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THE PHOTO-MINIATURE

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LANTERN SLIDES

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ON THE DUNES
Ph. R. von Schoeller

THE PHOTO-MINIATURE

A Magazine of Photographic Information

Edited by John A. Tennant

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LANTERN-SLIDES.

Except the portrait there is no photographic reproduction which appeals so strongly to the lay mind as does the lantern-slide. To such a mind the slide is known, not as a small, carefully prepared transparency on glass, but as a huge brilliant picture appearing on the white wall of a darkened room. There is still a wonderful glamour of mystery in the great disk of white light as the pictures succeed each other upon it, or melt gradually from one to the other, and the old name of "magic-lantern pictures," used by the uninitiated, was singularly appropriate. Only a short time ago the photographer felt inclined to scoff at what he termed a toy, and left the use of the lantern to the professional entertainer or the philanthropist, and the production of slides to commercial workers.

But within the past few years the amateur photographer has so increasingly taken up the work that he is to-day perhaps the largest user of lantern-plates. One great factor in influencing this change is undoubtedly to be found in the increase of amateur societies. A club meeting creates a wish for a picture which may be viewed simultaneously by a number of people; and by sharing the expense of a lantern, the club members meet a charge which would often be too heavy for an individual worker. The question of "art" is often raised in connection with lantern-slides, but as it is a subject as inexhaustible as empty, it may be left, so far as we are concerned, until that unfortunate and much prophesied date when the number of the subjects coming within the scope of THE PHOTO-MINIATURE shall have been exhausted.

The manipulation of lantern-plates does not materially differ in development from the manipulation of negatives

or of bromide papers, and in some ways the work is easier. There being no necessity for any snapshot work in the making of a lantern-slide, the bugbear of under-exposure is avoided; and the wide latitude permissible, from normal exposure to over-exposure, overcomes the difficulty of over-printing. For it is a strange fact that the amateur is very prone to under-expose his negative, and over-expose his *Velox* or *Dekko* print.

The Lantern-slide. A lantern-slide is a positive transparency on a glass 3¼ × 4 inches square. The picture itself is smaller, and may be any shape preferred by the maker, and any size up to about 2¾ inches each way. The edges of the picture are defined by an opening of the desired size being cut in a piece of opaque paper. This paper is laid on the slide and masks out the edges and parts not wanted in the picture. Over the paper mask a piece of clear glass is laid of the same size as the one supporting the picture, and the two glasses are firmly bound together by glueing a strip of paper around their edges. This cover-glass serves the double purpose of holding the mask in position and protecting the film from injury. A slide is not in itself the end aimed at, but is rather—as is a negative—a means to the end.

The lantern-slide is to be viewed as a picture much enlarged, by passing through it a powerful beam of light which is thrown through a lens on to a screen or wall in a darkened room. The mechanical limitations in constructing a lantern for this purpose have necessitated a standard size for lantern-slides, and this size has been fixed at 3¼ × 4 inches. (In England the standard size is 3¼ × 3¼ inches, and British and American workers each maintain that their own size is the more practicable one. Fortunately, the slides of the two countries are interchangeable in all lanterns.)

It is very necessary that there shall not be any very dense or opaque parts in the film—the deepest shadows should have the appearance of stains rather than of deposits of matter, or they will appear on the screen as black masses. The highest lights should be clear glass, and between these two extremes there should be as much gradation as possible. A slide, therefore, should be full of detail and gradation, and clear in the shadows. The picture is magnified many times on the screen—from two or more feet in diameter in a small room, to over

twenty feet in a very large hall. As there must be much loss of intensity of light in this enlargement, and as there is further loss in the reflection from the screen, we must guard against too much shadow in our slides. I do not mean from this that we must confine ourselves to light-colored or sunny subjects, but that our scale must commence with clear glass and we must obtain all the gradation possible in the higher scale of light. In a paper print it is often advisable to hunt for our detail among the deep shadows, even at the expense of the higher lights; but in a slide the deepest shadows must, if necessary, be sacrificed.

Making. Lantern-slides may be printed from a negative either by contact or by reduction. By contact is meant the process commonly used in making paper prints. The negative is laid in a printing frame, and against its film side is placed the film side of a lantern-plate. The back is placed in the frame, and a short exposure given to artificial light. In making a slide by reduction the negative is placed against a window or other source of light, either day or artificial, and is carefully focused with a camera. A lantern-plate is then placed in the plate-holder, and an exposure made on the negative. The contact method is used for making slides from small negatives, and by workers who do not care to provide the slight apparatus required for reduction. The reduction method is almost a necessity for any one working with negatives of 4 x 5 size or larger. If we endeavor to print a picture 3 x 3 inches from a negative 4 x 5, the question of which part to leave out is often difficult, and with a larger negative the difficulty is greatly increased.

Dust. Just one word of warning before describing the processes in detail. Cleanliness and care are advisable in all photographic processes, but in the preparation of lantern-slides they are absolutely essential. Dust is our arch enemy; not only the dust which settles on a plate before exposure and so causes pinholes, but that fluff which has such an affinity for the wet surfaces of developed plates when reared up to dry. The finished result, being seen by transmitted light — instead of reflected as in the case of a paper print — and under much magnification, accentuates every flaw and scratch in the film, and any attempt to fake or patch a defect is conse-

quently difficult. The remedy, therefore, is to take every care to keep the film clean.

Dry-plate Processes. The process almost universally used for making lantern-slides is the gelatine dry-plate process, under which term are included both gelatino bromide and gelatino chloride. The only other process worked to any extent is the wet collodion, which is still used by many who make slides in numbers for trade purposes. Among other processes are the dry collodion, the albumen, and the carbon; but, except perhaps the latter, their use is very limited and not likely to become more general.

"Gelatino Bromide." All the brands of dry plates on the market are what are commonly spoken of as gelatino bromide. The term is more general than technically accurate. The plate may be sensitized with bromide of silver, or the bromide may be replaced in greater or lesser degree with chloride of silver, or with a mixture of chloride and iodide. The plate sensitized with bromide is the more rapid one, and in proportion as the chloride is increased the plate becomes slower, until in the pure chloride we have one suitable only for contract work, and which may be developed in an ordinary room by lamplight, with no special precautions beyond a sheet of yellow paper to shield it from the direct rays. The chloride plate gives a wider range of tone than does the bromide—though the latter has sufficient latitude for most purposes. The character of the plate may be approximately judged from the appearance of the emulsion. In a bromide plate the emulsion is of a semi-opaque, creamy color, and a pure chloride plate is so colorless that it is difficult to distinguish the coated side by its appearance. This may be told by breathing on it, when the breath will condense on, and dull, the glass side only. Or if the finger be wetted it will stick to the corner of the coated surface, but not to the glass side.

A Good Rule. There is no *best* lantern-plate, though most slide makers have a favorite brand. There are minor differences, due to the various formulæ used in making the emulsions, but they do not affect the beginner. It is a good rule to begin with one brand of plate, and one developer, together with the wholesome belief that any failure is more probably due to the worker than to the materials. When

one plate has been mastered, others may be taken up, and various effects of tone tried.

The Negative. A good technical negative is advisable, as the great increase in the size of the picture when shown on the screen magnifies every defect. Negatives which are under-exposed are useless, however much "faking" is attempted, and any negatives with very harsh contrasts should be avoided. The negative should be developed to obtain the greatest amount of gradation in the half tone—this obtaining of slight differences in detail being very essential. At the same time the negative should be such as will give a "plucky" print, in which there is not the slightest indistinctness, but every detail clear. If the negative has been correctly exposed and developed, the sky—in an outdoor subject—will probably be sufficiently dense; if not, it may be blocked out. If sufficiently expert, this may be done by painting on the film with Indian ink or some opaque color, but the following of a delicate skyline in this manner is one of those details, theoretically easy and often recommended, which in practice proves difficult. The best way, perhaps, is to coat the back of the plate with matt varnish in which a little aurantia or other yellow alcoholic dye has been dissolved, and scrape it away wherever it overlaps the horizon. Pour a little of Hance's varnish in a small cup and add a drop or two of the dye. Or a matt varnish may be made by dissolving 30 grains of sandarac and 30 grains of dammar in an ounce of ether. When dissolved decant the clear part and add to it 4 drams of benzole. A little less benzole will give a finer grain to the varnish; more benzole gives a coarser grain.

Spotting. Any pinholes or scratches in the negative should be carefully worked out, if they appear in the sky, or in any dense part of the negative. To spot a pinhole mix a little Indian ink with water, and use a very fine sable brush, well charged with water, and just tipped with the Indian ink. Hold the brush perpendicularly to the film and gently touch the centre of the hole, holding the point of the brush in contact with the film for a few moments to allow the color to soak into the transparent spot. Unless the worker understands retouching, it is not advisable to attempt any work beyond spotting. Unfortunately, however desirable a perfect negative may be, we

often have to use a negative which is far from ideal. These defects may be largely overcome by a careful choice of the best lantern-plate, and suitable exposure. The old wet collodion process is unequalled for obtaining a passable result from a thin, ghostly negative. A slow, dry lantern-plate gives far better results with thin negatives than does a more rapid one. For the rapid gelatino-bromide plate a negative may be plucky *almost* to hardness if detail is not sacrificed. The more vigorous the negative the stronger should be the light by which the exposure is made. A very thin negative should be exposed to a very weak light, and the slightest trace of over-exposure should be avoided.

Contact Printing. Printing by contact is the method most commonly followed by the man whose time and means are limited, or who makes slides only occasionally. It has indeed but one serious defect in the limitation of the amount of negative which may be printed from. Its great advantages are that no special apparatus is necessary, and that it can be worked by artificial light in the evenings. Indeed, except the exposure, the whole of the operations until the plate is fixed are conducted in the dark room, and the exposure is merely a matter of seconds, using a gas-light. The negative from which the slide is to be made is gently but carefully dusted, and is laid in the printing frame. The box of lantern-plates is opened and one of them is placed in the frame, its film in contact with the negative film. If the back of the printing-frame is not lined with black cloth a piece should be placed over the back of the lantern-plate before the back is pressed in. If the negative is not smaller than 4×5 then the edges of the lantern-plate will not be protected from the light, and we shall get a certain amount of halation from reflected light which may reach in from the edges to the part we wish to include in our picture. A mask of paper, placed outside the frame, just sufficient to shield the edges, will prevent this. In printing from a larger negative a slight modification of the frame will be necessary. A frame larger than the negative will be required, say for a 5×7 negative use an 8×10 printing-frame. In this, place a piece of patent plate glass, or other glass if it is clear and sufficiently strong. On this glass lay a sheet of black or non-actinic paper with an opening 3×3 inches cut in its centre. The negative

from which the print is to be made is next placed in the frame. The extra size of the frame allows any desired portion of the negative to be placed over the opening in the mask. The lantern-plate is then placed in position on the negative and the back fastened in. It will be seen that unless some special precaution is taken the whole pressure of the back will be upon the small area of the slide. To prevent this the lantern-plate is placed in a kit or carrier, the full size of the frame. This kit is a piece of wood of the thickness of the lantern-plate, with a hole cut in its centre $3\frac{1}{4} \times 4$ inches, to receive the plate. Or it may be of thicker wood, if necessary, with a bed sunk in it to receive the plate. This bed should be lined with black cloth. Frames specially intended for contact printing are obtainable commercially. In some of these the frame is of sufficient size to allow of moving of the negative, but the opening to admit the light is of lantern-plate size only. When the back is fastened in the frame it is ready for exposure.

Contact Exposure. The question of exposure is one which causes an undue amount of trouble, and it is responsible for very many failures. These failures are largely due to hap-hazard work. A parallel case which will be familiar to many who have never made lantern-slides is that of the developing papers, such as *Dekko* or *Velox*. With a careful judging of the negative, followed by an equally careful exposure to the light, the failures from this cause are few. But accuracy is very essential. Many workers will say that they expose their plate—or paper—"about a foot" from their light. But they hold the printing-frame in their hand, and guess the exact distance. If instead of a foot, they hold the frame within ten inches of the light, they obtain about double the exposure which they get by holding the frame fourteen inches away; and yet in each case the distance could be termed "about a foot." The question of the light, too, needs some consideration.

