, and when dissolved the acid must be added and the solution well stirred. In a separate vessel the hypo. must be dissolved in 15 ounces of water, and when solution is quite complete, the acidulated sulphite solution *must be added to the solution* of hypo., the whole being gently stirred during the mixture.

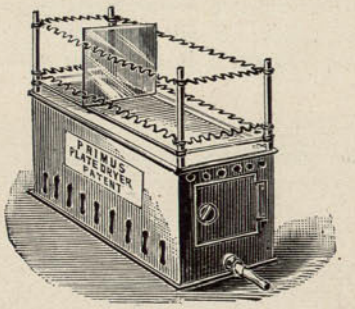
If preferred an ordinary fixing bath may be used, and the slides thoroughly fixed.

The slide should remain in this bath fully 15 minutes to ensure perfect fixation. Take out and wash well for 1 hour; the latter operation may be carried out in any ordinary room.

It is perhaps hardly necessary to warn the reader against making several slides until he is sure, by experiment, that the exposure has been quite correct. Towards this end, it is best to complete one slide from exposure to fixing before starting off to make a batch. By these precautionary measures the finished slide can be properly examined (when fixed) by daylight, to be certain that the proper density has been arrived at, and in a more sure way than by a cursory examination in the uncertain light of the dark room. If the result is quite satisfactory, then the operator may proceed.

A good lantern slide may be said to be one in which the whole of the image is of the most translucent character, in which the colour of deposit is pleasing (this after all is a matter of taste), and in which the tone values are proportioned in such a manner as to be suitable to the character of light which comes from the lantern. With regard to the degree of density necessary, it depends somewhat upon the kind of light to be employed in the lantern which is to be used to show the slides. Oxyhydrogen will require greater strength than oil light for the same size of projected picture.

When our slides are washed they must be set to dry in a warm and *dustless* room.

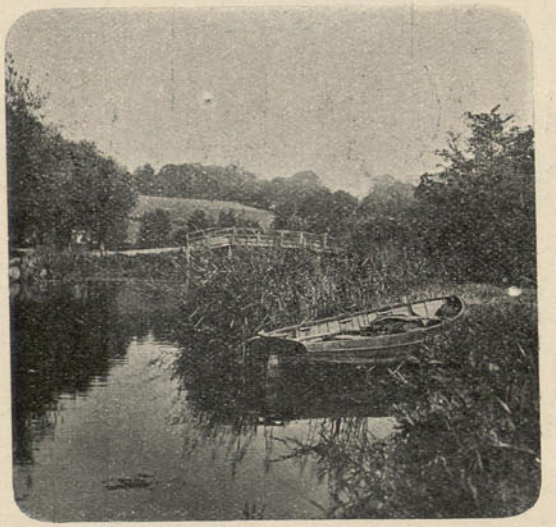


With this little appliance plates may be dried in ten minutes. The plates are supported in wire grooves on the top of the heating plate; underneath the plate is a box which forms a stand, and also the heating chamber. An atmospheric gas burner runs through the centre and may be connected to the house gas by a piece of indiarubber tubing.

CHAPTER VI.

CLOUDS IN LANTERN SLIDES.

A photograph showing blank white paper as the sky is now almost a thing of the past, and it should be the same in slides, yet there is a feeling with the average



FOREGROUND SLIDE.

amateur that it is such an awful job that it is usually neglected. Yet this is not so. In fact, many good workers assert they would rather make "effect" slides than prints.

There are two ways in which clouds may be introduced into a lantern slide—first, by combination printing from two or more negatives on to one plate, and a second method by using a separate plate for the clouds, and binding foreground and sky slide together to make up one final picture. The latter method is the one we should recommend

SKY SLIDE TO USE AS A COVER GLASS.

for the use of the average slide maker, for when he has successfully overcome the few difficulties of this method, he will have learned sufficient to enable him to take up the first method if so desired.

Now, for the benefit of the beginner who does not know anything about such things, we will be simple, and build up the picture from the raw material.

We take a negative, which in this case was taken especially for its foreground, and from it produce a lantern slide, which is shown on page 36.

When clouds are to be added to a slide the sky must be perfectly clear, and if the negative fails to yield such a slide the sky in the negative must be blocked out with some opaque medium or shaded during exposure. If the sky *does* show a slight veiling, it may be removed by the reducing method, as shown in a later chapter.

This shows the two previous slides, foreground and sky, bound together to form one pleasing whole.

Having secured a satisfactory foreground slide, we search through our stock of cloud negatives and find one taken at the same time of day as the foreground, and of such a form as we desire in our picture. A rough mask of paper should cover that portion (the

lower) of the negative as will be occupied by the foreground, and the mask roughly adjusted so as to make the foreground and sky slides match.

It is best perhaps to have more sky in the slide than is required, for should the sky overlap the landscape as to be noticeable, it can be brushed over with a weak reducing solution (as mentioned later) and so vignette the sky into the landscape; both illustrations, showing foreground and sky, are made from lantern slides; film side upward. Notice the clouds in the finished slide they are the reverse way to what they appear in the illustration of the sky only. This arises from the fact that the sky portion is used as a cover glass and the two slides are film to film.

This method of making pictures can be carried out to some length, but we think these few hints will help to convey our ideas on the subject.

In making slides which it is intended to join together, care must be taken to use an exactly similarly constituted developer for both slides, so as to obtain both slides of one colour, or the final result will not be pleasing.

CHAPTER VII.

THE AFTER-TREATMENT OF LANTERN SLIDES.

Lucky is the man who can always turn out just the slides he wants. Many slides come out of the fixing bath too thin or too dense, or perhaps of a most unsuitable colour. These must either be thrown away or doctored up. Personally we are in the habit of making fresh slides if our first endeavour does not satisy our own fastidious tastes; but at times we leave this principle and follow the ways of many others and doctor up some of the more or less vile specimens of slides which come out of our fixing bath.

The beginner in slide making makes two or three grave mistakes: First, over-exposure and under-development, which result in slides of a thin washed-out character, full of detail, yet lacking that vigour and range of gradation to enable it being classed as a success; second, over-development, which results in slides so dense or opaque that little or no light can penetrate them; third, under-exposure, a most common fault to which the beginner clings, for it brings him a slide of a black-and-white character, hard and brilliant, and pretty to look at, and one which we often find an uneducated audience appreciate.

Of these three classes we can make use of the first two, but those under heading of Class 3 are useless. No! not quite useless; they may be well cleaned and used for cover glasses for more perfect slides.

These slides can be improved in various ways, and even if not technically bad may be of a most unsuitable colour, and while we are considering the general improvement of our slides, we will take into consideration that of colours as before mentioned.

If a little more thought and care were exercised in the choice of colour, I am inclined to think it would do much to raise the standard of slides in general, especially in the eyes of those pictorial workers who have no sympathy with lantern slide "pictures," if that be the right term.

Nothing looks worse on the screen than landscapes in bright blue or a street scene in red.

GENERAL AND LOCAL REDUCTION.

Slides that show heavy and opaque, either in whole or part, must have this opacity removed in some way before they can be considered satisfactory.

The Howard-Farmer reducer will be found the best for this purpose. It is well known, and is made up as follows:—

No. 1—Hyposulphite of soda 1 oz.
Water 10 oz.

No. 2—Saturated solution of ferricyanide of potassium.

These solutions should be kept separate and mixed only for immediate use.

Take three clean dishes and into them place the following solutions:—

Dish No. 1—2 oz. No. 1 and 6 drops No. 2.
„ 2— „ „ 10 „ „
„ 3— „ „ 20 „ „

These mixed solutions quickly lose their power, and if many slides are to be worked upon, additional drops of No. 2 should be added from time to time as they are found to deteriorate. The work of reducing or faking of slides by this method should be carried on in a strong light and with a good flow of running water within reach.

