

## Nursing of Diseases of the Eye.

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### THE PHYSIOLOGY OF THE EYE AND THE EXAMINATION OF VISION.

Clinical experience has shown that the posterior part of the brain is the special seat of vision; the convolutions on the inner surface of the occipital lobe seem to be the chief, but there is strong evidence to show that convolutions on the outer surface of the brain, the so-called angular gyrus, are accessory.

It is of importance to be able to recognise whether a lesion is high up in this chain or not. This is readily done by observing the action of the pupils. The reflex arc of the pupils lies altogether below the cerebral hemisphere, and therefore a lesion in them will not disturb the pupil reflex—a lesion at the level of the optic tracts interferes with the afferent fibres of the arc also, and abolishes the action. Thus in uræmia, where loss of sight is not uncommonly cortical, the pupil reflex persists; if the blindness were due to lesion of the optic tracts or nerves, the reflex would be lost.

The actual method of testing the visual acuity is as follows: The patient is placed at a known distance—preferably 6 metres (20 ft.)—from the card of Snellen's type. The illumination on the type must be good, but there should not be a glare of light on the patient's face. The vision of each eye must be taken separately. This is often done by making the patient close one eye with his hand while he reads with the other. It is much better, however, to place a trial frame on the patient's face and a black disc in front of one eye. The mere closure of the lids—partly by pressure on the cornea altering its curvature, as Bull, of Paris, has shown, but more undoubtedly by the mucus, which collects on the cornea from the palpebral conjunctiva—causes a loss of acuity for a few minutes.

The vision is noted with each eye separately, and then with both eyes open. It will commonly be found that the binocular acuity is greater than that of each eye separately.

In a like manner we test the near vision for each eye separately, noting the number of the type which is read and the distance at which it can be read. The ordinary reading test employed is that of Jaeger, which is unfortunately most unscientific in having no definite principles by which the type is chosen nor any readily recognisable relation to Snellen and other graduated types. It may be taken as roughly true that Jaeger 1 should be read at 0.3 metre—that is, that it corresponds to 0.3 Sn. A further error in

the use of reading as a test for near vision is that people who are accustomed to read do not see each letter separately but rather the shape of the whole word, and thus it is much easier to read 0.3 at the appropriate distance than to read Sn. 6 at six metres.

Many people can read 0.3 Sn. up to a distance of 30 or 35 in. (0.75 m.) comparatively few can read even  $\frac{1}{4}$ . If, however, isolated letters of the same size are presented instead of continuous words, letters of 0.3 cannot be read much beyond 18 or 20 in. A rapid method of ascertaining whether defective vision is due to faults of refractive power of the media or other causes is to make the patient look through a small aperture—a pinhole in a card—at the test type. If the acuity is increased some at least of the defect may be corrected by glasses.

The estimation of visual acuity does not, as we have already indicated, complete the examination of vision, although frequently it is allowed to do so. It may happen that the peripheral parts of the retina lose their sensibility before the macular regions are at all affected. The peripheral vision is tested by means of the perimeter. This consists of a quadrant of metal mounted so that in its revolution it marks out a hemisphere. The moveable arm is marked in degrees graduated from the radius joining the centre of the hemisphere and the axis of rotation. The patient examined is placed so that one eye is at the centre of the hemisphere, and his head is supported in that position, either by means of a chin rest or by a rest for the cheek. His other eye is occluded by a bandage. He is directed to keep his gaze fixed on the axis of the quadrant, which is usually marked by an ivory button. If a perimeter of the model of Priestley Smith is used, the arm is placed so that it points to the patient's right and the chart, cut to size, slipped into the slot to hold it, with the words "right eye" or "left eye" upwards. Then the scale of the instrument lies on the line of the chart corresponding to the position of the arm.

All being prepared, a white object of known size is carried along the arm until it is seen by the patient while he still looks at the central point. We read off on the arm the degree at which this occurred and mark the corresponding place on the chart by the scale. Then the arm is rotated 30 deg. or 45 deg., and another reading taken. If the field is abnormal we may take readings even more closely together. If it appears normal only the four principal meridians may be taken. This last is of course, only a rough estimate, but in hospital practice detailed examination is not always possible. In many diseases the field is reduced below normal limits; in the examples given

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