There is much variation in lights which are usually considered reliable. The incandescent electric lights used for lighting our houses vary perceptibly in brilliancy, not only on different evenings but often within a few minutes, and gas is dependent on a variable pressure in the "mains." Fortunately a considerable latitude is allowable in exposure, and with reasonable care the failures should be few. Gas and oil are as good arti-

ficial lights as any, and within the reach of all. In using gas choose a fair-sized burner, and turn the gas on sufficiently to obtain the biggest flame without flaring or "roaring." If an oil-lamp is used some mark should be placed on the chimney to show the height of the flame, and the wick should always be trimmed. If the light can be placed on a table, or if a shelf may be put immediately under it, distances from the light should be marked on the table or shelf, every six inches to three feet. In case a pendant light is used, tie a string to the bracket with a knot tied every six inches. In this way, whether the printing-frame stands on the table or is held in the hand, the exact distance from the light is known. There is a considerable difference in the rapidities of different lantern-plates, but a few experiments will determine the correct exposure. Place a lantern-plate, in contact with a negative, in a plate-holder. There will be no difficulty in doing this if a negative on thin glass is chosen, for the transparency emulsion is itself coated on very thin glass, and the two thicknesses will easily go into the holder. Hold the plate-holder two feet from your source of light—if gas or oil-lamp or light equally strong—if candle-light is used try a distance of one foot, and draw the slide out one-third of its length, and give 20 seconds exposure. Then withdraw the slide another third, and give 20 more seconds exposure. Finally withdraw the slide completely, and give a third 20 seconds exposure. There are now on the one plate three trial exposures of 20, 40, and 60 seconds. Develop the plate and the result will give the approximate exposure. If 40 seconds shows slight over-exposure, we may fix the correct exposure at 30 seconds or try a second plate, giving on it exposures of 26, 30, and 34 seconds.

When once a standard or unit is found, grade all negatives into four or five classes according to their densities, and try an experimental exposure from each batch. It is a good rule to work at a standard distance from the light—two feet is a good distance—but there are exceptions. In the case of a very dense negative the exposure should be closer to the light, and with a very thin negative the distance should be increased. The nearer the source of light the greater appears to be its "momentum" in striking and penetrating dense high lights. If further removed it appears to have a softer effect, very beneficial for thin negatives.

SCENE NEAR DÜRRENSTEIN
Ph. R. von Schoeller

HEDWIG
Ph. R. von Schoeller

Intensity of Illumination. There is an oft-quoted law on this subject which must be given here. "The intensity of illumination varies inversely as the square of the distance from the source of light." Suppose that at a distance of one foot from the light an exposure of four seconds is required. At a distance of two feet the light would not be half as strong, but only one quarter as strong; for at two feet away the light has spread both vertically and horizontally, and so covers four times the area. At a distance of three feet away the light has spread to three times the height and three times the breadth, and therefore covers nine times the area it did at one foot.

Therefore if we move our negative two feet from the light we shall require 16 seconds exposure, and if the distance is increased to three feet, we shall require 36 seconds exposure.

The development of a lantern-slide is the same whether it is printed by contact or reduction, and will be described after we have dealt with reduction in the camera.

Reduction Method. If we wish to make a slide showing the whole of any negative which is larger than 3 × 3 inches we must work by reduction. The negative to be reduced is placed in position, and is carefully focused with a camera; a lantern-plate is placed in the plate-holder and a photograph of the negative is taken. A room darkened as described in THE PHOTO-MINIATURE No. 8, for bromide enlarging, will serve the purpose perfectly. To repeat very briefly: The window of a room lighted from the north is completely darkened by closely fitting into it a dense black cloth, or double thickness of brown paper, mounted on a light wooden frame. An opening of the size of the negative is cut in this screen and the negative placed in it. It is thus illuminated by the light which comes through it, and a camera placed in position inside the room is focused on it and the exposure made.

Reduction on a Fixed Scale. If all our negatives are of one size, and we reduce them to the same scale, the work is much simplified. A "fixed-focus" reducing camera is simply a long box, in one end of which the negative to be reduced is placed. The other end is fitted with a groove to hold a plate-holder containing the sensitive plate. The camera is divided into two parts by a division parallel to the negative and plate

as shown in Fig. 1, and in this division a meniscus lens is placed. The image is always in sharp focus, and the only things to be considered in making the exposure are the density of the negative and the intensity of the light. As these cameras are without intricate movable parts, and as there is no necessity for a rapid and high-grade lens, their price is very reasonable. Among those on the market the *Ideal* and the *Griffiths* may be mentioned. When the negative and plate are in position the whole box may be tilted with the negative toward the light and the exposure made.

Reduction by Focusing.

The fixed-focus camera is a great help to those whose negatives are always taken on 4 × 5 plates, but where larger negatives, or negatives of various sizes may be used, a modified form of camera is required. Our requirements now are: some arrangement for holding the negative and the sensitive plate parallel to each other, a means of focusing, and some universal motion by which any portion of the negative may be brought opposite the axis of the lens. There are many cameras specially built for this purpose, and in almost every case they are thoroughly satisfactory in their work. Such a camera is practically two cameras, one only of which is fitted with a lens. In the larger camera the negative is placed, and through the front of this camera the lens of the smaller one is inserted and the negative focused. Fig. 2 shows a home-made apparatus. A is a camera, which may be the one in which the negative was taken, with its lens removed, and B is a small camera, resting upon a table C, temporarily but firmly fixed to A by means of buttons, or by sliding in a groove. The negative is placed in a plate-holder in A. The central sheet which separates the two plates in a holder must be removed and a kit substituted, so that light may be transmitted through the negative. Focusing is done by the rack and pinion of the small camera, and the amount of reduction is regulated by the rack of the large camera. The rising and falling front of the large camera, carrying the small camera with it will, in most cases, place the copying lens centrally opposite the part required to be reduced; in very extreme cases the holder carrying the negative may be slightly withdrawn to obtain the centre, and the strip of light which is thus let into the big camera can be blocked out by covering it with a cloth. If the large

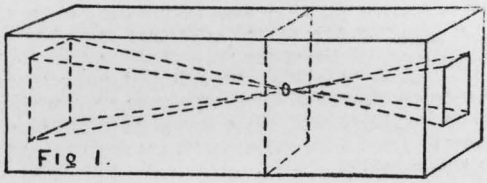


Fig 1.

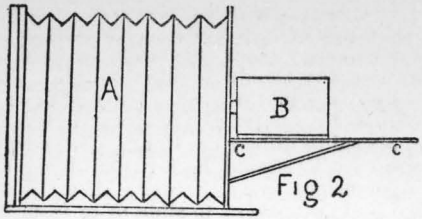


Fig 2

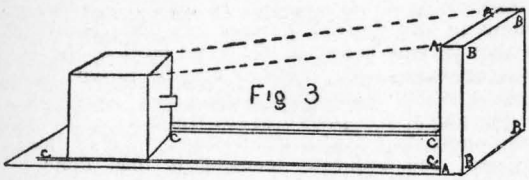


Fig 3

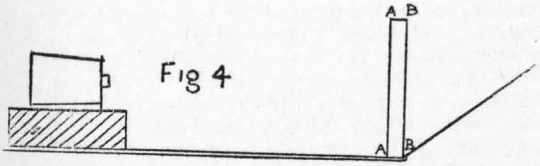
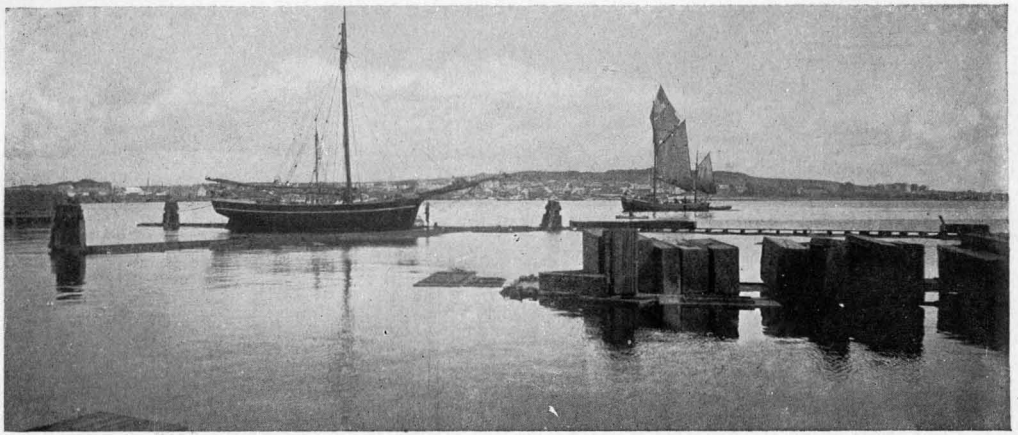


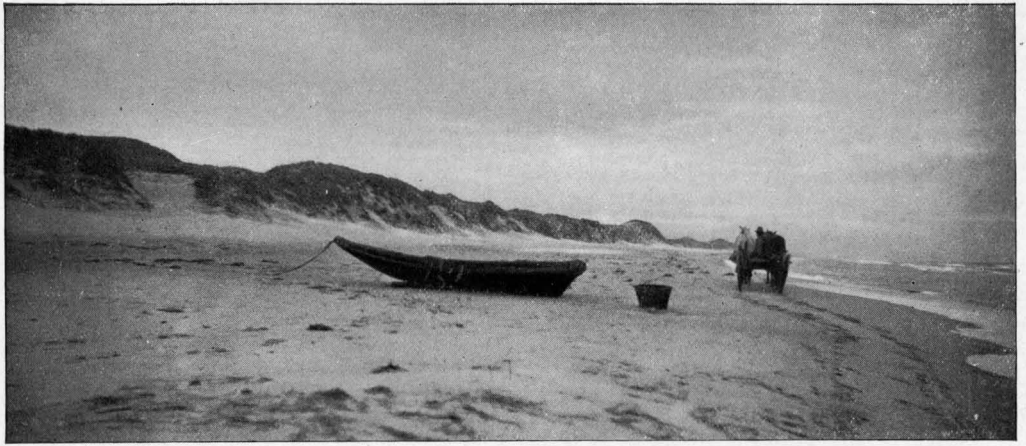
Fig 4

camera is placed on a stand or a tripod, and if possible one with a tilting or a universal head, the whole may be placed near the window and tilted to the sky for exposure.

Home-made Apparatus. Fig. 3 shows an apparatus which may be constructed in a few hours by those who have not the two cameras requisite for the method last described. The description here given is for solid and thoroughly satisfactory "hedge carpentry," and may be elaborated if wished. Procure a planed, seasoned board, about four feet long, twelve inches broad, and one inch thick. At one end of it raise a frame, at right angles to the length of the board, and perpendicular to it. This frame should be made to hold the largest negative from which a slide may be required, and if different sizes of negatives may be used, a nest of "carriers" or kits should be fitted into it. This frame is shown by AA. BB. in Fig. 3. The kits fit on A.A.A., and in B.B.B.B. a sheet of fine ground glass or tissue-paper is placed to diffuse the light. Two strips of one-inch wood (CCCC) should be fastened along the board with just sufficient space between them to allow the base board of the camera to slide to or from the negative. Or a slot may be cut along the length of the board through which a long screw is passed to clamp the camera in any desired position. If the camera is so low that its lens is not on the same level as the centre of the negative to be copied, it may be raised on a box or stand built to slide in the groove as is shown in Fig. 4. The negative is placed in the frame, and the camera is slid along the board until the correct size of image is obtained, and accurate focusing is then done. We have already spoken of the need of sharp definition. Focusing should be done by means of a small magnifying glass. When the negative is focused, and the slide ready for exposure, lay a couple of thin sticks of wood—as indicated by slight dotted lines in the diagram—from the negative frame to the camera, and over this throw a focusing or other dark cloth, to shut out light except that coming through the negative. This gives us, in crude but serviceable form, the two cameras of the more expensive apparatus. It is possible to obtain a photograph of the negative without this precaution of the focusing cloth, but the exclusion of extraneous light is always advisable, and often essential, for we wish our



THE HARBOR AT AALBORG
Ph. R. von Schoeller



NEAR GAMMELSKAGEN
Ph. R. von Schoeller

transparency to be of the greatest possible clearness. If the stand is rigidly made, and the camera firmly clamped in position, the whole may be tilted toward the light, if daylight is used, and the exposure made.

The Light. A north light is the best for most photographic work, because it is the most steady in intensity, and protected from the direct rays of the sun. The negative should face direct to the clear sky without any tree or building or column of smoke intervening. If a clear sky cannot be used the negative must face a white reflector placed at an angle of about 50° from it (as shown in Fig. 4). In reflecting daylight, the reflector should be placed where it obtains the greatest intensity of illumination, not necessarily absolutely close to the negative. In pointing a camera toward the window, the reflector should be outside the window and so reflect the light direct from above. The reflector should not have a glossy surface, and on no account should a mirror be used. A sheet of white blotting paper will give the best even light.