We will suppose the first slide for treatment requires reducing all over; this is quite an easy matter, yet there are several points where one can go wrong. Having decided the density required, take the slide, and after

having wet it all over, place it in dish No. 1. This bath is not over-strong and will act slowly; the more ferricyanide added, the quicker the reduction. The slide in the bath will slowly but surely begin to lighten, and it should be carefully watched; take it out occasionally, swill well under the flow of water, and examine. There is one point in the reduction of slides which should not be overlooked: the action of the solution begins on the outer or upper surface of the film, and works its way through, and very probably dissolves away the delicate half-tones before a sufficient reduction has taken place in the rest of the slide. That is, it will begin to work on the sky portion first, the half-tones second, and so on, so that if our sky has a veil over it it is easily removed without greatly injuring the rest of the slide. This is especially useful when preparing slides for the addition of clouds, as mentioned in the last chapter.. If reduction is required in certain parts, it must be done locally. Should the slide reduce evenly all over to the right density, it can then be washed and put away to finish. If bath No. 1 is not strong enough, place it in No. 2, or even No. 3, remembering that if left too long the entire image will disappear.

The principal power in the hands of the artistic slide maker is, however, local reduction. Oftentimes a negative requires more exposure in one part than another to obtain from it a perfect slide, and as a paper printer masks and shades his print during its printing, so may the slide maker, to a certain extent, but not so fully as with a paper print. He can, however, do this—expose the whole a little more than normal, not much, but just enough to allow him to over-develop without forcing. Whether we have intentionally over-developed or by accident is no matter, our slide is useless as it is, and we find it too deep in many parts, shadows blocked up, trees too heavy, landscape too deep in light and shade, and it is here the taste and judgment of the lantern slide artist and the skill of the photographer are brought

into play; with a series of two or three fine sable brushes and the three dishes before him, and a good flood of clear water at hand, he may reduce this shadow, that tree, alter high lights somewhat, and paint out those parts he desires to remove, and retain those parts he considers necessary for his finished production. If one bath does not work quick enough on a certain part, he can use another, and so produces the effect he desires. This is more easily done than is generally supposed, and the resources at our command in this are unlimited.

The principal point to be remembered in reducing is that, as previously mentioned, the high lights and details are first acted upon. Extreme care must be used if the slides have been developed with ferrous-oxalate, for if all the iron is not removed, the whole slide will turn a brilliant blue, or may be only in patches. This is due to the iron coming in contact with the ferricyanide. I have not, however, recommended ferrous-oxalate. It is now almost obsolete as a developer for slides.

INTENSIFICATION.

Slides which from over-exposure or other causes are too thin to be shown must now be dealt with. The slides to be treated should be well washed and free from all fog. To ensure the absence of hypo., the slides should be well washed for one hour in running water; this will remove all that will do any harm in our work.

The first thing we must do is to decide how much density we want in addition to that we have already got on the slide; this can, however, only be learned by a little practice.

Take the lantern slide and place it in a clean dish, and flow over it sufficient of the following to cover the plate well:—

Mercury perchloride 2 drams.
Ammonium chloride 1 dram.
Water to make up 10 oz.

This can be used over and over again.

The length of time the slide remains in this bath regulates somewhat the density of the final result in the slide. If the slide is *very* thin, it should be bleached right through; if only slight intensification is required, a mere dip will be sufficient, after which the slides should be well washed for fifteen minutes.

Now take another *clean* dish, into which place the slide; a bath of water 1 oz., liq. ammonia .880 1 drm., should be flowed over it, and this will at once darken the bleached image, in a lesser or greater degree as to the amount of bleaching it received.

A warmer colour may be obtained by using a saturated solution of sulphite of soda instead of the ammonia. As regards the permanency of intensified slides I would say I had recently through my hands a slide treated with soda as above, over six years ago, and although it has been shown hundreds of times it is to-day perfect. Thorough washing is no doubt the keynote to success.

Another and perhaps better method of mercury intensification is that after bleaching the slide it is well washed and redeveloped with an ordinary ferrous-oxalate developer. If a mercury method is used at all, I should certainly recommend this latter method, it having been our practice to use it for several years. If the slide is originally developed full of detail, yet *under* its proper density, and after being well washed of all hypo., just dipped into the mercury bath for perhaps three or four seconds, and well washed, and then redeveloped as above with ferrous-oxalate, it will impart a rich bluish-black, which is very telling in a snow scene slide.

The last method of intensification I intend to bring forward is a very valuable one, and it is surprising to find that it is not more generally used. Make two solutions as follows:—

No. 1.

Pyro 60 gr.
Citric acid 150 gr.
Water to make 10 oz.

No. 2.

Silver nitrate 90 gr.
Distilled water 3 oz.

The slides should be free from all stains, fog and all traces of hypo.

By this method there is no bleaching of the slide. The slide is placed in a bath of 1 oz. No. 1 and 5 or 6 drops of No. 2, and slowly, but surely, the image begins to gain strength. Take out when dense enough and wash well. If the solution shows signs of discolouring, throw it away or stains will result. If a slight opalescence or milkiness appears after intensification, it should be passed through a clear hypo. bath and it will be cleared. The great beauty of this latter method is that there is no alteration of the original colour of the slide, and this is not to be relied upon by any other intensification method, especially where there is any warmth in the colour.

The following formula of intensification is very valuable when great contrasts are required:—

No. 1.

Bichloride of Mercury 10 grains.
Bromide of Potassium 10 grains.
Water 1 oz.

No. 2.

Nitrate of Silver 10 grains.
Crystallized Cyanide of Potassium 10 grains.
Water 1 oz.

After well washing from the fixing bath, flood over with solution No. 1 till the slide is bleached, wash well and flood with No. 2 till the image is just completely darkened through the film, then well wash again. The solutions may be diluted with three times the amount of water if great density is not required.

Thorough washing should follow these operations.

THE TONING OF SLIDES TO VARIOUS COLOURS.

We now arrive at a field of work which is not overcrowded with workers, yet in which there is great scope for experiments. Sometimes the colour of the slide does not suit the subject, or we may desire a colour not to be obtained by development, so that we must resort to some other means to attain our end. The methods here set forward give us this power, and some very telling and effective slides may be obtained by their use.

First let it be understood that all hypo. must be washed out of the slides to be treated, and that all dishes are clean. It is also preferable that the slides should have been dried, as by this means the toning is slower and much more under control of the worker. Slides should be clear and transparent, and not dense or fogged in any way. In fact, slides that are just a shade too thin are best to use for the method first described.

It requires a great amount of judgment to decide upon what to tone and what to let alone, but this is a matter for the individual slide maker to decide for himself.

All commercial plates take these toning agents readily, but the finest results are obtained on chloride plates.

If a pleasing red or rich brown is desired, the following will be found to give good results:—

No. 1.

Uranium nitrate 50 gr.
Water 10 oz.

No. 2.

Potassium ferricyanide 40 gr.
Water 10 oz.

This will give an endless variety of colours. For sepia brown tones use nine parts of No. 1 and one part of No. 2; for red tones, thirty-five parts No. 1 to seventy-five parts No. 2. It must be noted that this is an intensifier, and slides a little under-printed will show best.

If a bluish-green colour is desired, proceed as in the last case, and after toning wash well and place in a bath of—

Ferric chloride 1 gr.
Water 5 oz.

