(2) Seventh to eleventh week, when, with the appearance of the anterior chamber, the mesodermal iris is formed.

(3) Eleventh to twelfth week, in which the ectodermal iris first makes its appearance.

(4) Third to eighth month, during which the pupillary musculature is formed from the ectodermal iris, and the central part of the mesodermal iris (up to the lesser circle) atrophies, leaving the pupil clear.

2. The definitive iris shows—

(1) A peripheral portion consisting of the entire thickness of the original mesodermal iris plus the ectodermal iris and bounded internally by the *circulus iridis minor*.

(2) A central portion consisting of a thinner layer of mesoderm carried forward secondarily by growth of the ectodermal iris and from the front of which the original central part of the mesodermal iris (pupillary membrane) has disappeared.

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INSTANTANEOUS STEREO-PHOTOGRAPHY OF THE ANTERIOR SECTION OF THE EYE WITH CONSIDERABLE MAGNIFICATION

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ON account of the constant movement, particularly of the diseased eye, and of the minuteness of the morbid changes, their photographic reproduction is attended by considerable difficulties. The ideal camera for the purpose is a stereo-camera giving considerable magnification, capable of rapid and easy adjustment and of working with an exposure of, at the utmost, no more than $1/25$ th second. One of the best instruments available is the mirror reflex camera

of Lenz⁽¹⁾. This instrument is, however, complicated and expensive and for general purposes the stereo-camera of Druener⁽²⁾ is to be preferred. With this camera there is the difficulty that after the image has been focussed on the screen this has to be removed and replaced by the plate holder and the shutter set for instantaneous exposure. Although these manipulations take but a few seconds there is always the danger of movement of the eye, specially in the case of nervous and light-shunning patients. Further, the objectives used are of low light power so that the necessary short exposures do not yield properly exposed plates even with low magnifications.

In the combination described below (see text figure) these difficulties have been overcome by fitting the stereo-camera to a binocular corneal microscope. The camera is mounted immediately above the microscope and it is essential that the angle formed by their axes should be as small as possible. In the original camera of Druener the shutter is an obstacle to this arrangement because of its size and of the position of the release, coming as it does between camera and microscope. For this reason the shutter has been modified and the release brought to one side. The camera is mounted on rack and pinion to allow of lateral and vertical movements and can be clamped in any desired position by means of a screw; it is thus easily centred with, and adjusted to the focus of, the microscope for each combination of lenses used. It is of

course to be understood that any alteration of objectives at either camera or microscope necessitates re-adjustment of the camera. The camera so fixed follows all the movements of the microscope, thus ensuring that an object sharply focussed in the latter is equally

FIG. 1.

Infiltratio cornea phlyctenulosa. Magnified 1.7 diam. Taken with objective F=55. Contrast with Fig. 2.

sharply focussed in the former. To avoid blurring of the image the camera is arranged so that the plate lies as far as possible in the plane of the iris.

FIG. 2.

The same picture magnified 4.1 diam. Taken with objective A2.

As the field of vision through the corneal microscope is less than that through the camera, only the central portion is viewed of what will appear on the photographic plate. This, however, is no objection to the apparatus but rather the reverse, as it permits very accurate focussing of the centre part of the object since this is seen through the microscope stereoscopically, much enlarged and brightly illuminated.

For illumination the most suitable source is the micro-arc lamp with quartz condenser and cuvette supplied by Zeiss for slit-lamp microscopy, etc. Mounted on the movable arm of the Zeiss instrument table it allows of easy and rapid

FIG. 3.

Papilloma of upper lid magnified 4.1 diam. Taken with objective A2.
Note the detail of the dark brown iris.

adjustment of the illumination. In order to avoid the dazzling of sensitive patients a grey disc or a geaphot filter may be inserted during focussing. The eye to be photographed does not as a

FIG. 4.

Cataracta pyramidalis magnified 4.1 diam. Taken with objective A2.

rule require any preparation, nevertheless, it is advisable before making the exposure to instil a drop or two of cocain or diocain. The procedure for taking a photograph is as follows: The camera being centred and adjusted to the focus of the microscope, the focussing screen is removed and the plate holder inserted. The shutter is set for instantaneous exposure and the dark slide with-

drawn. The patient's head is fixed in the usual manner for microscopical examination and the illumination adjusted. All that remains to be done is to focus the desired portion of the eye in the microscope, remove the filter from the lamp, and make the exposure.

By this arrangement one can obtain with certainty and ease excellent photographs enlarged either 1.7 or 4.1 diameters—the latter by using A2 objectives. With the fourfold magnification even dark brown irides are clearly shown in sufficient detail (see Fig. 3). Using the A2 objective, the 6 by 6 cm. plate is not large enough to reproduce the whole eye and its appendages, but this magnification is very valuable when dealing with minute changes on the bulbus oculi, specially on the cornea, iris, and pupil, which cannot be made out with the usual magnifications. The camera mounting does not interfere with the use of the corneal microscope for other purposes and in any case it may easily be removed. In the same way the Zeiss lamp can be used either alone or in combination with other instruments.

It is considered that the above described apparatus has several advantages over the Lenz camera and specially in that perfectly sharp fourfold magnified photographs can be obtained with ease and certainty; moreover, the apparatus is comparatively cheap.

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OBSERVATIONS ON THE HYDROGEN ION CONCENTRATION IN THE VITREOUS BODY OF THE EYE WITH REFERENCE TO GLAUCOMA

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THE physico-chemical conditions of the vitreous body and their alterations under pathological conditions are almost unknown. As human material is scarcely to be obtained in the requisite quantity without injury to the eye, the existing scant knowledge is founded chiefly on animal observations. This is specially true with regard to the pathogeny of glaucoma. Fischer⁽¹⁾ attempted to explain this condition, but on somewhat slender grounds, as an oedema determined by a disturbance of the acid-base equilibrium in the vitreous body due to an increase in the acid content of the