ABSTRACTS

I.—PATHOLOGY


(1) The term “Glioma of the Retina” probably includes several different types of growth and Rand quotes Grinhu’s classification which is as follows:—(1) Medullo-epitheliomata arising from the cells of the primitive neural tube. These tumours are rare and consist of various types of cells, primarily medullary epithelial, but also retino-blastomatic and spongioblastic and exhibiting rosettes; (2) retino-blastomata, whose cells are bipotential and may form ganglion cells or adult glia. These form the majority of retinal ‘gliomata.’ They extend into the orbit, invade the base of the brain and show distant metastases; (3) neuro-epitheliomata, composed for the most part of primitive spongioblasts, arranged in true rosettes. They are less malignant than the retino-blastomata. That glioma retinae is a highly malignant tumour is well-known and Reese found, on examining the cut end of the nerve in 119 excised eyes, that gliomatous tissue was present in 43 per cent. The rational treatment of such cases is intracranial removal of the optic nerve. This was performed in a case described by Rand, but unfortunately the patient was not seen until four months after enucleation of the eye, and the tumour had already invaded the chiasma and base of the brain. The author suggests that before an eye is removed for glioma retinae, the optic foramen should be examined by X-rays. If it shows signs of enlargement, this would constitute an indication for intracranial section of the optic nerve. He also advocates the microscopic examination of the cut end of the nerve in every case of enucleation for glioma retinae and the performance of the intracranial operation if extension of growth has occurred.

F. A. W-N.


(2) Before proceeding to describe two cases of his own, Davies gives an interesting review of this condition. The majority of the tumours are of the mixed variety. Warthin, in 1901, suggested that they arose from the endothelium of the lymph spaces, but Verhoeff, in 1904, regarded them as congenital epithelial tumours,
GLAUCOMA

a view which is upheld by Birch-Hirschfeld and later investigators. The neoplasm develops slowly and most commonly affects patients after middle age, but may occur in the young when it is usually rapidly fatal. The first sign is proptosis and there may be some early pain. Disturbances of vision and of ocular movement are later manifestations. It is quite possible for the tumour to grow to a considerable size before it can be felt. Eversion of the upper lid is, of course, a help in diagnosis.

This should be made as early as possible, because quite a number of cases are fatal—12.5 per cent. in a recent review of 95 cases—and complete removal is essential. This may necessitate performance of a Krönlein operation, though smaller tumours can be reached by an incision over the upper lateral orbital margin. Post-operative irradiation is advisable if the tumour is not encapsuled. The author’s two cases were dealt with by Krönlein’s operation, the first was a true mixed tumour, but the second was an adeno-carcinoma.

F. A. W-N.

II.—GLAUCOMA


(1) Epidemic dropsy is a disease probably due to a spore-forming proteolytic bacillus which grows in diseased rice. It produces a toxin resembling histamine which causes a cardio-capillary crisis. One attack does not confer immunity, but rather, predisposes to relapse in subsequent epidemics owing to the patient’s becoming hypersensitive to the toxin. The general features of the disease comprise oedema with discoulouration of the skin, sometimes diarrhoea, and tachycardia with breathlessness and enlargement of the heart. Telangiectatic dilatation of the capillaries is the most interesting pathological feature. Kirwan finds that glaucoma is usually a late manifestation, but in some epidemics it may be the most conspicuous symptom. It is most commonly seen in persons between the ages of 20 and 35 years, but is not unknown at as early as eight years. Pain is usually absent, the first symptom being haloes and defective vision. The anterior chamber is never shallow, the pupil is normal in appearance and the cornea is steamy or not according to the height of the intra-ocular pressure. The media and lenses are normal and cupping is not present except in cases of long standing. The tension is rarely below 50 mm. Hg (Schiotz) and figures of 70-100 mm. Hg are quite
common. The field changes are characteristic of glaucoma, the nasal quadrants being always more affected than the temporal and Seidel's and Bjerrum's scotomata appearing late in the disease when presumably cupping has developed. With regard to pathogenesis, there seems little doubt that the histamine-like toxin had caused increased permeability of the capillary endothelium of the ciliary body allowing increased outflow of aqueous and so a rise of intra-ocular pressure. The glaucoma responded well to corneo-scleral trephining.

F. A. W.-N.


(2) So much has been written during recent years on glaucoma from every aspect that it hardly seems necessary to make an abstract of the article by Juler, contributed to the *Lancet* by invitation, and, therefore, intended more especially for the general practitioner. One passage only need be quoted because it points to a difference of opinion. "The chronic simple glaucoma without more than a suspicion of tension is controlled by miotic drugs for a time, and in some cases for many years. In such cases one will watch the fields of vision and will only advise operation when they are becoming diminished in area. In my experience such cases do well with operation, but I know that all ophthalmic surgeons do not agree with me on that point."

ERNEST THOMSON.

(3) Böck, J. Kronfeld, Peter C., and Stough, J. T. (Chicago).—Effect on intra-ocular tension of corneal massage with the tonometer of Schiötz. *Arch. of Ophthal.*, May, 1934.