Toning will take two to four minutes, and the slides should be well washed and dried. If a mistake be made, the brown colour can be removed by placing in a bath of ammonia and water.

To obtain a pure blue colour, there is nothing better or simpler than the ordinary toning bath as used for the everyday P.O.P., such as the following:—

Sulphocyanide of ammonium 15 gr.
Gold chloride 2 gr.
Water 1 oz.

There are several formulae similar which are of equal merit, but this will serve our purpose.

The depth of colour given by this bath is regulated somewhat by the original density of the slide and the amount of sulphocyanide in the bath. An increase of sulphocyanide will result in much bluer colour, while a decrease tends towards bluish-black. If the slides are toned before drying, it also tends to increase the depth of colour. This bath can also be used for local toning. First let the slide be dried, then wet it under the water-flow, and place it face upward upon a piece of opal glass. Now, let us suppose we have a sunset slide which we have developed to a red colour all over. Take a soft brush and charge it with toning solution, and go over those portions which require toning down. Repeated applications of the toning bath must be made with the brush, starting at the edges of the slide and working gradually towards the centre, and thus vignette the red setting sun into what should be its darker surroundings; keep the centre clear from the toning bath by frequent flushes of water, and if these operations are successfully carried out, some magnificent slides should be the re-

sult. This method of toning can be carried out to a great extent, and the above will serve as an illustration as to how it can be done.

Another method of gold toning is one I first heard of in use by Mr. W. Prior Christian, of the Liverpool Amateur Photographic Society. It is very beautiful, yet little used; it is not only a toning method, but also an intensifier. It is as follows.

Bleach the well-washed slide in an ordinary mercury bath, and after bleaching wash well for fifteen minutes in running water. Slides for this method of toning should be full of detail, yet thin and clear; the thinner the slide the more it must be bleached and the more beautiful will be the resulting slide. If the slide is only just too thin, a mere dip into the mercury bath will be sufficient, but the result will not be so good. It is best to use very thin slides; bleach white right through.

Make the following stock solutions:—

No. 1—Sulphocyanide of ammonium 40 gr.
Hypo. 3 drops.
Water 14 oz.

No. 2—Chloride of gold 5 gr.
Water 2½ oz.

To tone, take 2 oz. No. 1 and ½ oz. No. 2, into which place the bleached slide. The colours will range from yellowish brown to golden brown, and on to purple and blue, the slide getting denser as the colours change. The plate must be taken out when the desired colour is reached, wash well and dry; any yellow stains can be removed by a weak bath of weak hydrochloric acid.

The bath is an easy one to use, and by its use most beautiful slides can be obtained, the golden brown being especially fine.

It is a good plan to use a small piece of opal glass upon which to rest the slide during these various operations, it being much easier to see what progress is being made.

BLOCKED OUT LANTERN SLIDES.

In making slides from negatives in which some piece of sculpture forms the principal object, it is often advisable to block out all the surroundings of the piece of sculpture or statuary, the background oftentimes being very obtrusive; or it may be we have some figure pictures taken in the street, which, if treated in a like manner, form very pleasing slides, as Mr. Paul Martin has clearly proved. The dried and finished slide should be rested upon a retouching desk or supported in such a manner as to get a good flood of white light through it; then get some Indian ink, and with a camel-hair brush well charged go over the outline of figures very carefully and so obtain a result as shown in this illustration—

If any of the ink should encroach on the figures, let it dry and then it can be easily removed with the aid of a brush and a little clean water.

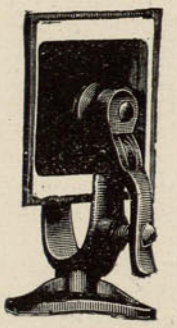
CHAPTER VIII.

MASKING AND BINDING.

We have now arrived at the final stage of our labour. The masking and binding of a slide is a very simple affair, yet the beginner with no knowledge of such things is sure to go astray. It is an operation that requires the same care and attention as the making of the slides themselves. The first things to obtain are what are known as cover glasses. These must be the same size as our slides—3¼ inches square—and should be as thin as possible; for this purpose the beginner will find the lantern plates he has spoiled come in very handy. Clean off the old emulsion from the glasses, and well wash and polish, then pick out only those that are *entirely* free from scratches or bubbles, for however small the defect in the glass or slide it will show up very unpleasantly when projected upon the lantern screen.

Now you require some masks, which are opaque pieces of paper, cut to the same size as the slide, and having various shaped openings through which the picture is seen. These masks may be purchased very cheaply, about 80 or 100 being sold for one shilling. It will be best for the beginner to purchase an assorted box containing all shapes except ovals and circles, which are useless. The next articles that are wanted are binding strips, which are strips of gummed paper and to be had in various colours and which are used to bind the two glasses together. We are now ready to start and finish off our historic slides, which operation is performed so as to protect the delicate image of the film from dust and scratches when in use.

Now take a piece of clean white paper and lay it upon the desk or table at which you propose to work. Gelatine is a substance which absorbs moisture, and which also undergoes decomposition much more readily when damp. To reduce this source of impermanence of a slide to a minimum it is a good plan to heat the slide about as hot as the hand can bear before proceeding to bind up; see also that the paper masks are "bone dry." This done, place the slide film upward on the piece of paper before you and proceed to select a mask which is most suitable, and in this the same judgment must be shown



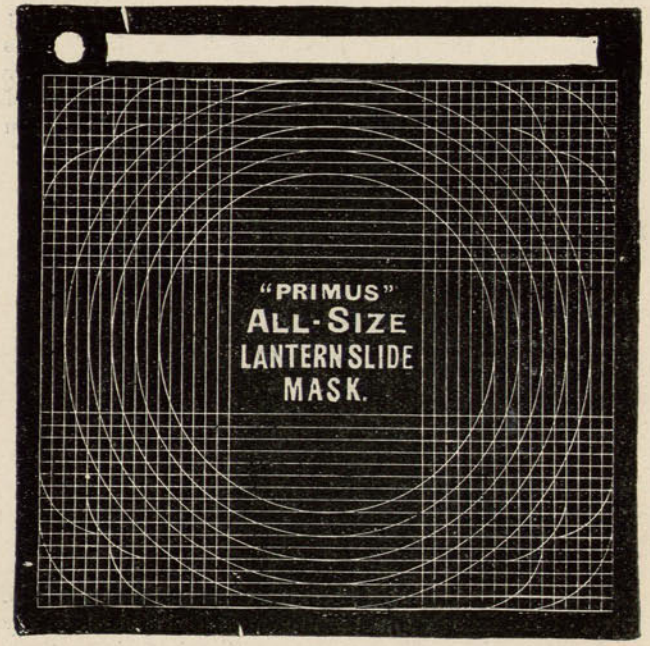
BINDING CLAMP.

as in trimming a print. If an unsuitable shaped mask be used, the slide as a picture may be spoiled. Try different masks until you get one that just shows those portions of the slide that require to be shown and no more. The "Primus" all size mask is a useful friend to the slide maker.

The white lines are marked upon it and any shape of opening can be cut by using the lines as a guide. Having decided upon the mask to be used we place it over the film side of the slide, and now take a cover glass, and after carefully dusting (with a brush) slide and cover, place

the two together, the film and mask between; it is now ready to be bound up.

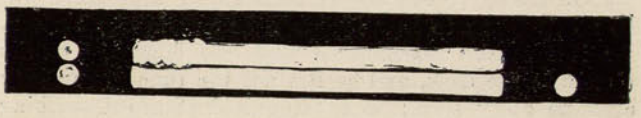
The "Primus" clamp will be found very useful when binding lantern slides with the long strips; it holds the



cover glass and slide together firmly and allows them to be turned round easily and the strip adjusted to them.

