

numbered, so as to show its exposure. Obviously, the most sensible thing would be to get a set of stops made to correspond with this arrangement, but we will see how we can construct a table for stops of any size. First, if possible, find the equivalent focus of your lens. If it is made by a known maker, you will find it in his price list, and if not you may calculate it for yourself by the rules given in the various text books, provided you have a camera of pretty long focus. However, it will be near enough for our purpose if you get a sharp image of the sun on a piece of paper, and while you hold lens and paper, get some one to measure the distance from the paper to the diaphragm aperture, or, in the case of a single lens, to the centre of the lens. Note down this focal length, and proceed to measure your diaphragms in sixteenths of an inch.

Then, with pen and paper, proceed to divide the diameter of each stop into the focus, and state the result as a fraction of the focus, thus  $\frac{f}{s}$ . For example, a Ross half-plate rapid symmetrical has a focal length of  $7\frac{1}{2}$  inches; for convenience reduce this to 16ths = 120. A diaphragm measuring  $\frac{1}{16}$  will give the fraction  $\frac{1}{16}$ .

Having picked out the stops that correspond, and filled in the exposure for them, we have now to deal with the odd sizes. Here is one  $\frac{1}{37}$ , which is just half way between No. 16 and No. 32; but a moment's thought will show that as the exposure increases as the square of the diameter, it won't do to take the exposure half-way between the two.

We have another factor to consider now; that is, the rapidity of the plate. If you use plates by a maker who has a name to sustain, you may be pretty confident that they are of fairly uniform rapidity; so, after you have got into the way of working any particular brand, the best thing you can do is to stick to it. The exposures in our table are for plates of medium rapidity in good spring light. In my own experience I find that they just suit "30-times" plates, or 15 on the sensitometer; but then I like a full exposure with slow development, and I know that others find these exposures just right for "20-times" plates developed in the usual way. The most rapid plates in the market will not be overdone with half the given exposures.

It must always be borne in mind that an error of a fraction of a second in either direction may be corrected in development, and it is impossible to make a very serious error if you refer to the table.

We come now to the light. If you depend on the eye entirely in judging the quality of the light, it will sometimes play you tricks. The rays which are most active on the plates are those which have the least effect on the eye. We can, however, by chemical means, arrive at an exact estimate of the actinic power, and for this purpose an actinometer is used. This is simply an arrangement whereby a piece of sensitized paper is exposed and allowed to darken to a standard tint, and by the time it takes to reach that tint, the value of the light is judged. Capt. Abney has, however, pointed out that ordinary sensitized paper is not suitable for bromide plates, since there are conditions of light in which the plates will be fairly rapid, while the paper will be very slow. He gives a formula for a bromide paper which is treated with tannin in order to absorb the bromine set free during exposure, otherwise the darkening would be very slight. I used this paper for awhile, but found it rather slow. The tannin also turned brown on keeping for a week or so. I then made some more, substituting for tannin potassium nitrite, not nitrate, which is colourless. This was an improvement, but still it was just slow enough.

Bearing in mind that your table of exposures is calculated for the best spring light, go to the country some bright day next month with note-book, actinometer, and the necessary appliances for exposing a few plates. Select (say) an open landscape, and use your smallest stop. When all ready to expose, get out your actinometer and expose it to the reflected light of the sky for ten seconds (if the sun is shining, turn your back to it, and keep the actinometer in your own shadow), then put it in your pocket, expose a plate according to your table, and in case the light or plate should not be just in accordance with the conditions under which the table was prepared, expose other two plates, one a little less, and one a little more than that first exposed. Then note down everything you have done—kind of view, stop, speed of plate, exposure of each plate, and length of exposure of actinometer.

When you get home, the first thing to do is to get hold of a paint box and paint the under side of the glass of your actinometer to match the darkened paper. Do this by gaslight, then

scrape away a little of the paint so as to let a strip of the paper be seen below it. After this, develop your three plates with developer of normal strength, and see which is best. If you have chosen a really bright spring day, and are using plates of medium rapidity, you will most likely find that exposed according to the table just about right.

Now let us see how we can use these aids in our field work. We have ascertained the correct exposure with a given stop on one class of view, with light of a given quality; but now suppose all these conditions altered, let the view have heavy foliage coming close up to the camera, the stop be a size larger than that used in our first experiment, and the day rather dull. The table tells us what the exposure would be with this stop on this view, on a bright day, and if the actinometer take 20 seconds to reach the painted tint, then we must double the exposure given in the table.

You may sometimes find that the actinometer indicates a very different exposure from what the eye would lead you to expect. For instance, one day last September I went to Bothwell Castle to get a picture I know of in the grounds. It was one of those strange yellow days we had then, and the sun, though shining with all his might, was apparently shining through orange glass. The actinometer indicated an exposure of 30 seconds, where in good light 5 would be right. I was rather incredulous; 20 seconds in broad sunshine! However, I gave this exposure, but for my own satisfaction, I gave another plate 15 seconds only. On developing, the latter was hopelessly under-exposed, while that having 30 seconds gave a negative which furnished one of my exhibition pictures.

I have shown you how to reduce the quality of the light to a certainty, also how to reduce to rule the exposure with different lenses and stops on certain classes of subjects, and it remains with you only to guess correctly to what class the view you wish to take belongs. I can assure you from my own experience that there is enough uncertainty about that point to prevent good negatives ever becoming monotonous. The only aid I can suggest in this case is the continual use of a note-book. Note every plate you expose, and when you have a failure, be careful to record the fact, and you will gradually find these accumulated notes becoming a great help in cases of doubt. One hint I can give to beginners is, that a great number of the pictures to be met with in this part of the country are intermediate between open landscape, and landscape with heavy foliage in the foreground; and it is scarcely needful to say that if you are in doubt, let the exposure be too much rather than too little. You may make a negative of an over-exposed plate, but never of an under-exposed one.

#### THE FACULTY OF OBSERVATION, OR COMMONPLACE KNOWLEDGE IN PICTURE-MAKING.

BY A. B. STEWART.\*

MY text will be found on page 802 of the last volume of the PHOTOGRAPHIC NEWS, under date 19th December last, where appear the following remarks by Mr. Hadley relative to an exhibit of his at the late Pall Mall Exhibition, which formed the supplement to that number of the NEWS. [Mr. Stewart quoted the passage].

As to the necessity of cultivating this faculty of observation, I think no one will dream of contradicting Mr. Hadley. It is the one thing which marks the difference between a mere photographer and an artist. It is the faculty which enables the artist to judge from what particular spot and at what particular time to take his picture, so as to get the best possible results out of it. But it appears to me that our artist has limited the application of the faculty. He confines it to the ability to see a picture in commonplace subjects. In this line certainly his picture "At the Wheel" is a good example, but I do not agree with him in thinking, as his remarks indicate he does, that the cultivation of the faculty of observation in this direction is so very rare. Witness the number of beautiful pictures which we have recently had before us, many of which were made up of the most commonplace materials: two girls reading a printed bill pasted on a smithy door; two women picking their way across a dried-up burr; haymaking; and many others from the same artist, all most effective subjects. Witness our last presentation print—an old crone just in from the harvest field, her "heuck" thrown carelessly over the arm of her old arm-chair, trimming her cheap common lamp in the semi-obscurity of her poor cottage; these

\* Read before the Edinburgh Photographic Society.