Reducing by Artificial Light. Daylight should be used for reducing, whenever it is practicable, as the work can be done more quickly, and an even illumination of the negative is more easily secured. The only difficulty connected with artificial light is in getting a steady and equal light through the whole of the negative. In the case of a 4 × 5 negative this is easy, but as a larger negative is used the difficulty increases. The negative is placed in the frame, and focused as for daylight enlarging. A little extra care will be needed here to get the image absolutely sharp. Place a lamp or candle behind the negative, and with the largest stop focus sharply with the help of a magnifying glass. If a number of reductions are to be made to the same scale from negatives of one size, there is no need to focus for each one. When once the correct focus is obtained, clamp the camera firmly to its bed, and it will be ready for each negative. A sheet of ground glass is placed behind the negative, to diffuse the light, and behind this the light is burned. If the worker possesses a lantern for showing his slides, he may use the light of this to illuminate his negative. The lantern should be so far from the negative that the disk of light just covers it. In every case where arti-

ficial light is used a sheet of ground glass or fine tissue-paper should be placed between the negative and the light. If a lantern cannot be had, a condenser for passing an even flow of light through the diffuser may be used in conjunction with a strong light such as gas or oil. The illumination of a negative by a single light, even when placed behind a diffuser, is too uneven to give satisfactory results. Unless a condenser can be used, we must obtain a larger area of flame or a more widely spread illumination by means of magnesium ribbon. A workable light for a negative of 5 × 7, or a little larger, is obtained by arranging five or six gas burners in a double tier in such a position that the six flames just meet at their edges, and so form an approximately even blaze of light of the area of six single lights.

Magnesium. Magnesium ribbon is the most suitable artificial light, if no condenser is used. The only objection to its use is that it gives off a very heavy smoke, which, however, is more inconvenient than injurious. Magnesium ribbon burns with a light so actinic that much less of it is required than would be expected. According to Paget instructions, exposure to one inch of magnesium ribbon burned at a distance of twelve inches from a negative in a contact frame, is equal to four minutes exposure to a "five foot" gas jet at the same distance. This relative intensity of course holds good in reduction work. To make an exposure by magnesium ribbon, burn the ribbon close behind the ground-glass diffuser, and keep it moving during burning so that the whole of the negative may be evenly illuminated. Or an even illumination is more certainly secured by placing a sheet of white blotting paper at an angle of about 45° from, and behind, the ground glass, and burning a piece of magnesium ribbon at each side of this reflector—so that the greatest possible amount of light may be reflected onto the glass, but the *direct* light from the burning ribbon must not in this case fall on the glass or negative.

The Lens. It is advisable, though not essential, to use a short-focus lens. If a lens of moderately long focus is used, the camera will require to be further from the negative and a considerable bellows extension will be needed, thus getting rid of compactness in working. Except where

architectural views are to be reproduced, a single lens is all that is needed. A lens of 4 inches focal length will be found as convenient as any, and if it will cover a plate 3 × 3 inches with a fairly large stop—say *f*/12—it will do all the work required.

Relative Exposures. The exposure required for reduction work is difficult to state very accurately. As a rough guide I would place as equal the exposure by contact at one foot from a five-foot gas burner, and the reduction of a 5 x 7 negative lighted directly from a clear north light in December, using *f*/22 stop. That is to say, if fifteen seconds exposure were sufficient for the contact print, fifteen seconds would suffice for the reduction. But this is only approximate. The exposure should be reduced as much as possible by using a large stop; if *f*/12 will cover the plate, do not work with a smaller stop. If magnesium ribbon is burned behind a 5 x 7 negative, using a rapid lantern-plate, such as Cramer or Eastman or Carbutt, use *f*/12, and make a trial exposure by burning six inches of ribbon.

Bromide and Chloride. The developing formulæ given here are, unless specifically stated otherwise, "all-round" standards, suitable for any commercial gelatine plate. There are slight differences in the working of bromide and chloride plates. The former give the more uniform results, with average care; the latter are more amenable to special after-tonings and local control. The bromide plate is the more widely used, and the chloride plate is favored by the worker who strives after special effects, and devotes individual care to each slide.

Development. Development in lantern-slide making is essentially the same as in negative making. As the lantern-plate is many times slower than any negative plate commonly used, we may considerably increase the amount of light in our dark room. Ruby light should be dispensed with altogether; a couple of thicknesses of yellow paper being sufficient protection, with an extra thickness, if necessary, when daylight is used to illuminate the dark room. In fact, if the daylight is of a safe actinic color, it may be of volume sufficient to allow of reading a newspaper by it. This increase of light enables us to watch the development of our plate closely, and to remove it from the

developer at the moment it reaches its best. The dish should be of porcelain, to allow development to be more closely watched; some workers prefer a glass dish, in which they can hold the plate over the light and judge it by transmitted light. At first, until experience is gained, each plate should be developed separately; later, if quantities of slides are required, four or more may be developed side by side in one dish.

There are as many development formulæ for lantern-plates as for negatives. I give three formulæ from which the beginner may with advantage make his choice. First, I would give the plate-makers' own formula. The formulæ printed by makers and issued with their plates are always the result of very careful experiment, guided by a full knowledge of the exact ingredients of the film, and therefore may be relied on to give good average results. The second formula is the "hydroquinone formula," which has been a standard for many years. It is a two-solution developer and is made as follows: No. 1, hydroquinone, 80 grains; sodium sulphite, 1 ounce; citric acid, 30 grains; potassium bromide, 30 grains; water, 10 ounces. Dissolve the sodium sulphite and the citric acid in 6 ounces of water, and then add the other ingredients and the rest of the water. No. 2, sodium hydrate, 80 grains; water, 10 ounces. For use with a plate which has received a normal exposure take ¼ ounce No. 1, ¼ ounce No. 2, and ½ ounce of water. This amount is sufficient to cover a lantern-plate, if developed in a ¾ x 4 dish; if a larger dish is used, more developer should be used, as it is essential that the solution evenly cover the whole plate at the first immersion. This is made easier by first soaking the plate for a few seconds in clear water. This formula leaves nothing to be desired in its working, but it has the objection that it contains sodium hydrate. Many workers not unnaturally object to developers containing this caustic alkali, and for them the third formula, which is the "standard formula" of the New York Camera Club, is given. A stock solution is made of carbonate of soda, 200 grains; sulphite of soda, 200 grains; hydroquinone, 50 grains; water, 10 ounces. For cold black tone, give a normal exposure, take equal parts of stock solution and of water, adding one or two drops of a ten per cent. solution of bromide of potassium. For warmer tones increase the exposure, and use a more

diluted developer, at the same time increasing the bromide solution to 15 or 20 drops. When I speak here of a "normal" exposure, I mean one which would be considered correct in negative making, that is, using a standard developer, the picture would begin to appear in about a minute or a little less, and a negative, clear and full of detail, with sufficient density, would be obtained in four or five minutes. To develop the plate place it in the dish and pour the developer evenly over it. The picture should begin to appear in a minute and should appear fully developed in three or four minutes. Examine the plate by transmitted light and then continue development even if the plate appears sufficiently dense. The density will considerably reduce in fixing, and the usual mistake of the amateur is to under-develop.

Other Developers. The two developers given are based on hydroquinone, but years before this useful agent was known the favorite developers for lantern-slides were pyrogallol (pyro) and ferrous oxalate. Perhaps the most convenient of the pyro developers—and equal to any—is made by adding dry pyro to a stock solution made of carbonate of soda, 1 ounce; bromide of ammonium, 12 grains; water, 8 ounces. For use take 1 ounce of this solution and add to it half a grain of dry pyro, or, as an old worker would vaguely put it, "some pyro on the end of the blade of your pocket-knife." With this formula and a correct exposure, a rich brown tone is obtained. But over-exposure will yield an unsatisfactory tone, and under-exposure will lead to stain through forced development.

Carbutt's ferrous oxalate developer, though intended in the first place for his own plates, is one of the best all round developers. It is a two-solution developer—No. 1, oxalate of potash, 8 ounces; citric acid, 30 grains; ammonium citrate solution, 1 ounce; water, 15 ounces. No. 2, sulphate of iron, 1 ounce; sulphuric acid, 5 drops; water, 16 ounces; for development take 1 ounce No. 1, ½ ounce No. 2, and add a few drops of a 10 per cent. solution of bromide of potassium. The ammonium citrate solution is made by dissolving ¼ ounce of citric acid in 1½ ounces of water; and a few drops of strongest water ammonia to neutralize the acid, then add water to make up to two ounces. The sulphate of iron used should be in clean crystals of a bright green

color. If the crystals are covered with a dull, rusty dust (due to oxidization by air) they should be rejected.

Ferrous oxalate developers normally give black tones; by increasing the exposure and adding more bromide of potassium to the developer warmer tones are obtained.

Ortol-metol. The ortol-metol formula, recommended by Henry Wenzel, is a good one-solution developer for slides: Water, 10 ounces; metol, 12 grains; meta-bisulphite of potassium, 6 grains; ortol, 18 grains; sulphite of sodium (crystals), ½ ounce; carbonate of potassium, 80 grains; bromide of potassium, 5 to 10 grains; hyposulphite of soda, 1 grain. If warmer tones are required increase the amount of potassium bromide. This is a formula specially recommended for Lovell lantern-plates, and I have found it work well, both with the Lovell and with other brands.

Fixing. When it appears as if the plate is beginning to veil all over, remove it from the developer and wash gently under the tap for two minutes and then immerse in a strong hypo solution—six or seven ounces in a pint of water. The slide will appear to fix more rapidly than does a negative, and will clear in three or four minutes, but it should be left in the hypo fully ten minutes. After fixing, wash the plate very thoroughly in running water. The fixing and washing must be sufficient, especially if the plate is to be subjected to after-treatment.

Clearing Solution. A saturated solution of alum and citric acid (equal parts) in water should be used for clearing. A saturated solution is guaranteed if some of the alum and acid remain undissolved at the bottom of the bottle after repeated shaking or stirring. Take 2 ounces of the clear liquid and add ½ a dram of hydrochloric acid. If this is poured over the plate in a dish, the dish should be steadily rocked to keep the solution continually flowing over the plate. The best way of applying it is to hold the plate in a special holder and flood the clearing solution over it and back into the bottle many times. Some workers never, or seldom, use a clearing solution. I am much in favor of it and recommend its use even when the plate appears perfect. Sometimes a scum forms on an oxalate developed plate. If so, use a clearing bath of oxalate of iron, 1 part; alum, 4 parts; water, 50 parts. Wash thoroughly after using this bath.

Restrainers. In these formulæ, bromide of potassium and bromide of ammonium are both referred to as restrainers. A word may be useful in explaining these. Bromine is an orange-colored liquid obtained from seaweed, or commercially from the salt springs of Stassfurt, or in a lesser degree as a by-product in the manufacture of certain chemicals. It is an element—that is, it cannot be divided into two or more constituent parts. Bromine is united with ammonia to form bromide of ammonium, or with potassium to form bromide of potassium. It is a moot point which of these is the more efficient restrainer. The bromide added as a restrainer appears to form a compound with the unaltered silver bromide in the film, and to make it less sensitive to the action of the developer.

Toning Slides. The tone of a lantern-slide, whether gelatino bromide or gelatino chloride, may be decided either by the length of exposure and the development, or by an after-process. The former of these methods is doubtless the one giving the more permanent slide. The broad rule of development toning is that a prolonged exposure and a heavily restrained developer give warm tones. The restrainer usually used is a 10 per cent. solution of potassium bromide. Another formula is ammonium bromide, ½ ounce; ammonium carbonate, ½ ounce; water, 10 ounces. The addition of ammonium carbonate is objected to by some workers as likely to render the tone fugitive, but we have not found it so. The carbonate of ammonium should be in clear lumps. On exposure to the air it becomes coated with white powder (bicarbonate), which should be scraped off. The table issued by Cullen for use with the Paget plates is a good, all-round guide. The developer he recommends is one of the many modifications of the hydroquinone developer and may be given here. No. 1, hydroquinone, ½ ounce; sulphurous acid, ¼ ounce; potassium bromide, 60 grains; water to make 20 ounces. No. 2, sodium sulphite, 2½ ounces; caustic soda, ½ ounce; water to make 20 ounces. It will be noticed that it is one of the many formulæ containing caustic soda, and this may be avoided by substituting 2 ounces of carbonate of soda instead of the ½ ounce of caustic soda.

The No. 3 solution he uses, and referred to in the following table, is the ammonium bromide and ammonium

carbonate solution just given. A plate with a normal exposure is developed with ¼ ounce No. 1, ¼ ounce No. 2, ½ ounce water (none of No. 3). Development in this case is complete in three or four minutes. To get warmer tones, ranging through brown to red, the exposure of the plate is increased, and an increasing quantity of No. 3 is added to the developer. The No. 3 solution serves two purposes; the addition of bromide of ammonium, which is contained in it, restrains the plate from developing too quickly, and the carbonate of ammonium, which also appears to act as a restrainer, assists in producing a much warmer deposit than can be secured by means of the use of the bromide alone. The longer the exposure which is given to the plate, the more of the No. 3 solution *must be used*, and the warmer the resulting slide will be. By following this simple method, a range of tones from black through warm black, brown, purple brown, and purple to red may be secured.