Screw the clamp to the table, holes being provided in the feet for this purpose, open the clamp by pressing the lever at the side, place the slide and cover in position, and on releasing the lever the same will be held securely.

In binding up the slide you may use one long strip or four short strips as you wish. The latter will perhaps be found to be the most handy.



This represents the top piece of binding strip. The white strip and two dots come on the face of the slide.

COMPLETE SLIDE MASKED AND SPOTTED

Bind round all the four slides in a neat manner, press the bindings into perfect contact with the glass,

and set to dry. When binding, press the two glasses tight together.

Having masked and bound our slide, it is important that it should be marked in such a way that there will be no doubt as to how it should be put in the lantern, for it must be remembered that the lanternist works almost in the dark, and he has not the time to carefully examine every slide; so a recognised standard marking has been adopted, which is to place a white spot on each top corner of the slide—thus, hold the slide so that you see the picture in its correct position, then place a white spot on each of the two top corners, and for this purpose I know of nothing better than Wheeler's Liliputian discs, sold in boxes of 400 at a remarkably cheap rate.

With a slide so marked any lanternist who may happen to handle the slide will know that for the picture to appear on the screen in the right way he will have to place the slide in the lantern with the spots downward and towards the light.

Before being shown, slides should be carefully cleaned of all gum and dirt and finally polished with a soft rag, and our slide, if properly made, masked and bound, will be a thing of beauty and a joy for ever.

DEVELOPING FORMULÆ

AND

INSTRUCTIONS

OF THE

PRINCIPAL LANTERN PLATE MAKERS.

The "Mawson Lantern" Plate.

DEVELOPERS.

EXPOSURE.—A negative of average density requires about 15 seconds at 1 foot from a No. 6 batswing burner. Short exposure tends to produce black tones; long exposure, brown tones.

Either of the following developers may be used, though we give the preference to the pyro-ammonia, greater variety of tone being available by it.

Development begins rather slowly, especially with the hydroquinone formula, afterwards proceeding more rapidly.

PYRO-AMMONIA DEVELOPER.

A. Pyrogallic acid	20	grains.
Bromide of ammonia	20	,,
Metabisulphite of potassium	50	,,
Distilled water to make up to.....(fluid)	10	ounces.
B. Liq. ammoniæ ·880	70	minims.
Distilled water to make up to.....(fluid)	10	ounces.

Use equal parts of A and B mixed at time of developing.

HYDROQUINONE DEVELOPER.

A. Hydroquinone	40	grains.
Bromide of potassium	40	,,
Metabisulphite of potassium	40	,,
Distilled water to make up to.....(fluid)	10	ounces.
B. Caustic potass (sticks)	80	grains.
Distilled water to make up to.....(fluid)	10	ounces.

Use equal parts of A and B mixed at time of developing.

EIKONOGEN DEVELOPER.

A. Eikonogen	100	grains.
Bromide of potassium	20	,,
Sulphite of sodium (recrystd.)	100	,,
Distilled water to make up to.....(fluid)	10	ounces.
B. Washing soda	600	grains.
Distilled water to make up to.....(fluid)	10	ounces.

Use equal parts of A and B mixed at time of developing.

Edwards's Special Transparency Plates.

PYRO AND AMMONIA DEVELOPER.

For Warm Tones.

No. 1.	Pyrogallic acid	1 ounce or	30 grammes.
	Sulphite of soda	4 ounces or	120 ,,
	Citric acid	¼ ounce or	8 ,,
	Water to make	16 ounces or	460 c.c.

First dissolve the sulphite and citric acid, and then add the pyrogallic.

No. 2.	Bromide of ammonium	1 ounce or	30 grammes.
	Liq. ammoniæ ·880	5½ drachms or	20 c.c.
	Water to make	16 ounces or	460 c.c.

For use, mix 1 part of No. 1 and 3 parts of No. 2, and dilute with water to double the quantity.

HYDROQUINONE DEVELOPER.

For Black Tones.

Hydroquinone	60 grains or	3 grammes.
Sulphite of soda	2 ounces or	45 ,,
Carbonate of soda (crystals)	4 ,, ,,	90 ,,
Carbonate of potash	2 ,, ,,	45 ,,
Bromide of potassium	40 grains or	2 ,,
Hot distilled water	20 ounces or	450 c.c.

For black and white line subjects add 1 drachm of a 60-grain solution of bromide of potassium to each ounce of developer.

Dissolve the hydroquinone in the water, and add the other ingredients in the order named.

AMIDOL DEVELOPER.

For Black Tones.

Amidol	80 grains or	5 grammes.
Soda sulphite	2 ounces or	60 ,,
Bromide of potassium	½ ounce or	15 ,,
Water	12 ounces or	360 c. c.

This developer is to be used without dilution, except when working from a very dense, strong negative, when it can be diluted with an equal amount of water. It may be used repeatedly without apparent loss of developing power. With correct exposure it yields slides of a very fine black colour. Exposure for contact printing the same as for Hydrokinone. Time of development, about 8 minutes. The developer will keep in good condition for a month or more.

Ilford Lantern Plates.

"SPECIAL" for Black Tones and "ALPHA" for Warm Tones.

DEVELOPER.

Solution No. 1.

Hydroquinone	160 grains.
Bromide potassium	30 ,,
Sulphite soda	2 ounces (avdps.)
Water, up to	20 ,,

Solution No. 2.

Soda hydrate	100 grains.
Water	20 ounces.

If a dish 3¼ inches square be used, 6 drams of solution will be ample to cover the plate, but if an ordinary ¼-plate dish only be available, one ounce of developer will be required. For normal use for SPECIAL PLATES we take

Solution No. 1	1½ drams.
Solution No. 2	1½ ,,
Water to make	6 ,,

ALPHA PLATES.

By the use of these images of any shade ranging from green, brown-green, yellowish brown, warm brown, to red, may be obtained by development only, whilst by toning a still greater variety can be produced.

Beginning with the green for the shortest exposures, the colours are, by prolonging exposure, produced in the order mentioned above.

About 9 inches from a gas burner, having an area of about 2 sq. inches, the exposure to produce rich brown tones from an ordinary negative would be from 5 to 10 minutes, and instead of using 1½ drams each of the Developer Stock Solutions as for Ilford Special Lantern Plates, only one dram of each should be used to make up with water the 6 drams required.

The image should appear somewhat slowly, and, although at first visible when lying in the white dish, it should not be seen too readily by transmitted light, otherwise the exposure has been too short, and the warm brown tone desired will not be attained. Development should not be carried too far, as these plates do not appear to lose at all in the fixing, and, moreover, on becoming dry they *darken* perceptibly, compared with their appearance when wet.

Should a red tone be produced, unless this is desired, the exposure has been too long, and should green be the result, the exposure has been too short.

Imperial Lantern Plates.

"SPECIAL" for Cold Tones and "SLOW" for Warm Tones.

The following tables give for both brands the exposure required for a negative of ordinary density at a distance of 12 in. from a medium gas burner; and also the approximate time of development and tones obtained.

"SPECIAL" SERIES (giving cold tones).

Developer.	Exposure required.	Time of Development (approximate)	Colour.
Hydrokinone..	10 secs.	2 mins.	Brown—black.
Single solution	5 ,,	1¼ ,,	Blue—black.
Pyro-soda ...	10 ,,	2 ,,	Green—black.

"SLOW" SERIES (giving warm tones).

Hydrokinone..	18 secs.	1½ mins.	Warm—brown.
Single solution	8 ,,	1 min.	Brown—black.
Pyro-soda ...	18 ,,	1¾ mins.	Olive—green.

