

cornea. The inside of the tubes are, of course, well blackened (especially near the part marked B in the figure) for the purpose of absorbing all light not required in making the photographs.

The object, the retinal image of which is to be photographed, is placed near the outer end of tube D, while the eye, whose fundus is to be photographed, is placed near the end of tube B. The light from tube D, or a portion thereof, being reflected through the dilated pupil, causes a certain portion of the fundus to be illuminated. In the cat only a small percentage of the illuminating rays are absorbed. The larger part pass out of the pupil and (in this case) meeting the plate glass, a certain portion are reflected back through tubes C and D to the source of illumination, the balance of the rays are transmitted and pass through the lens to the ground-glass screen at the back of the camera. The eye of a cat being emmetropic or only slightly hyperopic, these rays of light on being emitted by the eye are nearly parallel, and, being refracted by the plate glass and the camera-lens, form a picture at the principal focus of said lens. Hence, although the eye to be photographed is very near the end of the tube, the adjustment of the camera is the same as for distant objects.

In photographing the retinal image my plan was as follows: The object to be photographed was placed in tube D. The object used was a glass transparency printed from a negative, a slot on each side of the tube being made to admit the glass slide on which the transparency was printed. A convex-lens was placed at the inner end of tube C, at its junction with tube B. The length of the focus of the lens was determined by its distance from the glass transparency; thus, if the distance from the lens to the transparency were, say, 3 inches, a lens of 3 inch focus would be used, the object being to render the rays of light from the transparency parallel before being reflected into the eye.

Tube D, being made adjustable with reference to tube C, the distance between the transparency and the lens may be adjusted at pleasure, the object being to place the transparency in that position that will give the best retinal image. If, for instance, the eye to be photographed

were myopic, the transparency would be placed at a point within the principal focus of the lens, and if, on the contrary, the eye were hyperopic, the transparency would be placed at a point beyond the principal focus. In the former case the rays of light reflected into the eye would be diverging, and in the latter case they would be converging.

The same principle applies in focusing the image on the ground glass at the back of the camera. In the case of a myopic eye the focus would be shortened, and in the case of a hyperopic eye the focus would be lengthened.

Although the definition of these photographs leaves much to be desired, the fact that such photographs are possible is not without interest in itself, apart from any practical use that may be made of it. These experiments are also confirmatory of two fundamental principles in physiological optics already demonstrated by the ophthalmoscope, namely:

1. The eye is a perfect *camera obscura*, and the object to which the eye is directed forms an inverted image on the retina.

2. When the eye is illuminated it becomes a *camera lucida*, and light is reflected from the fundus. In the hyperopic, or in the emmetropic eye, these reflected rays may be formed into an image (inverted) by means of a convex lens. In the myopic eye an inverted image is formed in front of the eye without the aid of a lens.

[Dr. Rosebrugh has shown us copies of photographs of the fundus oculi—two series. The first series represents the nerve entrance and the retinal vessels simply. The second series gives the retinal vessels and also a portrait. While the definition in these photographs is not all that could be desired, they at least seem to clearly demonstrate the possibility of attaining the end desired.—ED. PRACTITIONER.]

THEIR SOUND IS GONE OUT.—Dr. T. Addis Emmet says that he has not owned a uterine sound for years and his uterine probe has been disabled for a very long time. Both instruments are useless to him since he has employed bi-manual palpation. On this basis it requires one-half less time to treat cases of pelvic inflammation of a non-surgical sort.—*Practitioner and News.*