

be thoroughly washed after handling it. When the hypo solution is discolored, it must be replaced with a fresh solution.

The plate is left in the fixing solution for a short time after the yellow color has entirely disappeared from the film; then it is washed thoroughly until every trace of the hypo is removed. Soaking for several hours in clear cool water, frequently changed, is effective in removing the hypo. The permanence of the negative depends on this washing. The negatives should be placed on a rack to dry, in a cool place, free from dust.

The hydrochinon developer is largely used, and gives good satisfaction. With this, the development of the plate can be as easily controlled as with the pyro, and it has the advantage of not staining the fingers to any great extent. An under-exposed plate which is beyond saving with the pyro developer can be brought out by a long treatment with hydrochinon.

The formula for Carbutt's hydrochinon developer is as follows:

A.

Hydrochinon.....	10 grains.
Crystallized sulphite soda.....	50 "
Distilled water.....	500 "

B.

Carbonate potash (pure).....	25 grains.
Distilled water.....	200 "

A and B should be mixed in equal volumes. The quantities here given make a very small amount of solution. It is advisable to make a much larger quantity. For normal exposures this developer should be reduced somewhat with water. For under-exposed plates it may be used at full strength. Development should be carried on in the same manner as with pyro; it should, however, proceed further. The developer is saved, as it may be used repeatedly, work-

ing a little slower each time. Old developer may be used for over-exposed plates and for lantern slides. Fine effects may be obtained by beginning the development with strong hydrochinon and finishing with the old, weaker solution, or this order may be reversed. The plates are washed and fixed as before described. The developer should be kept in well-corked bottles in a dark, cool place.

If a negative lacks density in the high lights, it may be intensified with bichloride of mercury and ammonia or silver cyanide; but if it is over-exposed, intensification will not help it. The negative may be intensified at any time after the final washing, even after it has been dried, but if dry, it should be soaked in water for a few minutes before intensifying.

An ounce of bichloride of mercury in a quart of water constitutes the intensifying solution. In this immerse the negative, rocking it gently until it is of a light straw color all through. It is then rinsed thoroughly.

After the negative is thoroughly washed it is placed in a solution of water and ammonia (1 drachm strong ammonia to a pint of water), or in the silver cyanide, where it is allowed to remain until it is blackened through the film. It is then washed thoroughly.

Lantern slide plates measure $3\frac{1}{4} \times 4$ inches. They are made of much thinner glass than the ordinary negative plates. If negatives are not of the proper size for lantern slides, they may be printed in the camera.

For contact prints the negative is laid in the printing frame face up, and a lantern slide plate is laid face down on this. A piece of black paper is then placed over the back of the lantern slide plate, and the back of the printing frame is put on and fastened. The exposure is made either by daylight or by artificial light, the latter being preferred. The plate is exposed by holding the printing frame about one foot from the light. Very weak negatives may be held at a distance of five or six feet, but the time of exposure must be very much increased. The time of exposure is from two or three to thirty seconds when a five-foot gas burner is used at a distance of one foot.

All lantern slide plates are slow, and admit of the use of orange light in the dark room. A good developer for this purpose is a weak hydrochinon solution. The image should begin to appear in from three to five minutes, and should be completely developed in fifteen minutes. Over-exposure is liable to veil the high lights, and while the slide may be handsome to look at, it will be worthless for projection. The high lights in a slide should be perfectly transparent. With a negative having clear shadows and a dense sky, care should be taken not to print too heavily, for while the high lights will be clear, other parts will be dark and without detail. After development is completed, the plate is rinsed thoroughly and fixed in hypo as already described. The fixing solution should be fresh and clean. When the fixing is complete, the plate is washed thoroughly and finally swabbed with wet cotton wool. After the prints are dry they are coated with thin collodion by flowing it evenly over the plate. The slides are covered with thin glass of the same size. Worthless negative and positive plates may be cleaned with very dilute hydrofluoric acid, and used as slide covers. A mat is interposed between the print and the cover, and the two glasses are bound together with adhesive paper cut into one-half or three eighths inch strips. A small label should be placed on the lower left hand corner of the slide to serve as a guide in putting it into the lantern.

PRINTING.

Few amateurs find profit in preparing their own paper for printing. And as various good ready sensitized papers are found in the market accompanied with full directions for toning, we will confine ourselves to the gelatino-chloride paper, which is easily worked. The back of the negative is cleaned before printing, the negative is placed face up in the printing frame, and a piece of paper is placed face down upon it. The back of the frame is put on, and the paper is exposed through the negative to the sunlight. Weak negatives should be printed in the shade. A cover of tissue paper placed over the printing frame during printing preserves details. With a good negative of a landscape, for

example, the printing should be continued until it is a few shades darker than required in the finished print.