The developers are:—

"IMPERIAL PYRO-SODA" DEVELOPER.

Stock Solution.

Pyrogallic acid	1 oz.
Bromide of potassium	60 grs.
Metabisulphite of potash	50 grs.
Water (boiled or distilled) to	12 ozs.

No. 1.

Stock solution	3 ozs.
Water (boiled or distilled) to	20 ozs.

No. 2.

Sulphite of soda	2 ozs.
Carbonate of soda	2 ozs.
Water (boiled or distilled) to	20 ozs.

For use take equal parts of No. 1 and No. 2.

This is a well-tried developer, and one which gives excellent results with our plates. It is specially suitable when the exposure has been ample and density is required.

IMPERIAL LANTERN PLATES.—*Continued.*

"IMPERIAL HYDROKINONE" DEVELOPER.

No. 1.

Hydrokinone	150 grs.
Metabisulphite of potash	10 ,,
Bromide of potassium	50 ,,
Water (boiled or distilled) to	20 ,,

No. 2.

Sulphite of soda	2 ozs.
Caustic soda	100 grs.
Water (boiled or distilled) to	20 ozs.

For use take equal parts of No. 1 and No. 2.

After using this developer, always rinse the negative well before transferring to the fixing bath.

The chief characteristic of hydrokinone is its density-giving power, it is *par excellence* the developer for lantern plates.

"IMPERIAL SINGLE-SOLUTION" DEVELOPER.

Metol	50 grs.
Hydrokinone	40 ,,
Sulphite of Soda	500 ,,
Bromide of potassium	25 ,,
Carbonate of soda	500 ,,
Water (boiled or distilled) to	20 ozs.

Thomas & Co.'s Lantern Plates.

EXPOSURES AND DEVELOPERS.

The negative taken as a standard is a brilliant black-toned one of good printing density, taking about 15 minutes in good diffused mid-daylight to furnish a satisfactory albumenised paper print.

Magnesium ribbon used is the ordinary commercial article, one foot of which weighed 2½ grs.

FORMULÆ FOR DEVELOPERS.

Hydroquinone.

No. 1 Solution.

Hydroquinone	160 grs.
Sodium sulphite	2 oz.
Citric acid	60 grs.
Potass. bromide	40 ,,

Water to 20 ounces.

No. 2.

Sodium hydrate	160 grs.

Water to 20 ounces.

No. 3.

Brom. ammonium	2 oz.

Water to 20 ounces.

No. 4.

Carb. ammonium	2 oz.

Water to 20 ounces.

Pyrogallic Acid.

No. 1.

Pyrogallic acid	1 oz.
Sulphite soda	3 ,,
Citric acid	¼ ,,

Water to 10 ounces.

No. 2.

Liq. ammonia ·880	1 oz.

Water to 10 ounces.

No. 3.

Brom. ammonium	1 oz.

Water to 10 ounces.

No. 4.

Carb. ammonia	1 oz.

Water to 10 ounces.

THOMAS & CO.'S LANTERN PLATES.—*Continued.*

EXPOSURES AND DEVELOPMENT FORMULÆ, with approximate time required for development at temperature of 60°.

BLACK TONE.

Hydroquinone.

Exposure, 1 in. Mg., distance 3 feet.

Developer No. 1	½ oz.
,, No. 2	½ ,,

Water to 2 ounces.

Pyro.

Exposure, same as with hydro.

Developer No. 1	30 minims.
,, No. 2	30 ,,
,, No. 3	30 ,,

Water to 2 ounces.
Time, about 2 minutes.

BROWN.

Hydroquinone.

Exposure, 2 in. Mg., distance 1 foot.

Developer No. 1	½ oz.
,, No. 2	½ ,,
,, No. 3	15 minims.
,, No. 4	15 ,,

Water to 2 ounces.

Pyro.

Exposure, same as with hydro.

Developer No. 1	30 minims.
,, No. 2	30 ,,
,, No. 3	45 ,,
,, No. 4	45 ,,

Water to 2 ounces.
Time, about 7 minutes.

PURPLE.

Hydroquinone.

Exposure, 3 in. Mg., distance 1 foot.

Developer No. 1	½ oz.
,, No. 2	½ ,,
,, No. 3	30 minims.
,, No. 4	30 ,,

Water to 2 ounces.

THOMAS & CO.'S LANTERN PLATES.—*Continued.*

Pyro.

Exposure, same as with hydro.

Developer No. 1	30	minims.
,, No. 2	30	,,
,, No. 3	120	,,
,, No. 4	120	,,

Water to 2 ounces.

Time, about 10 minutes.

RED.

Hydroquinone.

Exposure, 6 in. Mg., distance 1 foot.

Developer No. 1	½	oz.
,, No. 2	½	,,
,, No. 3	90	minims.
,, No. 4	90	,,

Water to 2 ounces.

Time, about 15 minutes.

N.B.—For the warm tones development must be carried much beyond what is apparently sufficient, so much is lost in fixing. A yellow light is recommended to be used, as it greatly facilitates judging of tone. It should also be mentioned that richness of tone is entirely dependent on depth to which development is carried.

It is probably needless to remark that more or less magnesium may have to be used on account of greater or less density of the negative, or possibly on account of its having a stain.

Paget Prize Lantern Slides.

DEVELOPMENT.

For BLACK TONES development should in no case exceed 3 minutes. If longer is required the exposure has been insufficient, and the result will not be so good.

Any of the following formulæ are suitable:—

HYDROKINONE.

Solution 1.		Solution 2.	
Hydrokinone	½ oz.	Caustic soda	½ oz.
Sulphurous acid	¼ ,,	Sodium sulphite	2½ ,,
Potassium bromide	60 grs.	Water to	20 ,,
Water to	20 ozs.		

For use, take ½ oz. of each to 1 oz. of water.

EIKONOGEN DEVELOPER.

Solution 1.		Solution 2.	
Eikonogen	½ oz.	Potassium carbonate	1 oz.
Sodium sulphite	1½ ,,	Distilled water to	10 ,,
Potassium bromide	8 grs.		
Distilled water to	30 ozs.		

Take 3 parts of No. 1 to 1 part of No. 2 solution.

RODINAL DEVELOPER.

Rodinal concentrated solution	1 part.
Water	30 parts.

This is a very clean developer, and gives a rich black colour.

FERROUS OXALATE DEVELOPER.

Solution 1.		Solution 2.	
Neutral oxalate of Potash	16 ozs.	Proto-sulphate of iron	4 ozs.
Citric acid	60 grs.	Citric acid	15 grs.
Hot water	50 ozs.	Hot water	8 ozs.

Solution 3.

Bromide of potassium	¼ oz.
Water	10 ,,

For development, take 6 ozs. of No. 1, and add 1 oz. of No. 2 and 24 drops of No. 3. Gives cold-black tones.

PAGET PRIZE LANTERN SLIDES.—*Continued.*

Pyro-Ammonia.

Solution 1.		Solution 2.	
Pyrogallic acid ...	1 oz.	Liquor ammonia ·880	1 oz.
Sodium sulphite ...	1½ ,,	Ammonium bromide	1 ,,
Citric acid	¼ ,,	Distilled water to...	10 ,,
Distilled water to	10 ,,		

For use, take 45 minims of each solution and make up with water to 2 ozs.

Warm Tones.—Developer.

Solution 1.		Solution 2.	
Hydroquinone.....	½ oz.	Caustic soda	½ oz.
Sulphurous acid.....	¼ ,,	Sodium sulphite	2½ ,,
Potassium bromide	60 grs.	Water to	20 ,,
Water to.....	20 ozs.		