It should be noted that the proportion of the No. 3 solution used determines the *time of development*, as well as the color of the image. The table on page 447 gives approximate relative exposures, proportion of No. 3 solution required, and time of development.

It will be seen that the exposure ranges from 30 seconds to 5 minutes, and development from 3 to 15 minutes. The proportion of No. 3 is also increased (and the amount of water proportionately decreased) until, to secure the red tone, we have more than one-half an ounce of No. 3 (480 minims = 1 fluid ounce) and only 180 minims of water.

Toning by Intensification. A plate to be intensified should be fixed in a newly mixed plain hypo bath, neutralized with a few drops of liquid ammonia, and then washed in running water very thoroughly. The intensifier is made of bichloride of mercury (poison), 4 drams; chloride of ammonium, 2 drams; water, 6 ounces. Place the slide in a clean porcelain dish and flow this intensifier over it. Rock the dish occasionally until the slide is bleached thoroughly, and then wash the slide well in running water. When the slide is thoroughly washed it may be toned by one of several methods. One which has proved very satisfactory in my hands, and appears especially useful with bromide plates, is suggested by John A. Hodges. It gives a tone varying from sepia to reddish-brown, the

latter color resulting on a very thin image. It is not suitable for use with a plate developed by ferrous oxalate. No. 1. Uranium nitrate, 30 grains; acetic acid, 3 drams; water, 10 ounces. No. 2. Ferricyanide of potassium, 30 grains; acetic acid, 3 drams; water, 10 ounces. Use equal quantities of each, mixed just before using, as the mixed solution does not keep. The plate is immersed in this and the dish slightly rocked until the toning action has been carried to a sufficient depth, afterward washing for ten minutes. This period should not be exceeded, or the slide will become lighter in tone.

TABLE OF EXPOSURES AND DEVELOPERS.

Time of Exposure.	Constitution of Developer.	Time of Development.	Color of Deposit.
30 secs.	No. 1 ... ½ ounce No. 2 ... ½ " Water to make 2 ounces	2½ to 3 min.	Black
60 secs.	No. 1 ... ½ ounce No. 2 ... ½ " No. 3 ... 100 minims Water to make 2 ounces	5 minutes	Brown
90 secs.	No. 1 ... ½ ounce No. 2 ... ½ " No. 3 ... 200 minims Water to make 2 ounces	10 minutes	Purple Brown
180 secs.	No. 1 ... ½ ounce No. 2 ... ½ " No. 3 ... 250 minims Water to make 2 ounces	12 minutes	Purple
300 secs.	No. 1 ... ½ ounce No. 2 ... ½ " No. 3 ... 300 minims Water to make 2 ounces	15 minutes	Red

Red Tone. The simplest color obtainable after intensification is undoubtedly red, which is obtained by placing the bleached and *washed* slide in a freshly mixed hypo bath. With different plates and developers the tone thus obtained will

vary from a brown tinge to almost a yellow, according to the plate used. A browner tone will be obtained by placing the plate in a solution of ½ ounce carbonate of soda, 4 ounces of water.

Gold Toning. A plate which has been bleached with mercury may be toned, after washing, in a solution of 1 grain of chloride of gold in 1 ounce of water; a wide range of tone from pink to greenish blue may be obtained, according to the length of time the plate is left in the solution.

Stieglitz Method. The artistic possibilities of a lantern-slide were never fully grasped until Alfred Stieglitz showed his locally reduced and locally toned slides, and his slides in which what he terms compensating cover-glasses are used. His method is to much over-develop the plate and obtain his values by local reduction with the Farmer reducer. In a succeeding paragraph we give a simple resumé of this mode of reducing, and here we insert Stieglitz's own formulæ for three tones which are very often desired. For this special work a plate such as the Seed or the Paget is used. Wonderful effects can be obtained by a capable worker on a Seed G. B. P. R. plate.

Blue Tone. In many cases it is desirable to color a slide to a pure blue, or perhaps only a suspicion of blue. An absolutely reliable method to obtain this color is to use the following bath: No. 1. Sulphocyanide of ammonium, 200 grains; water, 32 ounces; carbonate of soda (granular), 2 grains. No. 2. Chloride of gold (brown), 15 grains; water, 1 ounce. For use take two ounces of No. 1 and 4 drops of No. 2, always remembering to add No. 2 to No. 1 and never reversing the operation. This amount of solution will tone at least one slide to a perfect blue. The toning bath, in order to work satisfactorily, ought to have a temperature of 72° to 76° Fahr. Using the bath at a lower temperature results in failure, as the toning proceeds too slowly, and unsatisfactorily in other respects. A higher temperature will hasten toning, but the gelatine of the plate is apt to be attacked in a most disagreeable way.

To judge the process of toning, it is necessary to examine the slide by transmitted light, using daylight, if possible. A thoroughly toned slide will have a pure blue color when examined in this way. It is advisable

to tone reduced slides after they have been dried, especially in such cases in which only partial toning is to be used. As for the density of toned slides, let me say that those toned with the above bath do not increase in density perceptibly.

Green Tone. In order to obtain a green slide, the following treatment is best: No. 1. Oxalate of iron, 20 grains; ferricyanide of potassium, 15 grains; water, 32 ounces. No. 2. Chromate of potassium, 5 grains; water, 16 ounces. Bathe your slide, which in this case must be somewhat lighter than the desired result, in No. 1. In this bath the color will turn to a dark blue. From this it is placed in No. 2 for a minute, and then dried. When dry the slide will be a bright green.

Bartolozzi Red. Bartolozzi red is obtained by using the following bath: No. 1. Ferrocyanide of potassium (yellow prussiate), 15 grains; water, 16 ounces. No. 2. Nitrate of uranium, 30 grains; sulphocyanide of ammonium, 150 grains; citric acid (crystals), 30 grains; water, 16 ounces.

For use, take equal parts of No. 1 and No. 2, and place your slide, which must be first thoroughly soaked, in this solution. It will quickly assume a beautiful Bartolozzi red color. In many cases the whites are stained in coloring the slides in this way, and in order to remove the same dip them into carbonate of soda, 15 grains; water, 32 ounces; for a moment, not longer, and the stain will disappear. After this operation proceed to wash.

Local Reduction. The lantern-slide may be locally controlled, so far as the density of any portion of the slide is concerned, as easily as in making prints upon paper. Thus we may entirely clear an undesirable sky until we get clear glass, or reduce over-dense shadows or foliage, or harmonize the different planes of the picture, as when the foreground is dark from under-exposure. This is done by local reduction, and the ferricyanide and hypo method is perhaps the simplest and most efficient for the purpose.

There has been a great deal written and said about this method and its limitations, says R. R. Rawkins in *Photography*, but very little practical advice has been given, and I therefore propose to deal with the subject in as simple a manner as possible, describing my own method of working.

The Reducer. A solution of ferricyanide of potassium and hypo-sulphite of soda as a reducer attacks the high lights and half-tones more readily than the shadows—a fact which is of considerable advantage in slide making. Ammonium persulphate reduces the dense portions uniformly, but at the same time discharges the color of warm-toned slide. Ferricyanide does not affect the colour of a slide that has been developed to a warm tone, which is another advantage, seeing that a good warm tone is undoubtedly more pleasing for most subjects than the commercial black. A ten per cent. solution of ferricyanide should be made up, and will keep indefinitely. Two brushes, some blotting paper, and a tuft of cotton wool are also required. Camel-hair brushes may be used, but I prefer a home-made one consisting of cotton wool wound round a piece of thin, tapering wood, leaving a small wad at the point, taking care that the wood does not protrude and scratch the film.

Manipulation. Pour an ounce of the ferricyanide into a cup or measure glass, and insert a loose piece of cotton wool. Take the plate from the hypo, and, without washing, mop over the whole slide with the ferricyanide until the details are visible in the half-tones, wash quickly, and blot off the superfluous moisture. Now, if the slide is of a landscape with which you want to combine a cloud by printing on another plate, using it as a cover-glass, the whole sky portion must be reduced to clear glass. To do this, dip one of the brushes in the hypo, and carefully trace round the horizon and any trees or buildings that may project into the sky portion; then go over the whole ground again with the other brush charged with ferricyanide, and the fog and veil caused by the over-exposure and prolonged development will gradually disappear. Continue the painting, using the solutions alternately, washing under the tap after every few applications, until the sky is all but clear; wash quickly, and blot off the water. In cases where the skyline is very intricate, the over-hanging foliage or trees may be painted over together with the sky as, owing to the peculiar action of the reducer, the sky will be almost cleared before any appreciable reduction of the strong image has taken place. Should there be any very delicate half-tone

encroaching on the sky portion, great caution must be exercised, or the detail will be destroyed.

The sky having been cleared, and the plate rinsed, local reduction of the landscape portion may be proceeded with, and having formed some idea as to what the final result should be, the parts that require reducing slightly or wholly can be painted over first with the hypo and then with the ferricyanide. This is best done by holding the plate film downwards over a white dish, and the painting done from underneath. By this means the course of the brush can be easily followed, and any superfluous solution will run down the handle of the brush into the dish. The brushes I now use are made with this idea in mind, being as described, but cut down and tied with strong cotton at right angles to another strip of wood, which answers as a holder, and prevents the solution from running down on one's fingers. The brush looks somewhat like a diminutive golf club. After reducing any portion of the image, the plate should be well rinsed under the tap before applying the solutions to other portions. It is necessary to exercise great care when approaching the high lights, or these will reduce to clear glass and give the slide an unpleasant chalkiness. It is in this altering of tone values that the worker's own personal feeling comes into play.

In one instance I found it necessary to reduce a portion of a slide from a full tone to a very delicate half-tone, and as this portion was almost in the centre of the plate with an abundance of soft detail on either side, the following method was devised: A piece of plain paper was placed in contact with the slide, and the outline of the portion traced with a pencil on the paper. The paper was then lifted from the slide, and the marked portion cut away with a sharp knife. The other part was used as a mask, which, after soaking in a two per cent. solution of sodium sulphite, and placing in contact with the film, effectively prevented any superfluous solution from gaining access to the other portions of the slide; although several drops did fall on the mask, the sulphite and the thickness of the paper stopped the action of the reducer.

If the ferricyanide is used stronger than ten per cent., its action is too rapid, and, in addition, causes a yellow staining of the gelatine. If, after the manipulations of the slide, there remain any yellow discoloration,

it can be removed by immersing the plate in a two per cent. solution of sodium sulphite.

The Wet Collodion Process.

For thirty years wet collodion was the standard process of all photography, but so rapidly and completely has the dry plate superseded it, on account of its greater convenience, that the older process is quite unknown to the majority of present-day workers. To teach the manipulation of wet collodion would tax the limits of a number of THE PHOTO-MINIATURE, and in this description of the process I will merely give sufficient detail to enable the worker to decide whether it is worth attempting, and at the same time will endeavor to give the collodion worker a few hints especially applicable to this branch of his work.

The "Wet."

The process is known as "wet" because the glass is coated with an emulsion, and before the emulsion is dry the exposure is made, and the picture developed and fixed. This means that the worker must be his own plate-maker. Collodion is the substance used to hold the sensitive silver, instead of gelatine, as used in the "dry" plate film.

Advantages.

The advantage of wet collodion does not lie, as often stated, in the superior excellence of the results obtained with it. I doubt if it equals some of the newer processes in this respect. It does yield very clear high lights and very good shadows, but the range of half-tone, or gradation between the two extremes, is not as great as in the gelatino-bromide, or even the gelatino-chloride plate; and it is not easy to obtain a wide range of tone. The process is, however, unequalled for commercial work. By it a fair quality of slide may be steadily made, with little risk of failure, and the slides may be made from negatives of very moderate quality, which could scarcely be made to yield satisfactory results by any other process. To the man who understands the process it is very simple in its working, and it is very cheap.

The Stages.

Half the stages of the work will be unknown to the dry-plate worker, but once mastered the manipulation is (with *care*) simplicity itself. First the glass must be cleaned, and this is a vital and integral part of the work. Then it must be coated with the collodion film and sensitized

with nitrate of silver. Then come the operations of exposing, developing, and fixing — all more or less familiar — and finally the plate must be varnished to protect the film.

