same horizontal line. A screen, to shade the ground glass and the observer's eyes, is placed between the light and the back of the camera; or what I have found to be much better, a metallic tube or shade is placed around the lamp, from an aperture in which, projects a collar somewhat resembling that of a magic lantern, of the right size to allow the illuminating tube of the instrument to fit closely. Indeed with this apparatus the camera can be dispensed with, that is, in making examinations of the eye simply, but when the object is to demonstrate the fundus of the eye to a number of persons the camera is used both with and without the ground glass.

Since this paper was read before the Institute, Mr. Potter has constructed for me a modification of the above instrument which I find to be very convenient.

It shews the fundus of the eye of the cat or dog beautifully, but it remains to be seen whether the illumination is sufficient for examining the fundus of the human eye.

The light is supplied by an ordinary coal oil lamp which is placed in a box about six inches square and fifteen inches high. Opposite the flame of the lamp there is an aperture in one side of the box from which projects a brass tube or collar to which is adjusted the illuminating tube of the instrument.

In the outer or camera tube is a double convex lens of 2 inch focus instead of the two lenses of 5 inch focus each. At the outer extremity of this tube a moveable eye piece is attached three inches in length, and containing a convex lens of three inch focus.

OPTICS.

1st. *Illumination*:—Let MQ (fig. 1) represent parallel rays of solar light incident upon the double convex lens G: at the points NR they are refracted and emerge from the lens convergingly towards a focus V in the tube C, but at O and S they are intercepted by the plate glass D, a portion of the rays are reflected by its polished surface in the direction E, and rays not reflected or absorbed are transmitted and pass to form a focus at V—the principal focal distance of the lens G, and again diverge in the direction WX. The rays reflected from the surface of the plate glass form a focus at U (which is also the focal centre of the eye E), at the same distance in front of the plate glass D as V is behind it; these rays again diverge and illuminate a portion of the fundus at TP.

2nd. *Reflection*:—Let E (fig. 2) represent the same eye illuminated as just described; D the plate glass; and HI the lenses in the camera tube. Rays from any portion of the illuminated fundus as *a*, are reflected from the fundus and emerge from the cornea at *bc*, the width of the dilated pupil, and proceed to the plate glass D, parallel, where some of its rays are reflected from the plate glass through the lens G in the direction of the source of illumi-