Solution 3.

Bromide of ammonium	1 oz.
Carbonate of ammonium	1 ,,
Water to	20 ,,

Carbonate of ammonium should be in clear lumps; if from exposure to the air it has become coated with the white powdery bicarbonate the latter should be scraped off.

Brown.

Exposure, 60 seconds 1 foot from gas-flame, or 2 inches of magnesium wire burnt at a distance of 3 feet. Developer, solution 1, ½ oz.; solution 2, ½ oz.; solution 3, 100 minims; water to 2 ozs. Time required in development, about 5 minutes.

Purple Brown.

Exposure, 90 seconds 1 foot from gas-flame, or 3 inches of magnesium wire burnt at a distance of 3 feet. Developer, solution 1, ½ oz.; solution 2, ½ oz.; solution 3, 200 minims; water to 2 ozs. Time required in development, about 10 minutes.

PAGET PRIZE LANTERN SLIDES.—*Continued.*

Purple.

Exposure, 3 minutes 1 foot from gas-flame, or 3 inches of magnesium wire burnt at a distance of 2 feet. Developer, solution 1, ½ oz.; solution 2, ½ oz.; solution 3, 250 minims; water to 2 ozs. Time required in development, about 12 minutes.

Red.

Exposure, 5 minutes 1 foot from gas-flame, or 5 inches of magnesium wire burnt at a distance of 2 feet. Developer, solution 1, ½ oz.; solution 2, ½ oz.; solution 3, 300 minims; water to 2 ozs. Time required in development, about 15 minutes.

The "Premier" Rapid Lantern Plates

(Rapid Chloride).

EXPOSURE.—These plates are about the same rapidity as ordinary wet plates, and are from 20 to 30 times as rapid as the ordinary Chloride.

For contact printing the exposure required with ordinary negatives, using a fishtail burner (burning about 5-ft. per hour) at 1-ft. distance, is about 30 seconds.

For camera work, with average negatives, pointing to the sky, and using $\frac{f}{24}$ stop, the exposure required would vary from 2 to 5 minutes.

DEVELOPMENT.—The following developer gives very fine results with these plates.

HYDROKINONE DEVELOPER.

Hydrokinone	150 grains.	Carbonate of soda.	4 ounces.
Sulphite of soda...	1 ounce.	Water to 20	,,
Bromide potash...	10 grains.		
Water to.....	20 ounces.		

To develop take equal parts of each. The developer can be used several times in succession.

The plate may also be developed with the:—

FERROUS-OXALATE DEVELOPER.

Solution 1.		Solution 2.	
Oxalate of potass, neut	13 ounces.	Sulphate of iron ...	5 ounces.
Distilled water.....	50 ,,	Distilled water.....	15 ,,
		Sulphuric acid.....	15 drops.

For use, pour 1 part of No. 2 into four parts of No. 1. Do not pour the oxalate into the iron solution, as a precipitate of ferrous oxalate will be formed.

Add 1 drop of solution of Bromide of Potassium (80 gr. to 1 oz. of water) for dark tones, increasing the exposure and amount of bromide for warmer tones.

Austin Edwards' Queen Lantern Plates.

HYDROQUINONE DEVELOPER FOR LANTERN PLATES.

For Black Tones.

Distilled water	20 ounces.
Hydroquinone.....	60 grains.
Sulphite soda	2 ounces.
Carbonate soda (crystals).....	6 ,,
Bromide potassium	40 grains.

Time of development, if exposed correctly, about 2 minutes.

PYRO DEVELOPER.

For Warm Tones.

No. 1.	Water	20 ounces.
	Nitric acid	20 drops.
	Sulphite soda	4 ounces.
	Pyrogallic acid.....	1 ounce.
No. 2.	Water	20 ounces.
	Bromide ammonium (not potassium) ...	3 ,,
	Liq. ammonia ·880	1 ounce.

Add the acid to the water, and the other ingredients in the order named.

For use, take 1 part each of Nos. 1 and 2, and dilute with equal quantities of water. For still warmer tones, add 1 part more water, or again double the exposure and add one-fourth more No. 2.

Cowan's Chloride and Chloro-Bromide Plates.

FOR GELATINO-CHLORIDE PLATES.

IRON.

For Cold Tones.

No. 1	Potass. citrate	100 grains.
	Potass. oxalate	80 ,,
	Hot distilled water to make up to 1 ounce.	

For Warm Tones.

No. 2	Citric acid	90 grains.
	Ammonium carbonate	60 ,,
	Cold distilled water to make up to 1 ounce.	

For Extra Warm Tones.

No. 3	Citric acid	130 grains.
	Ammonium carbonate	40 ,,
	Cold distilled water to make up 1 ounce.	

In mixing the solutions Nos. 2 and 3, it is better to place the crystals of the salts into a deep vessel, and, after adding the water, leave alone till all effervescence ceases. It is advisable to make it over night.

To three parts of either of the above add one part of the following at the time of using :—

Sulphate of iron	120 grains.
Sulphuric acid	1 drop.
Make up with distilled water to one ounce.	

Either of these developers should give clear glass in the unexposed parts of the picture ; but, if at any time the slightest fog is found, it should at once be cured by the addition of a trace of either potassium bromide or sodium chloride. Bromide is better with No. 1, and chloride with either No. 2 or No. 3. A convenient form of using these will be to keep a ten per cent. solution of each of these salts, and one or two minims to each ounce of developer will be found a powerful restrainer.

HYDROQUINONE.

No. 1	Hydroquinone	48 grains.
	Sodium sulphite	320 ,,
	Ammonium bromide	2 ,,
	Water to make up to 10 ounces.	
No. 2	Ammonium carbonate	100 ,,
	Sodium carbonate	100 ,,
	Water to make up to 10 ounces.	

COWAN'S CHLORIDE AND CHLORO-BROMIDE PLATES.—*Continued.*

Equal proportions of each are mixed together, according to size of plate to be developed at the time of using.

Different alkalies may be substituted for those mentioned, such as potassium carbonate, sodium silicate, potassium hydrate, sodium hydrate, etc. ; but, in all cases, a small proportion of bromide should be used.

A number of plates may be developed one after the other in the same solution.

EIKONOGEN.

This developing agent, first introduced by us, will be found to give admirable results of a pleasing colour.

Formula.

A.	Sulphite soda, pure	200 grains.
	Eikonogen	50 ,,
	Potassium bromide	5 ,,
	Water to make up to 10 ounces.	
B.	Sodium carbonate	160 grains.
	Water to make up 10 ounces.	
	Equal parts to be mixed together at the time of using.	

FOR CHLORO-BROMIDE PLATES.

Pyrogallic Development.

A.	Pyrogallic acid	40 grains.
	Pure sodium sulphite	16 ,,
	Citric acid	5 ,,
	Water, 10 ounces.	
B.	Liq. am. fort	40 minims.
	Potassium bromide	40 grains.
	Water to make up to 10 ounces.	

Equal parts of the solutions to be mixed at the time of using.

A very pleasing warm colour will be obtained by adding to the B solution 200 grains of ammonium carbonate, but the time of development will be increased.

Ferrous-Oxalate Development.

The saturated solutions of potassic oxalate and iron sulphate may be used in the proportion of three or four parts of the former to one of the latter, with the addition of one grain of potassium bromide to each ounce of developer, adding more bromide and increasing the amount of exposure when warmer tones are required.

COWAN'S CHLORIDE AND CHLORO-BROMIDE PLATES.—*Continued.*

To keep the iron solution from oxidising, one drop of sulphuric acid should be added to each ounce of water before dissolving the salt.

