WHITE RINGS IN THE CORNEA*

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MR. W. H., a grocer, aged 66, was admitted to the Moorfields, Westminster and Central Eye Hospital, London, on January 19, 1948, suffering from a sarcoma of the choroid in the lower nasal quadrant of the right eye. This eye also presented a number of well-marked white corneal rings; the clinical picture is reproduced in Fig. 1. Examination of the left eye, which was otherwise

FIG. 1.—Right Eye.

normal, disclosed four faint corneal rings, shown in Fig. 2 (a). Fig. 2 (b) shows one of these rings in the optical section of the slit-lamp beam, apparently situated in the substantia propria. The patient gave a history of having been involved in an accident some 30 years previously, in which a carbide installation exploded and spattered both his corneae with gritty particles. After a few weeks of discomfort his eyes were symptomless and remained so until three weeks before admission when he noticed a defect in his right field of vision, together with a deterioration of visual acuity.

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The right eye was excised three days later and sections were stained by haematoxylin and eosin. The chief point of interest is the situation in depth of the deposits, which in cases previously reported have been on, in, or immediately under, Bowman's membrane. As will be seen from the low-power photomicrograph (Fig. 3) they are nearly all in the middle two-fourths of the stroma, though a few outlying ones (Fig. 4) are just below Bowman's membrane, the deep aspect of which they invade.

A thin meniscus, concave forwards and incomplete at one part of its margin, marks the deep boundary. The remaining deposits are within the concavity of

FIG. 2.—Left Eye. (a) faint corneal rings; (b) one ring in optical section; (c) distribution in relation to the pupil (actual size 11 mm.).

this meniscus, and the larger ones tend to form imperfect rings with scalloped borders, some of these rings being in their turn arranged in roughly oval formations. This latter configuration is most strikingly shown in the central large deposit which is the subject of the high-power photomicrograph (Fig. 5).

The higher magnifications show the meniscus to be composed of fine dust-like particles situated within, and also between, the corneal lamellae. These stain blue with haematoxylin. The other formations have a similar fine structure but in addition there are many larger particles staining a dark purplish blue. The staining reaction suggests that calcium is present in the particles forming the deposits.

Interest in this condition dates from a description of three cases by George Coats (1912), who suggested a congenital aetiology. Ballantyne (1933) described six cases, and he thought that white rings may be secondary to intra-ocular disease. MacRae (1935) maintained that such cases were probably traumatic in origin. In our own case, a traumatic aetiology seems most probable, and we suggest that the depth of the lesions is related to the degree of

trauma. The type of corneal ring usually described, situated in the plane of Bowman's membrane, may be the product of a very minor and therefore unnoticed injury.

FIG. 3.—Low-power photomicrograph of cornea.

FIG. 4.—Photomicrograph of Bowman's membrane.

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FIG. 5.—High-power photomicrograph of central deposit.