Care. Collodion is much more tender in texture than gelatine, and must be handled carefully. From the first coating of the glass to the final washing we are dealing with a wet or tacky film, ready to seize on any dust or slight impurity in the air.

The Glass. The cleaning of glass is dealt with on another page; but the final polishing with tripoli must be omitted. But polish it well with a *clean* chamois leather washed in water only. Around the edges of the plate—on the side to be coated —a line should be ruled with a fine brush, dipped in a solution of pure rubber, dissolved in benzole to the consistency of thin syrup. This edging of waterproof tends to prevent the water used during subsequent washing from getting between the film and the glass, and so washing the film away.

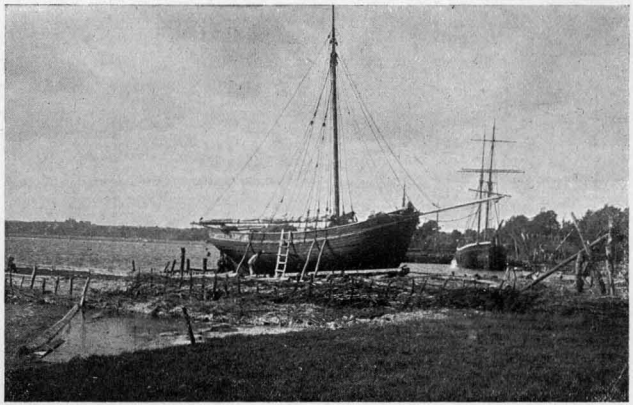
Collodion. Collodion—which is one of the most inflammable of substances, but quite safe if used with reasonable care — should be purchased ready for use. Do not dabble with its preparation. An iodized negative collodion should be used. Iodized collodion matures or ripens with age. When freshly made it is a pale yellow color, and it gradually darkens, through red, to a rich deep ruby. Collodion three or four weeks old should be used, and if a little — say ten per cent. — of an older ruby-colored collodion should be added to it, it will be still better.

Coating the Plate. The glass to be coated should be held by means of a suction cup attached to its reverse side, or it may be held by two edges between the thumb and finger. Dust the glass very gently, and pour a little collodion onto it. Tilt the glass until the collodion has flowed to every corner and covered the whole area. Then let it drain from the corner last covered into a bottle—not the one from which the collodion was first poured. Do not rest the corner of the glass on the mouth of the bottle, or vibration marks may show in the film. As soon as the film is "set" so that a finger-mark shows when the corner of the plate is touched, the plate is ready for sensitizing.

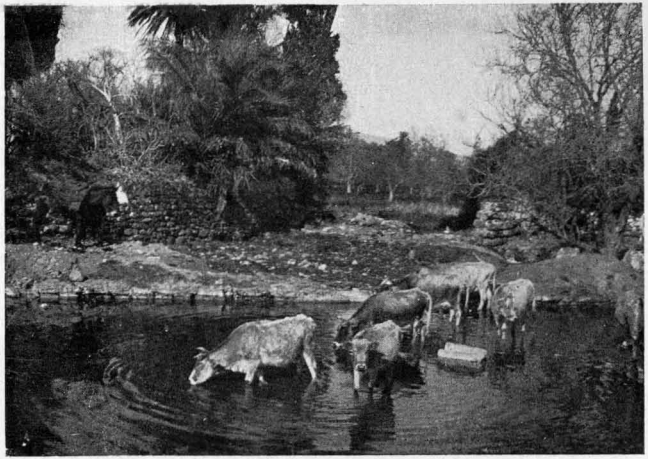
The film may reach this stage in less than a minute from the coating of the glass—and it must then be sensitized before any part of it becomes dry. During this setting the plate should be steadily rocked to insure even coating, but the corner from which the collodion drips should be kept downward, and should retain that position through the subsequent operations.

The Nitrate Bath. The nitrate bath, or silver bath, is a solution of seven parts of nitrate of silver (recrystallized) in 100 parts of water. The water should be distilled water, or if this cannot be obtained dissolve three or four crystals of nitrate of silver in a pint of clear rain-water, and let it stand in sunlight for several days. Before the bath is used a small crystal of potassium iodide should be dissolved in it. The bath must be slightly acid. This is tested by dipping blue litmus paper into it. If it does not turn the paper red, drop a couple of drops of nitric acid into the bath and stir it well with a clean glass rod. If the litmus paper does not yet redden, add more acid, a drop at a time, and stir and test after each drop until the acid reaction is reached.

The Dipping Bath. The nitrate bath—as the solution is called—may be poured into a flat glass dish, and the plate immersed in it. But the better plan is to use a narrow, deep tank into which the plate may be lowered. The fingers must not be brought in contact with this bath. A piece of silver wire is bent in the form of a broad hook to hold the plate vertically, and the plate is steadily lowered into the solution. Let the plate rest in the bath for about a minute, and then for another minute gently raise and lower it, keeping it all this time entirely immersed. Now lift it gently from the bath, and notice if the surface appears at all greasy as the surplus liquid flows off. If it does, lower it again into the solution, and examine again at the end of another minute. The plate should remain in the bath for about a minute after all trace of greasiness has disappeared. This sensitizing must be done in the dark room, and in all subsequent work until fixing we must guard against white light as carefully as we do in dry-plate work. When the plate is sensitized stand it for a few moments on a pad of absorbent paper to drain.



THAASINGEN ISLAND
Ph. R. von Schoeller



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Ph. R. von Schoeller

The Plate-holder. The plate-holder used for wet plates differs slightly from the dry plate-holder. As we expose our plates immediately after sensitizing and then at once develop them, we do not need a double holder. The recess for the plate must be fitted with silver corners to prevent the delicate film anywhere touching the wood.

The Exposure. The camera should be ready, with the negative to be reduced sharply focused. Place the holder in the camera, and draw the slide. Try giving an exposure not quite double that given to a slow bromide plate, or in reducing a negative to half its size, with *f*/11 stop and a north light, direct from a clear sky, at noon, in December, try an exposure of two minutes.

Developers. The developer most used for wet lantern-slides is probably the sulphate of iron developer. Dissolve 120 grains of sulphate of iron in 8 ounces of water. Add 10 minims of nitric acid, and 40 minims of alcohol. Another standard developer is pyro, 10 grains; alcohol, 1 dram; nitric acid, 5 minims; water, 4 ounces. For use take pyro developer, 1 part; water, 20 parts. For pyro development the plate needs considerably more exposure in the camera—at least twice as long—than when the iron developer is used.

Development. The plate is placed on the suction-holder, and rather less than 3 drams of the developer is poured over it. The plate should be rocked so that the developer flows backward and forward over it, but it should not drip off the edge of the plate. There is some free nitrate of silver on the film which assists building up the image, and if any of the developer flows off the edge of the plate it carries this silver with it. The density of the image may be accurately judged, as there is very little loss of density in fixing. As soon as the image is sufficiently developed, or if the developer becomes muddy, rinse the plate gently under the tap. If in development the image flashes up and grays all over it indicates over-exposure; under-exposure is shown by a very weak image appearing very slowly.

Redevelopment. A collodion plate often develops very thin, and the common mode of strengthening it is to redevelop with the same

solution as before, adding a little silver nitrate to it to replace that washed from the plate. Make a solution nitrate of silver, 50 grains; water, 1 ounce; nitric acid, 2 drops; and add twelve drops of this solution to 2 drams of the original developing solution. If the developer shows the slightest sign of muddiness wash it off the plate, and if necessary develop a third time.

Fixing. A collodion plate is fixed in hypo in the usual way. The hypo bath should be about 1 part hypo to 4 of water. Fixation will be complete in about a minute, and the plate should then be washed under a gentle flow of water.

Toning. A wet collodion slide usually requires toning. The pyro-developed slide tones more easily than the iron-developed one, but either may be toned. The simplest toning bath is chloride of platinum, 2 grains; nitric acid, 2 drops; water, 4 ounces. Pour the toner in a dish and lay the fixed and washed slide in it. The tones will range from brown to black. A gold toning solution is made of chloride of gold, 1 grain; water, 8 ounces. This solution should be flowed onto the plate in the same manner as the developer, and will yield a warm black tone.

Varnishing. The collodion film is so delicate that it should be varnished, even though it is to be protected by a cover-glass. A clear varnish is made by dissolving gum sandarac, 1 part, in benzole, 25 parts, or a commercial "crystal" varnish, such as Hance's, may be used.

The Albumen Process. The albumen process is sometimes spoken of as the finest of all lantern-slide processes. Very beautiful slides have been made by it, but on account of its great tediousness it has been very little worked. In fact its sole reputation may be said to be based on the fine work produced by two Frenchmen, and notably by Ferrier. Instead of using collodion the whites of new-laid eggs form the basis of the film, which is flowed on as described for collodion. Albumen plates are not obtainable commercially, and to manufacture the emulsion requires expert skill. The plate is very slow in sensitiveness and is exposed by contact to direct daylight. Like the other slow printing processes it yields very fine tones, and it is through some of the tones obtained by M. Ferrier—who kept the secret of them—that albumen has achieved its

reputation. The finest results ever obtained on albumen plates are obtainable on some brands of gelatine plates, if handled by a worker who is capable, and at the same time sufficiently enthusiastic in his work to give to the gelatine plate a part of the care which must be bestowed upon albumen.

Carbon-slides. As carbon is coming more and more into use it will probably be much used for slide work. The delicacy of tone and range of gradation which are characteristic of carbon are of especial value in a lantern-slide. The tissue, too, may be obtained in various colors, which is an obvious advantage, giving a wide choice, without toning, and assuring uniformity of tint in any required number of slides. It will be a saving of time if the tissue is sensitized in pieces of a size larger than lantern-plate—say 6 × 8 inches—which will cut into four lantern-slide size pieces. Sensitize the tissue in a five per cent. solution of bichromate of potassium and squeegee it down onto a polished, collodionized piece of plate glass. Place it in a dark, dust-proof cupboard to dry. When quite dry the sensitized tissue will peel from the glass, and it may then be cut to lantern-plate size and the exposure made in contact with a negative. For the "safe edge" required in carbon work, a mask with a large opening will serve. The exposure is timed by an actinometer, and when it is completed the tissue may be laid down on the glass slide. The glass which is to finally support the tissue should be thoroughly cleaned and then polished with 6 grains of pure white wax in 1 ounce of benzole. Rub a very thin film of the wax evenly over the whole of one side of the glass, using a clean flannel rag. The exposed tissue is immersed in clean water until it becomes pliable, when it is squeegeed down to the waxed plate. Lay the plate on the table—tissue side upward—cover it with a few sheets of blotting-paper under a slight pressure—a book will do—for half an hour. To develop, immerse the plate in a bath of water kept at 100° Fahr., or a little over (the temperature must be kept even). The paper support will soon loosen and can be peeled away, leaving the exposed tissue on the glass. The image will appear, and when sufficiently developed remove from the warm water into a dish of cold water to set the film. Then soak for twenty minutes in an alum bath (five per cent. of alum in water). Wash well under the tap and set aside to dry.

Collodio-bromide. The dry collodio-bromide process is occasionally heralded as the one matchless process for lantern-slide work. In theory, perhaps, dry collodion is "superior" to gelatine, but the process is not worked commercially to any extent, and it is therefore of little practical interest.

Clouds. The man who first coined the term "bald-headed landscapes" did more to emphasize the necessity of rendering skies either with clouds or in a suitable tone than years of writing had done. A print of a landscape in which an expanse of sky is shown by white paper is very unpleasing, but to view a number of slides, on the screen, in which skies are represented by clear glass, causes actual physical pain to the eyes. In many landscapes and seascapes half or more than half the picture is above the horizon line, and unless some precaution is taken the dazzling white of the upper part of the picture on the screen quite overpowers the rest. The remedy is to print in a cloud sky. This may be done either by double printing on the slide or, more easily, by printing a sky on another plate and using the second plate as a cover-glass.

Clouds on Cover-glass. When the slide is made, choose from the stock of cloud negatives a sky which is suitable. When the cover-glass is placed on the slide the two film sides will be in contact. It will be seen from this that the pictures will be reversed toward each other, and we must therefore choose a sky negative which is lighted from the direction opposite to the landscape, so that when the sky is reversed in the finished slide the lighting will appear correct. If the cover-plate is made by contact this precaution is necessary. If the cover is made by reduction in the camera, a negative lighted from the same direction as the landscape may be selected, but in this case the reduction must be made from the back of the negative, that is, with the glass side nearest to the lens of the camera, and the film side facing the source of light. Make a mask, cut to follow the contour of the sky-line, and hold it in front of the cloud negative during exposure, moving it gently to prevent any distinct edge being shown, in such a way as to mask off that part of the glass which will cover the landscape, and have clouds printed only on that part where they are required.