The ferrous-oxalate gives a blacker coloured image than pyrogallic developer.

The time of development will vary from two to four minutes, according to temperature and density of image required.

HYDROQUINONE DEVELOPER.

Hydroquinone Solution.

Hydroquinone	40 grains.
Sodium sulphite, pure	120 ,,
Potassium bromide	5 ,,
Citric acid	5 ,,
Water to make up to	10 ounces.

Alkali Solution.

Potassium hydrate, pure	80 grains.
Water to make up to	10 ounces.

Equal parts to be mixed together at time of using.

It is advisable that all solutions should be made with distilled water, though not absolutely essential.

Several plates may be developed in the same solution.

EIKONOGEN DEVELOPER.

This developer will be found to suit these equally well with slight modification.

A small proportion of bromide must be used to ensure absolute clearness in the unexposed parts.

Formula.

Sodium sulphite	400 grains.
Potassium bromide	5 ,,
Eikonogen	100 ,,
Water to make up to	10 ounces.
Sodium carbonate	320 grains.
Water to make up to	10 ounces.

Equal parts of each to be mixed together at time of using.

"Cadett" Lantern Plates.

DEVELOPERS.

Warm Tones.—Pyro Ammonia.

A. Pyrogallic acid	40 grains.
Ammonium bromide	40 ,,
Potass metabisulphite	120 ,,
Distilled water to make altogether...(fluid)	20 ounces.
B. Liq. ammoniæ	150 minims.
Distilled water to make altogether	20 ounces.

Equal parts of A and B to make developer.

This formula gives rich warm tones with suitable exposure.

For warm black tones, the following may be used:—

A. Pyrogallic acid	30 grains.
Sodium sulphite	100 ,,
Sulphurous acid (or citric acid 5 grains)	5 minims.
Ammonium bromide	30 grains.
Distilled water to make altogether	20 ounces.
B. Liq. ammoniæ ·890	40 minims.
Distilled water to make altogether...(fluid)	20 ounces.

Equal parts A and B to make developer.

A rich warm black can be obtained with hydroquinone, and we strongly recommend the following formula:—

A. Hydroquinone	70 grains.
{Potass metabisulphite	10 ,,
{or sulphurous acid	15 minims.
Potassium bromide	35 grains.
Distilled water to make altogether...(fluid)	20 ounces.
B. Potassium hydrate (sticks)	140 grains.
Sodium sulphite	700 ,,
Distilled water to make altogether	20 ounces.

Equal parts A and B to make developer.

Gem Lantern Plates.

DEVELOPER FOR COLD OR WARM TONES.

Cold Tones.—Hydroquinone.

A.	Hydroquinone	½ ounce.
	Citric acid	¼ ,,
	Potassium bromide	60 grains.
	Water	20 ounces.
B.	Caustic Soda	½ ounce.
	Sodium sulphite	3 ounces.
	Water	20 ,,

For use, take equal parts of A and B, and dilute with water equal to their combined bulk.

Warm Tones.

C.	Ammonium carbonate	1 ounce.
	Ammonium bromide	1 ,,
	Water	20 ounces.

For use, take of the above hydroquinone formula 2 parts, and add 1 part of C.

In obtaining either cold or warm tones, it is well to remember that exposure is the greatest factor. For cold tones, an exposure of 10 to 20 seconds, 1 foot from a No. 5 gas burner, will be ample, and develop as above. For warm and deeply coloured tones, expose from 30 seconds to 3 minutes, and develop with addition of C, always using a slightly increased proportion of C as the exposure is prolonged.

"Barnet" Lantern Transparency Plates.

For Cold or Warm Tones (according to exposure and development).

INSTRUCTIONS FOR USE.

Contact Printing.—For black tones the exposure required is about 10 seconds at a distance of 1 foot from an ordinary gas flame: the developer to be used is either No. 1 or 2.

To secure warm tones it is necessary to increase the exposure to 2 or 3 minutes and use formula either No. 3 or 4.

To obtain still warmer (reddish) tones, increase the exposure still further to 5 or 6 minutes and develop with formula No. 5.

Reductions in the Camera.—For black tones with stop *f*-16 in bright diffused light from a half-plate negative an exposure of about 10 seconds is required, using formula No. 1 or 2 for developing.

For warm tones increase the exposure to 2 or 3 minutes and using for developer either formula No. 3 or 4.

For still warmer tones further increase the exposure to 5 or 6 minutes and develop with formula No. 5.

FORMULÆ FOR DEVELOPERS.

Cold Black Tones.

A.

No. 1.	Metol	400 grains.
	Soda sulphite	8 ounces.
	Water	80 ,,

B.

Carbonate of potash	1200 grains.
Ammonium bromide	240 ,,
Potassium bromide	480 ,,
Water	80 ounces.

Take equal parts of A and B.

Note.—The ammonium bromide is necessary for the production of absolutely cold black tones; a larger quantity is not recommended, as it tends to produce a slight veil in the high lights.

Length of time in developing about 2 minutes.

"BARNET" LANTERN TRANSPARENCY PLATES.—*Continued.*

Warm Black Tones.

A.

No. 2.	Hydroquinone	640 grains.
	Soda sulphite	8 ounces.
	Potass bromide	120 grains.
	Water	80 ounces.

B.

	Sodium hydrate	640 grains.
	Water	80 ounces.

Take equal parts of A and B.

This produces a very pleasing warm black. Length of time in developing about 2 minutes.

Warm Brown Tones.

A.

No. 3.	Pyro	1 ounce.
	Soda sulphite	4 ounces.
	Water	80 ,,

B.

	Carbonate of ammonia	900 grains.
	Potassium hydrate	750 ,,
	Ammonium bromide	600 ,,
	Water	80 ounces.

Take equal parts of A and B.

Length of time in developing about 2 minutes.

Or the following may be used:—

No. 4.—Take equal parts of No. 2 formula and add to each ounce 3 grains carbonate of ammonia and 3 grains of ammonium bromide.

Length of time in developing about 3 or 4 minutes.

Very Warm (Reddish) Tones.

No. 5.—Take equal parts of No. 2 formula and add to each ounce 6 grains of carbonate of ammonia and 6 grains ammonium bromide.

Length of time in developing about 8 minutes.

SOME USEFUL RECIPES

FOR

LANTERN WORKERS.

White Ink for Writing on Lantern Slide Masks.

Oxide of zinc mixed in gum water of sufficient strength to prevent precipitation of the pigment, yet not sufficiently thick to prevent it flowing from an ordinary pen, forms, probably, the most satisfactory ink, but at a pinch any insoluble powder of sufficient fineness may be used, such as whiting.

Chinese white is made by grinding zinc oxide in a mucilage of gum tragacanth, a very small proportion of glycerine being added.

How to Make Ink for Writing on Glass, Lantern Slides, etc.

Take ½ ounce of copal resin and 4 ounces of oil of lavender, and dissolve, after which the colouring matter should be added. This may be lamp black, vermilion, ochre, etc., but it must be in a fine powder.

Development in Cold Weather.

Lowering the temperature of the room or developer generally slows chemical action; therefore warm the developing solutions and developing dishes to about 60° Fahr. A good method of doing this is to place the developing dish into a larger one full of warm water.

Showing Lantern Slides.

Do not have your slides spoiled by being shown on thin and inferior sheets. To show a slide to perfection the lantern sheet should be perfectly opaque; many so-called are at present on the market, but they are far from being opaque. After the front has been coated with a fine white pigment the back of the sheet should also be coated, it being best to use a black opaque pigment for this purpose.

To Clean Stained Bottles.

