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THE SCHOLAR'S EYE.

V.

ASTIGMATISM.

Nature of Astigmatism.
Its causes.
Its frequency; statistics.
Its effects.
Treatment.

THROUGHOUT this series of articles on the Scholar's Eye, it is presumed that the reader comprehends that rays of light are brought to a focus on the retina. This focus is theoretically a point for each point of the object. If the eye be perfect in shape and in refractive power, the pencil of light received by the pupil is made to focus at a point on the retina. That this should be so it is necessary that in each and every section made through the centre of the pupil there shall be the same curvature at corresponding parts of the section, and the same density of the refractive media and other transparent structures. But suppose we have in one section one degree of curvature of the cornea, and in another a different curvature; one degree of density at one part of the section and a different degree at another. Each will bring rays to a focus at a point, but not the same point for each. Refraction is different with different degrees of curvature and density. For a third section through the centre of pupil and corresponding to a third meridian on cornea, we have a third focal point, and so on for each meridianal section. This condition is called astigmatism. In other words we have numerous focal points instead of a single one. Some of the focal points may coincide. There will then not be so many focal points as there may be sections. The result is a blurred image on the retina, and consequent defective vision.

Its *causes* are chiefly *congenital*. We are born so—a minor malformation in so far as its extent is concerned, but often important if occurring in an organ of such delicate structure as the eye. Other causes are *acquired* during life. Such are chiefly the effects of ulcers and injuries to the cornea and the changes caused by inflammation. These are often manifest on inspecting the cornea. Slight malformations are common all over the body. Fully eleven noses out of a dozen are deflect-