from twelve to fifteen dollars and upwards. Lenses of this character purchased from the United States are, as a rule, much higher priced. A good single lens may be had from one dollar upwards, while the rectilinear variety may be obtained from three dollars upwards.

When a mechanical device or engineering construction has reached the stage where photography is called upon to enter the general scheme it is usual to exclude all idea of the artistic and brush all other features aside in the idea of securing the picture containing the most descriptive material.

Next to the lens and plate, the important item in picture making and taking is the diaphragm or "stop." This is a contrivance which admits of regulating the amount of light passing through the lens and, what is still more important, how much of the lens will be used. In most lenses of to-day the diaphragm is built into the lens cell (called an iris diaphragm) and regulated by a ring or lever which plays across a scale to show the relative size of one opening to another. Each number is placed in such a position as to indicate a reduction of 50% in area over the preceding number when the ring or lever is arranged over it.

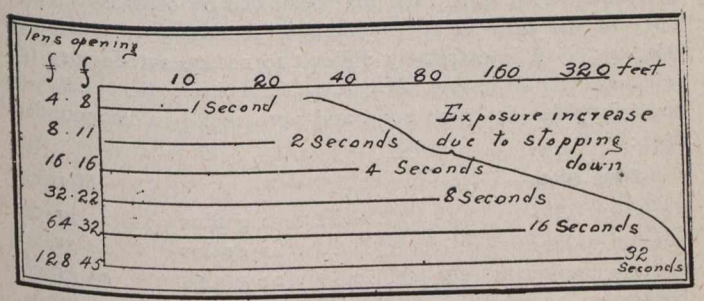

Fig. 1.

In explaining the use of these diaphragms it will be necessary to consult Figure 2. The figures on the top represent the distance in feet from the lens to the first principal object in the foreground. When the lens is open to its greatest photographic ability (represented by the upper left-hand set of figures) it will sharply focus any object at the distance indicated on the scale, but beyond this principal object the definition will become indistinct or "fuzzy." Assuming the operator desires the detail to extend farther into the picture than where the first principal object only appears sharp, this accomplished by stopping down the lens, and not by altering the focus. This might be put as a rule and read: "In focusing always regard the first principal object as the starting point, then consider what depth is required, and arrange this by the stops or diaphragm."

An examination of Figure 2 will disclose the fact that the smaller the opening used the more detail is secured. Allowance, however, must be made for the reduction in the light to secure equal contrast. An example will render this clear.

In Figure 3 assume the camera operator to be considering the taking of two views—one a group of workmen (a) and the other the interior of a power house (b). The group of workmen are drawn up in single line and twenty feet in the rear is a generator that they have been erecting. The purpose of securing this photograph is to photograph the workmen and not the generator, which is to be used as a background. An examination disclosed the fact that the men are fifteen feet from the lens and the generator thirty-five feet distance. If the lens is placed in such a position that the indicator points to fifteen feet, and the lens opened to its greatest capacity, the group will appear sharp and distinct, but beyond the group the detail will be very poor and the generator acting in this instance as a background, will perform its duties by keeping in the background and centering all interest on the group.

In the case of (b) the circumstances differ greatly inasmuch as detail is required. The operator would set his indicator at 25 feet and then arrange his lens opening so that stop f 32 was in the lens; this would evenly distribute the detail; allowance, of course, would be made for the reduction in light passing abilities as illustrated in Fig. 2. The distance from the lens to generator No. 1 is twenty-five feet, and, assuming the total length occupied by machinery to exceed this by one hundred feet, then stop No. 1 (f 8 or f 4) would render generator No. 1 sharp, the next stop would cut fifty feet, the next one hundred and the next two hundred; this includes the hundred and twenty-five feet and should be adapted (4–8–16–32) or the fourth stop. Once the relation between the focusing scale on a hand camera and the stops controlling the opening through the lenses is mastered, the operator has travelled a long portion of the road to successful picture making.

Of great importance is the light available when an exposure is about to be made, as, of course, the length of time in which the shutter remains open is governed entirely by this factor. The brightest portion of the year is obviously during the hours of 10 a.m. and 2 p.m. in the months of June and July; the darkest period is six months later. However, the important factor in estimating available light is not so much in the season's change, but in the hourly change. Under ordinary circumstances 7 a.m. may be regarded as the earliest average time in which successful negatives may be produced; and 4 p.m. may be regarded as the latest average time.

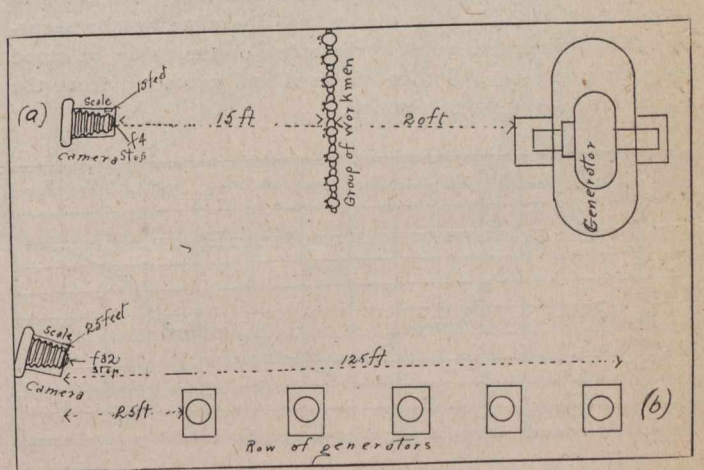

Fig. 2.

Exposure.—Fig. 4 is a curve showing the light value for a year for the district comprising the southern parts of Canada made on a noon comparison. Of course available active light in June will be of greater duration than in December, so that in making an exposure in the afternoon this must be accounted for.

An old photographic maxim is "Expose for the shadows and the high lights will take care of themselves." This is true to a certain extent in general photography, but would not yield results in certain specific cases.

There is generally found on a box of plates a "speed number" which is very useful in making an exposure. This figure is generally given in the H. & D. or Hurter and Driffield system.

The Eastman and Ensign film may be rated on the above system at 275 H.D. This figure represents that the plate or film quoted thus is practically twice as sensitive to light as one rated or quoted at 150, and consequently if the exposure of any specific plate for a given subject is known it becomes