Nursing of Diseases of the Eye.

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THE PHYSIOLOGY OF THE EYE AND THE EXAMINATION OF VISION.

The eye is, from its anatomical construction, a camera. The refractive media, cornea, aqueous, lens, and vitreous humour, together form a system of lenses to throw an inverted image of the outside world on the retina, which takes the place of the photographic plate, and from which the sensation is transmitted along the optic nerves to the brain.

Much discussion has arisen from time to time of the fact that the image is inverted on the retina; it has been asserted that we "see things upside down." The whole question is really a mental one; we do not "see" the image on the retina; our appreciation of external objects and their position is entirely the result of experience. The new-born baby has, as can be readily seen, no power of recognising the relation of itself to external objects; when it first begins to "take notice," the efforts to grasp the object noticed are not those best calculated to attain it, and the final successful clutch is rather a happy accident than a thought-out and carefully co-ordinated movement. Only after many such failures does the infant gain the power of projection, that is, of interpreting the position of outside objects from visual sensations.

The acuity of vision of the eye depends on a considerable number of factors. In the first place, the refractive media, cornea, aqueous, lens, and vitreous must be reasonably transparent and have a curvature approaching normal to produce a clear image, and the retina must be in such a position as to receive the image on itself when it is formed.

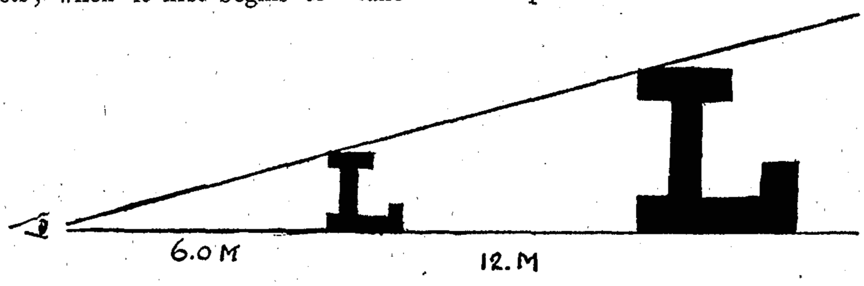
If the media are imperfect in any way the formation of this image and consequently the acuity of vision will be interfered with. Thus, if the cornea be irregularly curved the image will not be sharp. If any part of the media be semi-opaque vision will be interfered with partly by the blocking of the path of the entering light, and partly by the diffusion of the light which passes the obstruction.

If the retina be not at the focus of the entering rays, but within or beyond it, the image of any point is not a point but a diffusion circle; and the image of any object, being made up of a number of these circles overlapping, is necessarily indistinct and blurred. Thus, when the eye is too long (myopic) or too short (hypermetropic) vision is imperfect.

The visual acuity is usually estimated only at the macula, the region where the acuity is greatest, and this is noted as *the* visual acuity. It is usually tested by reading letters, which are devised of certain sizes.

The largest of the scale ordinarily in use should be read by a normal person at a distance of 60 metres (about 200 ft.); the smallest is usually one-twelfth the height and width of this, and should be read at 5 metres; between these are graduated types to be read at 6, 9, 12, 18, 24, and 36 metres.

It is easy to see that at their appropriate distances they subtend the same angle to the eye, and therefore form an image of the same dimensions on the retina.



If a patient at 6 metres read the line appropriate for the distance, we call his vision $\frac{6}{6}$, or normal. If, on the contrary, he only reads the line numbered D 12 m., then each letter of the line read subtends an angle double the normal, and the patient's vision is ½ of the normal, or, as it is usually expressed, $\frac{6}{12}$.

The reason why this fraction is best kept unreduced is that in its form $\frac{6}{12}$ it shows that the vision was tested at 6 m., and that therefore we are dealing with distant vision. If a patient were slightly myopic, "shortsighted," —2.0 D., for example, then at his far point (in this case 50 c.m.) his vision would be normal, and he would read in Snellen's type 0.5 Sn., at 0.5 metre, or expressed as the usual fraction $\frac{0.5}{0.5}$. This, again, equals unity, and if the fraction were reduced we might say V = 1. However, if such a patient were examined at 6 m., we should probably find V $\frac{6}{18}$—the acuity being only one-third of normal.

Note.—It is convenient to use the metre as the standard of length (1 m. is equal to 39.37 in.). The lens of a metre, focal length (i.e., which forms an image of distant objects at one metre from its centre), is taken as the standard lens, and

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