THE EYE IN GRAVES' DISEASE

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In spite of the characteristic eye signs which accompany Graves' disease no agreed standardized nomenclature exists for their description (Selwyn Taylor, 1960). The many eponyms which have been used in the past are best discarded. For simplicity the eye signs can be divided into four categories.

Classification

"Lid lag"

True lid lag is virtually specific for hyperthyroidism. It is probably due to increased tone in the levator palpebrae superioris and gives rise to the "staring" appearance. It can be elicited by making the subject follow movements of the finger rapidly up and down. The upper lid can be observed to lag behind the movement of the eyeballs, especially in a downward direction, with the result that a line of sclera can be observed between the lid and the upper margin of the iris during this movement. It is commonly bilateral but may be much more marked in the one eye than the other.

When this sign is more marked the upper lid may be permanently retracted so that even at rest a margin of sclera may be observed between the upper lid and the upper margin of the iris. This can be conveniently measured, especially in consecutive photographs. These signs usually disappear when the patient becomes euthyroid. The subsequent improvement in the appearance of the patient may give rise to the false impression that the other signs are progressing favourably (Dobyns, 1950).

Exophthalmos

By this is meant the forward protrusion of the eyeball. At first this is nearly always asymmetrical and may appear to be unilateral but sooner or later both eyes are usually involved. It can be measured from the lateral rim of the bony orbit and successive standardized lateral photographs can be of great assistance in assessing progress. When marked it nearly always accompanies a bulging of the upper and the lowers lids which should also be recorded. A decreased resiliency of the eyeball can be appreciated by pressure on the closed lids. It can be measured more accurately by a Hertel exophthalmometer, but this requires the same skilled observer to use the same instrument in following the course of the individual patient.

Ophthalmoplegia

This is due to weakness of the external eye muscles which move the globe. It is often severe when exophthalmos is severe, but it does not necessarily parallel the other eye signs. Lesser degrees have to be elicited by asking the patient to perform the movements most commonly affected. These are upward and lateral gaze and convergence. The axes of the eyes should be observed while carrying out this procedure and the patient asked for their subjective feelings of diplopia. The normal patient should be able to converge to about four inches from the eyes without experiencing diplopia and lateral gaze should not induce this experience.

When ophthalmoplegia is more severe spontaneous complaints of diplopia are present especially when the subject is fatigued, and with grosser forms of ophthalmoplegia evident strabismus may cause considerable distress.

Oedema

This consists of chemosis and peripheral conjunctival congestion. It is often accompanied by symptoms of irritation and lachrymation. Some authorities grade this sign 1-4 and it is sufficiently important to warrant close attention. It begins as a watery swelling of the scleral conjunctiva with a suffused appearance of its vessels. Often it begins at the inner canthus and may spread to involve the whole conjunctiva and even to evert the lower lid thus blocking the normal tear duct drainage and increasing lachrymation.

Oedema is nearly always present in a severe degree in those uncommon cases in which progress is so severe that visual acuity is impaired or corneal ulceration likely with possible loss of the eye. Consequently visual acuity should be measured frequently where there is much oedema as deterioration can be quite rapid. Similarly the cornea should be carefully and frequently examined since the ulceration may
come quickly. The presence of either loss of visual acuity or corneal ulceration is an indication for the consideration of surgical decompression of the orbital cavity.

Pathology
The changes observed in the orbit are unfortunately not specific. They consist of œdema and round cell infiltration of the orbital contents and muscles in the acute or malignant phase (Naffziger, 1954) and of increased fat in muscles and orbital content in the long-standing cases (Rundle and Pochin, 1944).

Aetiology
This is as yet obscure. Exophthalmos can be produced by pituitary extracts (Marine and Rosen, 1934; Smelson, 1937). This is not thyroid stimulating hormone, TSH (Gilliland and Strudwick, 1956). Whether the exophthalmic producing substance, EPS, of Dobyns is clinically important has yet to be established as has the role of long acting thyroid stimulator LATS (McKenzie, 1958; Monro, 1959; McKenzie and Fishman, 1960; McKenzie, 1961). The role of the hypothalamus in the causation of Graves' disease and its eye signs has still to be elucidated (Gilliland, 1960; McCullagh, Reynolds and McKenzie, 1960; McKenzie, 1962).

Treatment
When the aetiology is unknown and the course often unpredictable treatment is necessarily difficult. Even the worst case may spontaneously remit but the chances of improvement grow less and less the longer the condition has been present. As abrupt changes of thyroid status have been shown to cause a worsening of eye signs many authorities adopt the procedure of Fraser and Wilkinson (1953) and administer the normal requirement of thyroxine throughout treatment whether by medical or surgical means.

Cortisone may be applied topically with great benefit to the œdema and ecchymosis though its systemic application showed no real benefit (Medical Research Council, 1955).

Radiotherapy has a part to play with careful shielding of the cornea and may reduce the acute œdematous swelling. Irradiation of the pituitary itself, either externally or by implantation, is as yet difficult to assess and has not been uniformly successful. Surgery has a lot to offer apart from the relief of orbital congestion in malignant cases. After two years have elapsed from the acute process the residual eye deformities may be considerably helped by elegant operations designed to improve the palpebral gap and to correct the malalignment of the axes of the eyes.

REFERENCES
MUNRO, D. S. (1959): Observation on the Discharge of Radioiodine from the Thyroid Glands of Mice Injected with Human Sera, J.Endocr., 19, 64.