

# PHOTOGRAPHY FOR THE BEGINNER

## II—THE LENS

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AS the lens is rather an important factor in photography, although by no means absolutely necessary to the taking of a photograph, it is well for every one, who intends to do any work with a camera, to have at least a working knowledge of it. Many pictures are lost through ignorance, on the part of the operator, of the possibilities and limitations of his lens, when a very little study upon this subject would have taught him the things he should know.

In the first place we must understand that the lens does not form the picture, the rays of light do that, and, therefore, it is possible to take a photograph without any lens; simply by the means of a small aperture in the place where the lens should be, but of this method I shall not speak now. The lens, however, serves to sift and alter the rays of light, permitting a few to do what many would not, intensifying them so that their action on the coating of the plates is extremely rapid.

Of course there are many different makes of lenses on the market, from the cheap, single lens, composed of but one piece of glass, that is placed in the cheapest of hand cameras, to those which are the outcome of the highest skill of the lens makers and are correspondingly expensive. The first kind I should advise no one to use for any purpose as they are absolutely worthless, the latter is often too expensive for the uses of the amateur, that there is a happy medium found in the ordinary rapid rectilinear lens that is suitable for nearly every purpose for which a beginning would be apt to require it.

All lenses are fitted with what are called "stops" by which the aperture of the lens can be made larger or smaller. There are three different styles of these stops: the Waterhouse stop, which is made in separate plates that can be slipped into the barrel of the lens, the rotating stop, made in a round plate that rotates in the barrel of the lens, and the diaphragm stop, formed by a set of thin plates which open and shut like the iris of the eye. This latter is the most common and the most desirable form.

The principal function of the stops is that which any beginner in photography discovers, to overcome the fact that it is impossible, with the lens at full aperture, to get objects in different planes equally into focus at the same time. In order to do this the lens must be "stopped down." I will endeavor to explain. There are two terms in photography that are often confused; depth of focus and depth of field. Depth of focus is the distance that the ground glass may be moved to and fro without any single object becoming visibly unsharp. This distance is very small with the lens at full aperture, but increases with each

smaller stop used. Depth of field is the distance between two objects lying in a straight line with the camera, each of which is at the extremes of the field of sharp focus; in other words, it is the width of the field in which all objects are in sharp focus. This also increases materially with each smaller stop used. Thus we may focus upon an object at ten feet from the lens and we will find that an object five feet farther away is out of focus. Now if we insert the largest stop and focus again we will find that our field of focus has increased, but still both subjects are not sharp at the same time, so we must continue to use smaller stops until we accomplish this. Now, if we again open the lens to its full aperture we will find that neither object is in sharp focus, but that that point lies somewhere between the two. Thus we see that, by the use of the stops, the field of focus is increased not only away from but toward the lens.

Of course, by the diminishing of the aperture and the consequent lessening of the light that enters, the action upon the plate is not so rapid and the length of exposure must be increased correspondingly with the diminishing of the aperture. It is difficult to give any hard and fast rule to cover this, it can only be learned by experience, but, roughly speaking, the length of exposure should be doubled with each successively smaller stop used. Stops also increase the covering power of a lens, and one that will not cover a plate sharply to the edges may be made to do so by stopping down.

The focal length of a lens is the distance between the rear glass of the lens and the ground glass when distant objects are in sharp focus. The greater the focal length of a lens the larger the images which may be obtained.

The term "fixed focus" is often used, but its meaning is rather obscure. When using the term, however, most workers have in mind that point upon which a lens may be focussed beyond which point all objects will be also in focus. With most so-called "fixed focus cameras" all objects beyond a certain distance are, approximately, in focus and thus the lens needs no focussing, but is always "in focus."

It is impossible, however, with these cameras to get its sharp image of anything nearer than that given distance.

Lenses need care. They should be kept free from dust and constantly covered when not in use. Never allow the fingers to come into contact with the surface of the glass, and in cleaning them do so with some soft material other than chamois skin. Never put water, ammonia, or any kind of acid upon them, but to remove spots a drop of alcohol may be used.