An easy and economical way to do this is to procure some small shot and put them into the bottle you require cleaning; then pour into the bottle some warm water, and add a little soda. Now shake up the bottle in such a way as to make the shot go round the bottle. It is surprising how soon bottles may be cleaned in this way. Take out the shot from the bottle and reserve it for a future occasion. Rinse the bottle out with clean water and set to dry.

Hyposulphite of Soda.

This is one of our best friends in photography, and also our worst enemy. It is a friend by itself, but a fiend incarnate if brought into contact with developers or dishes when making lantern slides.

To Dry Lantern Slides Quickly.

After being fixed and well washed, wipe off the surface wet from the film of the plate, and immerse in a bath of alcohol for a few minutes; then place in a room to dry, which will only take a few minutes.

An Aid to Focussing Negatives for Reduction.

In making slides by reduction through the camera, a good plan is to make a screen to assist in obtaining a sharp focus. Such a screen can be made by taking an old negative and clearing off the old gelatine; then give it a coat of black varnish, and when dry rule a series of lines from right to left, cutting through the varnish, so as to show clear glass lines. If this be focussed in place of the negative, it will be found much easier to obtain a sharp image. When the correct focus is found take out the screen and insert the negative to be reduced.

Stripping Films from Glass.

Most photographers have experienced the difficulty of stripping a gelatine film from glass in order to use the glass again. Caustic alkali is usually employed, but if the glass be immersed for any length of time in a strongly alkaline solution, its surface is certain to be attacked, sometimes very badly. For this reason caustic alkalies are to be avoided. Acids, on the other hand, while getting rid of the gelatine, do so by dissolving it, and the glass requires subsequently a very thorough cleaning. A method recently recommended is ingenious, to say the least. The plate is allowed to soak for some minutes in water which has been rendered slightly acid with hydrochloric or other suitable liquid. When this has soaked right through the film, the plate is immersed in a strong solution of sodium bicarbonate or of washing soda. Carbon di-oxide is at once liberated both in the body of the film and between the gelatine and the glass, and the removal is greatly facilitated.

Under-Exposed Lantern Slides.

These are usually lacking in detail, and if intensified with one good blow from an ordinary hammer it will be found to have as much detail as such a slide deserves.

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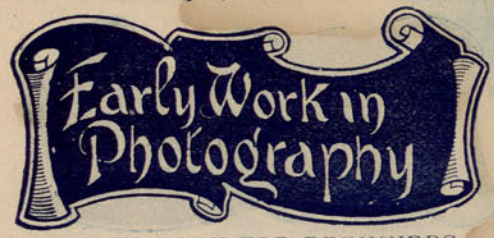

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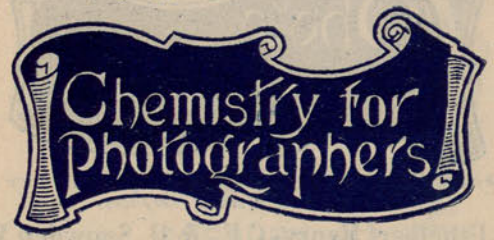

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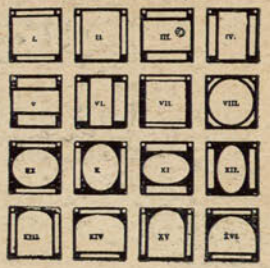

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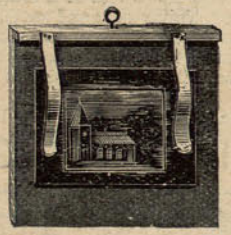

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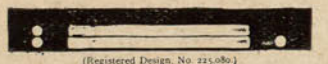


(Registered Design, No. 225,080.)

Supplied in black, or four new artistic colours. Thin paper; thrice gummed; cut narrow. Price 1s. per box.

"Primus' Everlasting Binding Strips. Made of Silk.

Easy and quick to put on, being flexible immediately they are wetted; and well gummed. Very neat in finish, and wear everlastingly. Price 1s. 6d. per box.

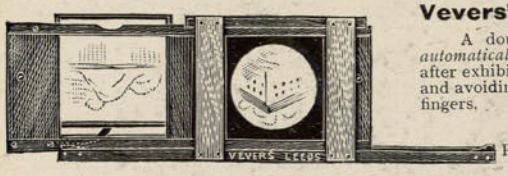
W. Butcher & Son, Blackheath, London, S.E.

PATENTEES AND MANUFACTURERS OF ALL "PRIMUS" SPECIALITIES.

VEVERS' LANTERNS AND ACCESSORIES

Are 20 per cent. better value than any in the Trade.

VEVERS' IMPROVED FULL SIZE JAPANNED METAL LANTERN, with Superior Front Lenses, 4 in. Condenser, 3-wick Lamp, 21/-



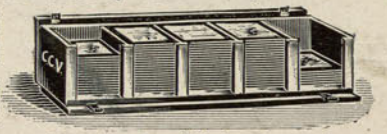
Vevers' New Slide Carrier.

A double registering Carrier, which *automatically* raises the slide out of the frame, after exhibition, thus facilitating its removal, and avoiding the glasses being soiled by the fingers.

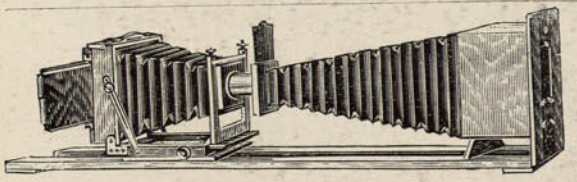
Best Quality in Mahogany, 1/9 Postage 3d. extra.

Vevers' "Security" Slide Box (Protected).

Five Compartments, each holding 25 lantern slides. Slides lay flat, and as exhibited, are placed in empty compartment. Lids fold perfectly flat against box, hence no projections. Slides packed in this box can be safely sent per post or rail. 100 slides occupy less space than 50 in grooved box. No breakage. No sticking in grooves. No slides shown out of proper order. No more trouble.



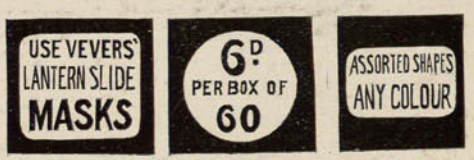
Best make stained walnut and varnished boxes, 3s. 9d. each. In polished mahogany, 5s.
Ditto, with lock and key, 6s.

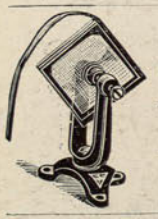


VEVERS' CAMERA
FOR MAKING
Lantern Slides
By REDUCTION.
½-plate 17/6; 1-1, 25/-

Lantern Masks. — Twelve colours. Cushion, Circular, Oblong, Dome, and Oval. 6d. per box. Post free, 7d.

Vevers' Coloured Lantern Slide Binders—In Six colours: Orange, Green, Lilac, Pink, Blue, and Black. Packed in neat box, 6d. per 100. Post free, 7d.





VEVERS' LANTERN SLIDE BINDING CLAMP

For holding and revolving the transparency, mask, and glass in binding.

The Best Clamp in the Market. Price 1s. Post free, 3d. extra.

Thin White Cover Glasses.

3d. per dozen; 2s. 6d. per gross.

Gummed Numbers.

For Numbering and "Spotting" Lantern Slides, Slide Boxes, Negatives, &c.

Twelve Sets (Nos. 1 to 156, or 157 to 300), 3d. Post Free, 3½d.

Vevers' New Illustrated Lantern and Slide Catalogue, 2d. free. Catalogue of Photographic Specialities, 2d. free.

C. C. VEVERS, 54, Grand Arcade, LEEDS.