If the slide is made by reduction, hold the mask behind the negative, between the diffusing ground-glass and the source of light. Some workers do not take this precaution, trusting to remove any clouds which are in the wrong place by local reduction; but the little extra trouble of the mask is well repaid in the result.

Reducing. Some little blending may be necessary where the sky and ground meet. We often see skies in which the clouds do not reach quite down to the horizon, and therefore it is easy to work our sky into a natural effect. For this purpose Farmer's reducer should be used, after the plate is fixed. This reducer is a solution of potassium ferricyanide in water, with a little hypo added. For our present purpose use a weak solution—5 grains ferricyanide of potassium; 1 ounce water; 10 drops of a saturated solution of hypo. With a camel's-hair brush apply this solution very carefully to the clouds which require softening or eliminating. This reducer will, if allowed, dissolve the entire image away, and a water tap should be at hand so that the reducer can be washed from the plate at any moment. If the whole plate is too dense it may be cleared by immersing in the reducer.

Double Printing on One Plate. Double printing of the sky and foreground on one plate is not difficult if care be used, and it has the advantage of guaranteeing a uniformity of developing and toning which has to be carefully worked for when two separate plates are used. Make first a paper print from the negative to be used for the picture, and with a pair of shears cut the print carefully in two along the skyline. One half of this print will serve as a mask while printing the foreground, the other will serve for the sky. Place the negative in the printing-frame with the sensitive plate behind it. As there will be no visible mark on the plate after we have exposed for our foreground, marks must be made on the frame showing the exact positions of the ends of the skyline, to ensure register when we print the sky. Hold the mask which is to cover the sky in position in front of the negative and make the exposure. Then take the negative out of the printing-frame and insert the cloud negative, and replace the plate. Hold the foreground mask in front of the cloud negative to cover the lower part of the plate and make the second exposure. If a reduction is made

in the camera, shield the negative in the same way, and while the sky negative is being substituted for the landscape one, close the slide of the plate-holder. The mask in this case is held behind the negative and between it and the source of light.

Blending. In spite of precautions it may happen that we do not get a good joining of land and sky. If a cloud slightly encroaches on the land it will, in most cases, not be noticeable. If it is, the best remedy will be to make another slide. If the sky appears too strong near the horizon, Farmer's reducer, still further diluted, may be very carefully and sparingly used.

Compensating Cover-glasses. For years slide makers were content with their clear glass skies, but now they are rapidly awakening to the advantages of clouds. It has remained for an American worker to practically demonstrate that the pictorial possibilities contained in the modifying influences of cover-glasses are by no means fully understood. By devoting all the care which is usually bestowed on the most intricate of prints to the making of a lantern-slide, Alfred Stieglitz has produced some work which has set a new pace in pictorial effect. In brief, his process is to make, by contact, a very thin under-exposed (negative) copy of his *slide*, and use this negative copy as a cover-glass. In the case of a sky which was clear glass in the slide, a negative made from this would be very dense. But if we very much under-expose our contact negative, the sky in it will be very thin. If this negative is used as a cover-glass, and the slide shown in the lantern, the light will pass through the thin sky, and will be modified so that it no longer reaches the screen as clear white light. Where we have representations of reflections, as in water-scenes or "wet-night" scenes, this compensating cover-glass often turns what might be a mere clever slide into a picture. The method is simple in outline. Place the finished slide, after it has been washed and dried, in a printing-frame, and in contact with it place an unexposed lantern-plate. I say in contact, but the plates must be separated by laying a mask between them. This slight separation allows a slight diffusion of the light. Were the plates printed in absolutely close contact their separation to the extent of the thickness of a mask, when shown in the lantern, would result in a

narrow line or halo of whiter light around our modified high lights. Give a very brief exposure. If the lantern-slide received 15 seconds exposure, 1 second will probably be sufficient in this case—we want a mere ghost of a negative. If this negative after development is placed over the slide, in exact register, it will tone down every high light, for where we have clear glass in the positive transparency, we shall have the densest film on the negative cover-glass. If the two are temporarily bound together and projected in the lantern, or examined by a strong light in the lanternoscope, any place in which the correction of values has been overdone may be noted, and when the glasses are unbound, local reduction, with a brush and Farmer's reducer, may be worked to any extent.

The Final Operations. When the slide is finally toned and dried we reach the operations of covering with a glass, masking, and binding—necessary for the protection of the delicate film from injury, for the slightest scratch or flaw would be unpleasantly magnified on the screen.

Masks. A mask is a piece of opaque paper cut to the size of the lantern-plate—3¼x4 inches—with a cut-out centre through which the picture is seen. This inner opening of the mask serves as a boundary or frame to the picture when thrown on the screen, and may be of any size or shape which is considered most suitable. Usually for slides made by contact—where we wish to obtain as much of the picture as possible—a large square or oblong opening with slightly rounded corners is used. In the case of a slide by reduction the picture is nearly always—though not necessarily—made smaller. There are many standard shapes of cut-out masks on the market, and a sample box of assorted shapes can be purchased from any dealer. These shapes are either round, oval, various forms of dome—that is, square lower corners with a rounded top—square or oblong. The square and oblong, often with their corners slightly rounded, are the favorite shapes. In choosing a mask we are practically trimming our picture, and have room for the exercise of all our skill. When the proper mask is chosen the plate should be laid, film side uppermost, on a white sheet of paper on the table. Everything at this stage should be thor-

oughly dry, and it is well to heat both the plate and the mask. The mask is laid carefully in position on the film, and a cover-glass is placed over it. The cover-glass and the slide are then firmly bound or glued together by a narrow strip of thin paper run round their edges.

A very convenient mask, or mat—as often called—is the Olmsted. This is a piece of paper the size of a slide, but without the opening cut in it. One side is white, and on this side a number of crossed lines are ruled in such a way that by following a set of lines with a sharp knife any desirable size or shape of opening may be cut out.

If the worker wishes to make his own masks he may obtain a few templates—which are sheets of brass or zinc with an opening cut in them—from any large photo-supply house or hardware store. With these a pivoted wheel-trimmer should be used to cut the paper. A method of making dies was suggested some years ago by, I believe, Jos. P. Beach, of New York, and to those who can use carpenters' tools, and who may not require a great variety of patterns of masks, it may be useful. The method suggested consisted in taking a block of hard mahogany, apple, or pear wood, with the end grain upward and about an inch and a quarter thick, and as large in size as an ordinary lantern-slide plate. Mark upon the surface with a lead pencil the form and size of the mat wanted, but perhaps a trifle smaller than the actual size. Then with proper tools—chisels and files—take from the block, a half an inch in depth, the wood, until it assumes the oval or square marked out. Around this wood form an old clock spring or other piece of thin steel is bent and fastened by screws to the wood. Holes for the screws should first be punched in the spring, and when ready for fastening the spring may be held tightly to the wood by means of a vise. When the spring entirely circles the wood the joining of its two ends will require some little care. Either they must exactly meet, or what is easier, slightly overlap, in which case they must be very finely filed down. As a clock spring is too thick to be a good cutting edge it should be filed, from the inner side, before mounting, to a sharp edge. If the steel is too hard to be workable the temper may be softened by heating it in a fire and plunging it among the ashes to cool. This die, when

made, should be placed on the table with its cutting edge upward, and over it three or four thicknesses of the mask paper are laid. Another block of hard wood is placed on the paper and a few light taps of a hammer on it are sufficient to cut the masks.

A simpler method, and one allowing the greatest amount of discrimination in choosing the size of the mask, is to cut needle-paper into strips about four inches long by one inch wide. The slide should be placed film side up as before on the white sheet of paper, but on the paper two straight lines should be ruled, meeting at a right angle. The plate is moved until the lines on the paper exactly show the part of the foreground and one side to be masked off; then two pieces of paper are slightly moistened and carefully placed in position. The slide is then turned half round and two more strips of paper complete the mask. The only objection to this method is the slight one that the strips are dampened to ensure their adhesion to the film.

The Paper. The paper most commonly used for masks is a black needle-paper, opaque and tough, but thin. Some workers prefer a mask with one side white, on which particulars may be written with ordinary ink. If black needle-paper is used, any data may be written on it with Chinese white thinned with a little gum-arabic in water and used with a fine pen.

Blocked-out Masks. A suggestion, due to Paul Martin, may often be utilized with advantage. It is to block out any background or undesirable features from a plate by the use of some opaque medium such as Indian ink. This makes of the pictures a kind of "living statuary," and is especially useful in such subjects as street scenes or photographs of caged animals where the houses over the way, or the barred fences, unduly distract the attention. Take the slide to be blocked out, and with a little Indian ink diluted with water very carefully paint round the outline, using a fine sable or camel-hair brush. If a false stroke is made, the whole may be washed off with water, and when the slide is dry a fresh start made. When an opaque line one-eighth inch broad has been painted around the outline, the rest may be blocked out with a larger brush, or a paper mask may be cut to cover it.

The Cover-glass. The cover-glass should be very clear and thin and free from blemishes. The thinness of the glasses used in lantern-slide work is a concession to weight, and is so universal that if a very thick glass were used for cover, the slide might jam tightly in a lantern when shown and cause trouble. The glass is placed in register carefully over the slide and mask, and the whole is ready for binding by means of a strip of paper around the edges of the glasses.

Cleaning Glass. The troublesome question of the disposal of spoiled negatives is in part solved for the slide maker. He can at least use the glasses from his spoiled transparencies as cover-glasses. To cleanse the glass place it in a pan, film side up, and pour over it a hot, strong solution of washing soda in water. By the time the solution is cool, the film should easily leave the glass if scraped with a flat piece of wood cut to a chisel edge. If the film is obstinate, let it soak for an hour. When the glass is clear, rinse it well in running water and then immerse it for a few minutes in a five per cent. solution of hydrochloric acid. After a last rinse under the tap the plates should be reared on end to dry. When dry they should be thoroughly polished with a mixture of Tripoli powder in methylated spirits or wood alcohol. Mix to a thick cream and then add a few drops of ammonia. Smear the cream on the glass and wipe off and polish with a clean linen rag. If necessary, finish the polishing with a clean wash leather which has been washed in water only.

Binding. Binding is one of those "little things" which so often cause trouble. A binding strip is a piece of paper about ⅓ inch wide and 16 inches long, well gummed on one side. The trouble with some binding strips is that they will not adhere to the glass, but persist in sooner or later drying off. One strip which works quite satisfactorily is the *Model;* or home-made strips may be made by coating needle-paper with thin glue. The secret of good sticking is to have the strip thoroughly limp with water. Lay the damp strip on the table, and take the slide and cover-glass between the finger and thumb. Press one edge down firmly along the centre of the strip of paper. The paper will adhere to the glass and may

now be raised from the table. About ⅛ inch breadth of paper will overlap each side of the slide and this must be pressed firmly down to the glass with the finger and thumb of the other hand. As soon as the paper adheres along one edge bend it carefully around the corner, being especially careful to press it well home at the corner. Rub the finger and thumb repeatedly along each edge. When all four sides of the slide are bound, tear or cut off the inch of binding strip which is left, and put the slide away to set. To facilitate this binding there is a little vise known as a "lantern-slide binder," in which the two glasses are firmly grasped by two revolvable clamps. This allows the use of both hands in fixing the strips. A useful wrinkle in binding — for which I am indebted to Andrew Pringle—is to bind with some thin, tough, porous paper, such as tissue-paper, and afterwards dip the edges of the slide into a shellac varnish.

Naming the Slides. Slides are named, and any required data added, either by writing on the mask, or by affixing a label to the cover-glass. When a slide is placed in the lantern the cover-glass is always placed inwards, and any distinguishing marks are placed on this side. If a mask of light colored or white paper has been used, a pen and ordinary ink will write the particulars; if black needle-paper has been used a little Chinese white, mixed with dilute gum-arabic, should be used. If the writing is placed on a label after the plate is bound the label should be glued on the cover-glass along the left margin as the picture is held right side upwards.

Spots. The lantern-slide is placed in the lantern with the sky downward and with the cover-glass next to the light. It is necessary to have some ready means of telling when the slide is in its right position. To secure this we gum a round label on the lower left-hand corner of the cover-glass—or if we have a label across the left end it serves the same purpose. In England—and to a certain extent in America—the distinguishing marks are two white spots, one in each *upper* corner of the cover-glass. These spots may be attached to the mask, or placed on the cover-glass after binding. I prefer the latter plan, as then any number may be written on the spot, and so a set of consecutive slides easily kept in

place. If slides are made by the carbon process they will be reversed, and in this case only, the spotting should be on the slide itself, not on the cover-glass.