It is advisable to trim all prints before toning. The trimming may be done on a glass plate, using a glass trimming form to guide the knife. Prints should be carefully kept from the light until they are toned. They should be toned within two or three days from the time of printing—the sooner, the better. The prints are thoroughly washed in eight or ten waters until the free silver is washed out and the water is clear, before they are placed in the toning solution.

Formulas of several toning baths are given below:

For Purple or Black Tones.

Chloride of gold..... 2 grains.
Bicarbonate of soda..... 8 to 16 "
Water..... 16 ounces.

For purple tones the smaller quantity of bicarbonate soda is used; for black tones, the larger quantity. This solution should be made up an hour before use, and not kept in stock.

For Deep Brown Tones.

Chloride of gold..... 1 grain.
Sodium acetate..... 20 "
Water..... 10 ounces.

Make up several hours before use.

In either case use enough solution to fill the pan. About one grain of gold is used for each 20 × 24 sheet of paper. If the prints tone too slowly, the solution must be slightly strengthened. Only a few prints are put into the bath at a time, and they are kept in motion until the red disappears and they are a little darker than they should appear when finished. Prints may have a bluish tinge, or the color may run into a purple. A print when undertoned is red. The art of toning can be learned only by practice. After toning, the prints are placed in water for a time. The solution,

made according to the last formula should be filtered, and kept in a dark place for future use.

The fixing bath consists of:

Water.....1 pint.
Sodium hyposulphite4 ounces.

The hypo should be dissolved before the toning begins. The prints may all be put into the hypo at the same time—not more than two sheets of paper to each pint of solution. They should be turned and moved about continually. The time required for fixing will be from fifteen to twenty minutes. The hypo reddens and fades prints which have been only partially toned or printed too light. The color of all prints is rendered lighter by the hypo. After fixing, the prints must be thoroughly washed for an hour in running water or in several waters and allowed to soak for a considerable time, say half an hour between the washings. The permanence of the print depends upon this washing.

The prints when completely washed, and while still wet, may be squeegeed.

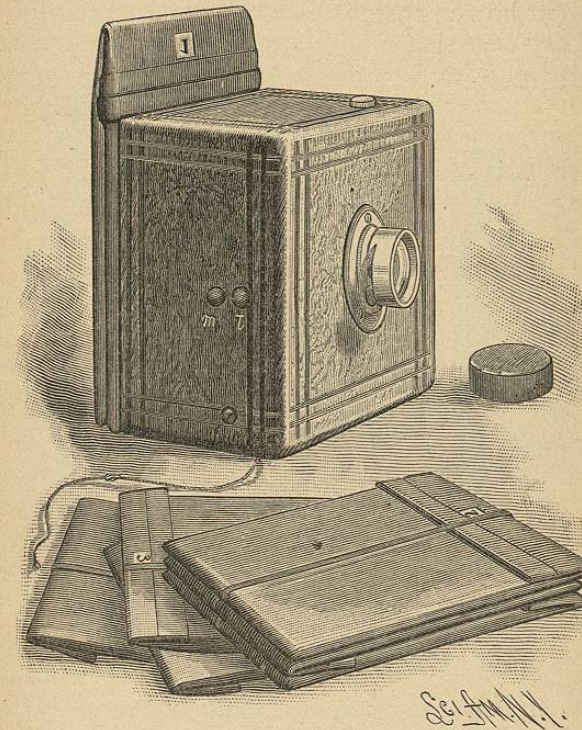
A POCKET CAMERA.

No equipment for a tour or a summer's vacation is now complete without a photographic outfit for making instantaneous memoranda of scenes and objects met with upon the road, on the river or lake, or in the picturesque nooks of mountain and valley. The principal trouble with photography in these days is not with the plates and chemicals, as of old, but with the more or less cumbersome camera and accessories, which must be ever present with the artist.

If large pictures are desired, a large camera and tripod of corresponding size will, of course, be required. To these must be added a complement of plate holders if a number of pictures are to be made in a short time. Some of the recently devised cameras are very portable, and in every way desirable. The writer adds to the list an instrument which differs in some respects from others. The principal feature is the plate-changing device, which is quite

simple and admits of the use of flexible bags for holding the plates before and after exposure. The bags—which hold one plate each—are made of the stout black paper known in the trade as leatherette. Each bag has a very thin covering of leather, such as is used by bookbinders on very light work, and around the mouth of the bag is glued a band of

FIG. 318.



A Pocket Camera.

thin, tough pasteboard. The bags are made over a wooden form. A dozen filled bags occupy very little more room than the plates in the original package. The light is excluded, and the plates are held in the bags by folding over the top, as shown in the engraving. Each bag is provided with a rubber band extending around it lengthwise, to prevent it from unfolding.