Coloring Slides. A retouching desk to hold the slide, a few oil-colors, a little megilp, a few fine brushes, and a finger-tip are all the essentials for coloring a lantern-slide. The colors used are moist oil-colors, sold in tubes for ten or fifteen cents. Any good make of colors may be used, but transparent ones only must be chosen. First comes Prussian-blue, both in transparency and ease of working. The siennas, crimson-lake, gamboge, and ivory-black are a useful minimum to commence with. I have used both Rowney's and Winsor & Newton's colors, and lately I have had much satisfaction with those of Devoe & Raynolds. This latter firm has a very useful white—blanc de laque, for thinning. Water-colors proved unsatisfactory, until the introduction of the specially prepared Elmendorf aniline colors, which work perfectly.

The materials used are not numerous. A retouching desk is the best thing to hold the slide, and beyond that nothing is necessary except a few tubes of color and some fine sable-brushes. Get the best brushes. They will last a long time, and with cheaper ones it is impossible to do good work. Ordinary oil-colors, worked with a little megilp or a little mastic varnish, do all that is required. The most useful tool of all is the tip of the third or fourth finger, which is used in spreading an even or graduated tint—usually in the sky. Before describing in detail the coloring of a slide I will explain the use of the finger-tip. It is used wherever any considerable surface has to be covered, and as a little practice is required to work it successfully it would be well to practise on a clear film before attemping to color a slide. Thin a little of one of the colors with megilp, and with a brush dab a few streaks of the color unevenly across the part of the glass to be first experimented on. Then dab gently with a finger-tip until the color is evenly spread over the required surface. Keep at it without getting hurried, and each attempt will make the work easier. A few attempts will usually be sufficient to lay an even tint, and then a graduating effect may be tried and the work merged gradually and evenly from a deep tint to the clear glass. When this can be done

choose a slide to experiment on. Take one with a considerable sky, and commence the dabbing of a sky-tint with Prussian-blue, gradually thinning it down before the sky-line is reached. If a "sunset" is required a little touch of crimson-lake may be blended into the blue to form the green band through which the blue melts into the gold of the horizon, which may be indicated by a careful use of gamboge. Probably by the time this is done a good deal of the color has worked over the sky-line onto the trees or hills of the distance. This should be removed with a clean rag.

It must be remembered that in lantern-slide work we are, first and last, impressionists; that is, we do not separately touch each leaf, or blade of grass, or minute detail. A slight, even wash over the whole of the mass gives it the requisite variety and contrast of tint.

So far I have suggested only the coloring of masses, for such should, I think, be first tried. When this branch is mastered the more intricate matters of coloring such things as flowers or microscopical objects will be largely a matter of care, together with an artistic perception of the best colors to be used. It is best to use a separate brush for each color when several are used, and the brushes should be cleaned with a little turpentine. The same applies to the finger-tip after it has been used for dabbing. In taking out color, as in working clouds into a blue sky, or placing a white touch of a flower among the green of the grass, a very fine stump covered with chamois-leather will be the best tool to use. Remember that a lantern-slide is often enlarged thirty diameters or much more, and any crudeness may show too prominently on the screen. At the same time remember that the great fault of beginners is in overdoing the color; the light cannot struggle through a dense wash, and a slide which may appear gorgeous as a hand-specimen of coloring may be too dark to be recognizable on the screen. From this it follows, too, that the slide chosen should in the first place be very clear in the high-lights. When the slide is colored we face what is perhaps the most difficult part of the whole business—the drying of the slide. The difficulty is the purely mechanical one of our old enemy, dust. The film takes some time to dry, if the colors are mixed with megilp, and it is next to impossible to keep the dust away unless the slides are put away in a dust-proof box.

When it is dry the slide will present a most amateurish, unsatisfactory appearance. This is not necessarily the result of inexperience, but simply because the operation is not completed. The final step is to varnish the negative. The varnish required is a good quality of balsam mixed thinly with turpentine. As a little will go a long way, I would advise obtaining the balsam from some optician handling microscopical supplies, who keeps a special quality for mounting microscopical objects. When the balsam and turpentine are well mixed let them stand a week to allow a thorough settling of impurities. Then decant the clear solution to a clean bottle, and flow a little of the varnish carefully over the plate and drain off into another bottle. There is a word of caution here necessary. Turpentine is a solvent of oil-colors, and if a stream of the varnish is poured too roughly on the color it will mark the place; if it is flowed carefully and evenly over, the only result of its dissolving action will be a slight softening or blending of the colors. A few minutes will suffice for drying, and the slide may be then masked and protected with a cover-glass. The whole tone of the slide may be lowered by the varnishing, and, if this is observed, a similar change may be provided for by painting the next one with due allowance for this alteration.

BOOKS.

How to make Lantern-slides. By S. L. Coulthurst. Simple, practical instructions for gelatino-bromide work. 80 pp. Illustrated. (1898.) Cloth, 50 cents.

Lantern-slides by Photographic Methods. By Andrew Pringle. A practical book, containing formulæ for all processes, including emulsion formulæ. 71 pp. Diagrams. (1897.) Paper, 75 cents.

The Lantern-slide Manual. By John A. Hodges. Containing full instructions for coating plates and making slides by all processes. 140 pp. Diagrams. (1892.) Cloth, $1.00.

Lantern-slides: How to Make and Color Them. By D. L. Elmendorf. 69 pp. Illustrated. (1897.) Cloth, $1.00.

NOTES

We take this opportunity to publicly acknowledge the very large number of letters recently received from readers of THE PHOTO-MINIATURE, expressing their good-will toward, and appreciation of, the special work undertaken by this magazine. The fact that we are behindhand with the work makes it impossible to reply, individually, to those who have written in this way; but we are keenly appreciative of all that has been said and done to forward the success of the magazine. May we again suggest that the best of all ways in which readers may give us practical help is to *invariably* mention THE PHOTO-MINIATURE when writing to or dealing with manufacturers and dealers in photographic supplies.

The January number of THE PHOTO-MINIATURE, dealing in an interesting way with *The Blue Print and its Variations*, is now in press, and will be ready for delivery about the middle of February. There is room for a better understanding of "blue print" methods, and we believe that a little book about them will find sufficient favor to justify its publication. The February number, a practical handbook on *Developers and Development*, will, we expect, be published before the end of the month, and will be specially illustrated.

Telephotography: An Elementary Treatise on the Construction and Application of the Telephotographic Lens. By Thomas R. Dallmeyer. 148 pp., small 4to. With 26 plates and 66 diagrams. Price, $4.00 net. New York: Tennant & Ward.

Carefully, simply, and clearly, with few words and many apt illustrations, Mr. Dallmeyer tells, in this handsome volume, the story of the telephotographic lens—how it is constructed, its purpose and application, and its practical use. There has been a constant demand, of late years, for an authoritative explanation of the full significance of telephotography, and it is peculiarly fortunate that the first book dealing with the subject (for American and English readers) should come from the

famous optician to whom is due the first description and commercial introduction of the telephotographic lens. The titles of the various chapters will sufficiently explain the scope of the book, viz. :—Preface and Historical Notes; I., Properties of Light; II., The Formation of Images by the "Pinhole Camera" and its Perspective Drawing; III., The Formation of Images by Positive Lenses; IV., The Formation of Images by Negative Lenses; V., The Formation of Enlarged Images: *Part* 1—By Two Positive Lens Systems: *Part* 2—By a Positive System and a Negative System Combined (The Telephotographic Lens); VI., The Use and Effects of the Diaphragm, and the Improved Perspective Rendering by the Telephotographic Lens; VII., Practical Applications of the Telephotographic Lens; VIII., Working Data (Exposure, Development, etc.); Abridged Formulæ for Reference; Bibliography. Chapter V., as a matter of course, contains the heart of the book; but the interest is remarkably well sustained throughout, and the method of teaching adopted is one readily grasped by the average photographer acquainted with the action of photographic lenses.

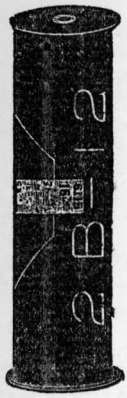
For the general reader the interest of the book will probably centre in Chapter VII., on the practical applications of the telephotographic lens. What is here said of the advantages of the lens in portraiture will, we believe, surprise the intelligent portraitist unaware of its use in this field. The application of the lens in medical and surgical photography, for groups and hand-camera work, long-distance photography, interiors, animal and bird life, in war, balloon, and solar photography, all are treated and convincingly illustrated in this chapter.

The numerous engravings throughout the book offer thoroughly good examples of telephotographic work, and are accompanied by interesting data. We commend the volume as one which will, undoubtedly, give the fullest satisfaction alike to the student and to the practical man.

There are indications that the year will develop more or less lively competition in the manufacture and retailing of photographic apparatus and materials. Our readers are already informed of the combination of interests effected by the principal manufacturers of sensi-

tized papers. Closely following comes the news that the Rochester Optical Company, the Rochester Camera and Supply Company, the Monroe Camera Company, and the Ray Camera Company, all of Rochester, with the Western Camera Company, of Chicago, have been organized in one concern as the Rochester Optical Camera Company, capitalized at $3,500,000. We are now informed that the manufacturers of hand-cameras and printing-papers not included in the foregoing combinations have themselves combined under the title of the Photographic Manufacturers' Association of America. The Association, according to the report before us, includes the Scovill & Adams Company, of New York; John Carbutt, Willis & Clements, the Bullard Camera Company, the Manhattan Optical Company, the Kozy Camera Company, Defender Photo Supply Company, Vive Camera Company, Gundlach Optical Company, New York Dry Plate Company, and G. Gennert. Mr. W. I. Lincoln Adams is the president, M. B. Hoyt, secretary, and F. H. Hoge, treasurer of the association. Inasmuch as the makers of dry plates, publishers of photographic journals and other important photographic interests do not appear in the "make-up" of these various combinations, we may still enjoy the excitement of waiting for further developments. Meanwhile the combinations already organized will make things lively, and the wide-awake consumer should keep his eye on the market. The general forecast is, rising temperature, sultriness, cyclonic storms, and general disturbances, followed by considerably colder weather, with a touch of frost over a wide area.

"When in doubt use *Pyrox*" should be the motto of the man behind the developer department of the M. A. Seed Dry Plate Company, for *Pyrox* is a developer which has not had the publicity it deserves—a developer in which good pyro and something else have been "mixed with brains *quant. suff.*," as the sarcastic text-books put it. Some days ago we tackled the development of half a dozen negatives; subject, a group comprising a two-year-old boy, four-year-old girl, three dolls, and a maiden aunt, taken indoors at noon with a leaden sky and a flurry of snow outdoors; exposures, from two to six seconds—all insufficient. Results: five failures with three approved developers, and one fairly success-



2 & 6 Exposure Cartridges

Now and then, especially in winter, the amateur wishes to make from two to half a dozen pictures, but does not care to use up an entire spool of a dozen exposures before development. To provide for this we have now prepared to furnish daylight loading cartridges for two or for six exposures. For work at home, then, as well as for one's outings, the Kodak becomes more convenient than the plate camera. No dark room except for development, no bothersome plate-holders or dark slides.

	6-Exposure Cartridges, each.	Packages 2 Cartridges 2 Exposures each, (4 exposures)
2¼x3¼, No. 1 Folding Pocket	$ .20	
3½x3½ No. 2 Bulls-Eye, etc.	.30	.25
4x5, No. 4 Bulls-Eye, etc. (4″ spool)	.45	.35
5x4, No. 4 Cartridge Kodak (5″ spool)	.45	.35
7x5, No. 5 Cartridge Kodak (7″ spool)	.80	.60

EASTMAN KODAK CO.

For sale by all dealers Rochester, N. Y.

ful negative developed with *Pyrox*. It was remarkable to see what *Pyrox* did with that negative and an exposure of barely three seconds.

The Art Institute of Chicago and the Chicago Society of Amateur Photographers announce a Photographic Salon, which will be held at the galleries of the Art Institute from April 3d to 18th next. "The purpose of the Salon is to exhibit that class of work only in which there is distinct evidence of individual artistic feeling and execution; the pictures to be rigidly selected by a competent jury," as follows: Alfred Stieglitz, Joseph T. Keiley, Clarence H. White, Miss Eva Lawrence Watson, and Ralph Clarkson. The co-operation of advanced workers at home and abroad is cordially invited. Particulars of entry and forms may be had from F. W. Lawrence, 65 State street, Chicago.

The British Journal Photographic Almanac for 1900. Edited by Thomas Bedding. 1,516 pp. (text, 500 pp.; advertisements, 1,016 pp.) With numerous illustrations. London: Hy. Greenwood & Co. New York: G. Gennert. Paper covers, post free, 70 cents.

For the man who desires a comprehensive survey of the photographic activity of 1899, from the British point of view, the *Almanac* is, without the shadow of a doubt, *the* one book wherein he may most fully satisfy his desires. Aided by the remarkable enterprise of the British advertiser, who here and there "spreads himself" over sixty odd pages, Mr. Bedding has accomplished his herculean task with complete success. The volume includes (apart from the more or less complete catalogues of over two hundred firms dealing in photographic supplies) a review of the year's work, a hand-book on Stereoscopic Photography, seventy-six papers on as many different subjects by contributors, an Epitome of Progress in Methods, Some Patented Inventions of the Year, Recent Novelties in Apparatus, Practical Notes and Suggestions of the Year, Notes on Some Iron Printing Processes, Miscellaneous Information, Standard Formulæ and Tables, and an additional one hundred pages of varied information packed in front of the foregoing, apparently inserted to make sure that the pur-

chaser should get his money's worth. It is a book which everybody buys, or should buy, but which nobody reads, or should attempt to read, through; to be dipped into at leisure, or glanced over, like a biographical dictionary or census report. We are distinctly grateful that the *Almanac*, like Xmas, "comes only once a year."

By an error in type-setting the Hammer Dry Plate Co.'s advertisement in THE PHOTO-MINIATURE has appeared to make the absurd claim that "Hammer plates will not frill in hot water." For "hot water" read *hot weather* and you get the fact in the case. The Hammer plate is a good all-around plate, and a particularly good hot-weather plate, but we would not advise the hot-water test.

The frontispiece of *Wilson's Photographic Magazine* for January is an uncommonly good example of portraiture as it should be done. It was made by C. C. Kough, a professional, of Greensburg, Pa., and embodies a new idea in lighting the subject which is described in the magazine.

The *Rembrandt* Head Grounds, just introduced by Geo. Murphy, 57 East Ninth Street, New York, deserve a word of mention as peculiarly useful for amateur portraiture at home. They give a graduated area of 4 × 5 feet, and at a dollar apiece are remarkably good value. The new background announced by W. P. Buchanan, Philadelphia, at a dollar, giving six changes of effect in a single ground, is another specialty of the same sort which should not be overlooked. For those who seek richer effects, such as the dainty miniature grounds (which give the picture image encircled by a miniature frame of tasteful design), Seavey's *Miniature* grounds are decidedly the best of their class. Amateurs or professionals seeking exclusive designs in backgrounds should see Seavey's reproductions of new effects before purchasing.

A new carbon paper, similar to the Artigue Velours paper of a few years ago, has been placed on the market in France. It is obtainable in several tints. The Artigue

paper, as will be remembered, was a direct carbon paper which did away with the necessity of double transfer in printing, and gave prints of such delicacy of detail and gradation as to be indistinguishable from fine platinotypes.

Speaking of platinotype prints reminds us that it is time someone entered a strong protest against the ridiculous waste of platinum paper evidenced in much of the platinotype work sent to our table from amateur and professional photographers. We may fairly say that less than two platinotypes out of a dozen reaching our table show any knowledge of the capabilities of the paper, of its manipulation, or of the ability to decide when its use is advantageous or otherwise. The craze for platinum prints is widespread, and the average worker seems to labor under the delusion that so long as a picture is printed on platinotype paper, it must be artistic, whether the print is technically good or bad, or whether the subject is suited to the variety of platinum paper or not. The fact of the matter is that a good platinotype print requires a great deal of intelligent care in its making, and that half the battle depends upon the choice of the variety of paper employed, its texture, tone, and the adaptation of the development of the print to the character of the subject. A careful reading of THE PHOTO-MINIATURE, No. 7—*Platinotype Processes*—will give practical aid in the obtaining of the best results.

A new sensitive film, just introduced in England, differs from all others in that it is not coated upon any support, such as glass, celluloid, or paper, but consists simply of two emulsions of different sensitiveness coated in contact with each other. This gives one the additional advantage of working with either side, besides all the practical advantages of a double coating so far as halation, etc., are concerned. One side of the new film has a matt surface, the emulsion of this half of the film having a sensitiveness of 120 Watkin, or 78 Wynne. The other half (or other side) of the film has a smooth surface, and a speed of 23 Watkin or 15 Wynne. The thickness of the film is such that it lies flat in manipulation, the developer penetrates very rapidly on both sides and development is considerably shortened. The

negative enlarges about 25 per cent. during development and washing, but this enlargement is quite regular and can be obviated by the use of a bath of wood alcohol. In manipulation a tray larger than the negative is used, to allow for the enlargement of the film; pyrocatechin is the developer advised, and the films are previously treated in a bath of formalin and bromide of potassium. They are supplied in rolls and spools for daylight cartridges. These particulars are gleaned from the maker's announcements, and make it clear that the new films are by no means as simple in manipulation as the ordinary film or dry plate.

Mr. John Beeby, the amiable librarian of the New York Camera Club, has recently been awarded several medals at English exhibitions where his work has been shown. His latest success was at the Borough Polytechnic Exhibition (London), December 28th, where he received a medal for a set of lantern-slides.

The following report upon the trade in photographic paper in Germany, furnished by the British vice-Consul at Frankfort, and reprinted from the *British and Colonial Printer*, offers information of general interest:

In Germany, hitherto, there have been used for the cyanotype or "blue-print" process only the ferroprussiate paper (white lines on blue ground) and the ferrogallic paper (black lines on white ground). These papers, in respect to durability, high sensitiveness, and simplicity of use, have been constantly improved and are being exported in large quantities. . . .

Albumen paper and unglazed salted paper are largely used by the old photographic establishments, and are supplied by the following manufactories: Vereinigte Fabrik Photographische Papiere, in Dresden; Dresdener Albumen Paper Manufactory, in Dresden; Trapp and Münch, Friedberg. These papers are recognized as of the best quality the world over. Of late a new paper has obtained a good footing. It is of the emulsion-albumen order, and is known as protalbin paper. It is sold by its inventor, Dr. Lilienfield, at his protalbin factory in Vienna; it is also produced by the Vereinigte Photographische Papiere, in Dresden, Saxony.

The formerly much-used chloride of silver gelatine paper has now a limited demand, coming mostly from amateur photographers. It is a specialty of manufacture with Ed. Liesegang, in Düsseldorf, and Alb. Peltzer, in Wichrath, and is also made by most of the collodion paper manufacturers. Of foreign makes, the *Solio* paper of the Eastman Company is alone worth quoting. A sort of calcium paper is also imported from L. Sevaert, Antwerp.

Collodion paper, both glossy and matt, is now more widely bought by amateurs and professionals. The factories preparing this paper are divided into two classes —those that use only the Rives plain paper and those that work the German plain paper. The former have formed a trust, under the lead of the Vereinigte Fabrik Photographische Papiere, in Dresden. The principal factories that have not entered this combine are : Chemische Fabrik, E. Schering, Berlin ; Ernst Colby & Co., Zwickau ; Rhein Emulsions Fabrik, E. Stolle, Cologne ; van Bosch, in Strasburg ; Dr. Lüttke-Arndt, in Hamburg ; Dr. Opity & Co., in Munich ; Walter Münch & Co., in Carlsruhe ; van Dyck, in Aix-la-Chapelle.

Platinotype paper is nearly all furnished by the Platinotype Company, of London, which commands the German market. Only a few of the most prominent photographic establishments produce this paper themselves or use the German article, which is made by Dr. Rich Jacoby, in Berlin. This, however, owing to its excellent quality, is rapidly growing in favor.

As long as bromide paper was little used, the Eastman Company and Ilford supplied the demand. In addition to others imported from England, those made by Dr. Just, Vienna ; Lumière et Fils, Lyons ; Wellington & Ward, England, and Velox paper, from the United States, are used ; but the bulk is supplied by German factories, many of which have sprung up during the last few years, furnishing an excellent article. Among these the following deserve mention : Dr. Stolger, Berlin ; Chemische Fabrik, vorm. Schering, Berlin ; Neue Photographische Gesellschaft, Berlin ; Dr. Ruebinsam, Berlin ; Posseldt, Berlin ; Vereinigte Fabrik Photographische Papiere, Dresden ; Rhein Emulsions Papier Fabrik, Cologne ; Photographische Gesellschaft, Düsseldorf.

The Autotype Company, of London, furnishes most of the supplies needed in the line of carbon tissue. The

firms of A. Braun & Co., Dornach, and F. Hanfstangel, in Munich, are the manufacturers of the native article.

The Richmond (Indiana) Camera Club is a thriving institution, boasting twenty-six active members, including no less than five professors, and a programme for 1900–1 which might well make many a bigger club turn green with envy. Secretaries of moribund camera clubs (they abound) in search of inspiration would do well to apply to Secretary C. W. Hasletine, of the R. C. C., for a copy of the new programme. It is a credit to all concerned.

Two clever examples of street photography at night, showing State street, Chicago, with the Memorial Arch and holiday illuminations, have been received from M. L. Masure, of that city. The following information concerning his method of working is interesting: The plates used were Seed's 26*x* *Non-halation*, backed with a syrupy mixture of lamp-black, honey, and alcohol. The exposure, with a Zeiss *Anastigmat*, Series IV., was twenty minutes, and a solid spot of black was put at the centre of the lens, about half the size of the stop used. This latter device was the result of experiment to lessen the glare of the electric lights and give greater general brilliancy, and its use proved of great advantage. The developer was a mixture of pyro and potash, a weak solution being used to avoid harshness in the lights of the picture. Particulars of this kind are always welcome when readers of the magazine send examples of work technically difficult.

The Royal Photographic Society (London) has inaugurated a series of "one-man" exhibitions at its new home in Russell Square, and J. Craig Annan, of Glasgow, has promised to furnish the first display of the series. Mr. Annan has proved himself, by his work, to be a master in pictorial photography, and the exhibition will, undoubtedly, be one worth going far to see. Speaking of "one-man" shows, the January exhibition at the rooms of the New York Camera Club comprised an interesting display of the best recent work of Miss Mathilde Weil, of Philadelphia. Miss Weil is a professional of

the "new school," and has produced some decidedly clever portraits. Her treatment of the subject is notable for breadth and individuality with extreme simplicity.

The February exhibition of this Club will present the work of Chas. I. Berg; March, the work of Joseph T. Keiley; and April, that of Miss Eva Lawrence Watson, of Philadelphia. These "one-man" shows are exceptional opportunities for the study of pictorial photography as interpreted by skilled workers, and should not be overlooked.

Probably no man is so widely known in the photographic world of to-day as Captain Abney, whose contributions to photographic research and literature cover over a quarter of a century. Hence the subjoined note on his public career, from the London *Amateur Photographer*, is of general interest. Captain William de Wiveleslie Abney was born in 1843, and from 1873 to 1881 was captain in the Royal Engineers, when he retired. He was made a Fellow of the Royal Society in 1876, and received the Rumford Medal in 1882 for his researches on radiation. Two years later he was appointed Assistant-Director for Science in the Science and Art Department at South Kensington, and Director in 1893. In 1899 he was appointed to the office of Assistant-Secretary of the Science and Art Department. He was President of the Royal Astronomical Society, and for some time President of the Royal Photographic Society, in which office he was succeeded by the Earl of Crawford. Captain Abney has been President of the Camera Club as long as most of us can remember, and a few weeks ago he was gazetted as the recipient of the royal order of K.C.B.

A Twentieth Century International Photographic Exhibition is to be held at Birmingham, England, during March and April. Medals are offered in various classes as follows: 1 gold, 11 silver-gilt, 4 silver, and 12 bronze, with 14 diplomas. Full particulars may be obtained from W. D. Welford, 19 Southampton Buildings, Chancery Lane, London, W. C.

Ray filters

Cadett and Neall have recently published full particulars of the two kinds of orthochromatic light-filters which

they issue for use with their *Lightning Spectrum* Plate. That which is adjusted to render all colored luminosities with approximate accuracy is called the "Absolutus," and with this the exposures must be increased to twenty times under glass, as in a studio, or forty times out of doors. The second kind, called the *Gilvus*, is only intended to render violet, blue, and green in their relatively correct values, leaving the red uncorrected. For a great many out-door subjects and in portraiture, where there is little red, this light-filter would probably be all that is required, and it has the additional advantage of only increasing the exposure about three or four times. The concession implied by the issue of the *Gilvus* filter is one which will be appreciated by the average out-door worker.

Among the first to publicly point out the practical value of THE PHOTO-MINIATURE, No. 6—*Orthochromatic Photography*—was that trusty counsellor, Dr. John Nicol, the veteran editor of *The American Amateur Photographer*. In recent issues of his magazine Dr. Nicol has himself taken up the advantages of orthochromatic methods, and the series of papers is one which should be read by all who desire to make improvement in their work.