(3) This work was performed by Böck, Kronfeld and Stough in order to determine whether the reaction of the human eye to pressure on the cornea was sufficiently constant and characteristic to serve as an aid in the diagnosis of glaucoma. The method employed was to use a Schiötz tonometer fitted with a 15 gramme weight and to allow it to rest on the patient's cornea for two minutes, the tension being measured at the beginning and end of the procedure. A decrease of tension varying from 5 to 15 mm. Hg occurred in every normal eye, the greatest decreases occurring in those eyes with the highest tension. The decrease does not depend on the depth of the impression of the cornea by the foot of the tonometer since this was necessarily greater in the eyes with lower tension. The age of the patient appeared to have no effect on the result obtained. In glaucomatous eyes (only those with a tension of 36 mm. Hg or under were tested) it was found that if the
original tension were below 27 mm. Hg, behaviour tended to be the same as in normal eyes. If the tension were above 27 mm. Hg, the drop of tension was considerably less than in the non-glaucomatous eye.

F. A. W-N.


(4) Cohen, Newell and Killian engaged on this work in order to find out whether swelling of the vitreous—which is sometimes regarded as a cause of simple glaucoma—could really occur. Their first experiments consisted in placing ox vitreous into the mouth of a thistle funnel the wide end of which was sealed with a porous alundum disc. Immersion of the funnel into solutions of acids, alkalies, and of sodium thiocyanate produced no alteration in the size of the vitreous gel. A second series of experiments showed that immersion of the vitreous in alkaline solutions had no demonstrable effect on the bound or the free fluid of the vitreous. When acid was used, some variation did occur, but it was inconsistent, and the same occurred with various salts. In filtration experiments, it was found that a large amount of the fluid in the vitreous was “unbound” and the authors, therefore, agree with those who state that it is not a homogeneous colloid, but is composed of two phases, i.e., fibres or membranes suspended in a liquid which can flow slowly in or out of the mass. It is thus impossible for the vitreous to swell, because if the fibres enlarged the increase in size could be at once compensated by escape of some of the free liquid. There remains the possibility of osmotic changes in the blood bringing about swelling of the vitreous. A series of 10 rats were fed on a diet which has been shown experimentally to lower the proportion of serum proteins by 40 per cent. Seven of the rats survived for 19 weeks, and of them, five had marked accumulations of ascitic fluid. In none of them was there any evidence of increased intra-ocular pressure.

F. A. W-N.


(5) Nelander reviews the literature on glaucoma as a cause of blindness and on the frequency of the disease amongst patients seen in eye hospitals. In European countries glaucoma accounts for 10-20 per cent. of cases of blindness, whilst about 1 per cent.
of eye patients come for this complaint. On a careful analysis of cases seen in Upsala (a Swedish university town with a population of 30,000), the author concludes that the incidence for primary glaucoma is 3 per 1,000, whilst new cases amount to 0.23 per 1,000 per annum. Glaucoma is rare under 50 years of age, whilst at 90 years of age the danger of glaucoma rises to 6 per cent.; women are rather more prone than men.

ARNOLD SORSBY.

III.—LENS


In an exhaustive survey on the literature on cataract in skin affections, Kugelberg shows that endocrine disturbances are frequent in scleroderma, but on the available evidence it cannot be stated definitely that both the skin affection and the lens changes are determined by these disturbances. A familial factor seems to be present. He records two cases of cataract in neurodermatitis; these cases were familial and the lesion was confined to the anterior cortex, the nuclear and perinuclear regions of the lens being spared. Reverting to the difficulty of determining cause and effect as between the skin and lens lesions, he suggests the name of cataracta syndermatotica as opposed to the more current name of cataracta dermatogenes.

ARNOLD SORSBY.

(2) Caramazza. (Bologna).—The vitreous after cataract extraction. (Biomicroscopia del vitreo nell'afachia). Boll. d'Ocul., September, 1934.

Caramazza has examined the condition of the vitreous in a number of patients who have undergone cataract operation, with a view of finding whether the nature of the operation has any effect on the condition of the vitreous.

There may be found alteration of the structure of the vitreous such for example, as increased fluidity, synchisis scintillans, which is probably to a large extent independent of the operation; or of its amount and relation to other parts, which depend on the injury done during operation. The author has rarely found blood in the vitreous in any quantity; and only when the hyaloid has been ruptured with hernia of the vitreous. In these cases the blood
is often very slow in absorbing. He finds that hernia of the vitreous is more common after intra- than after extra-capsular extraction. The size of the hernia varies with the size of the pupil (being larger when there has been iridectomy), and with the condition of the vitreous. When the vitreous is herniated, it frequently may be seen to adhere to the scar. After simple intra-capsular extraction, the hernia of the vitreous often pushes; the base of the iris forward, and this becomes adherent to the scar. He concludes that the method of election for cataract operation is the extra-capsular with or without iridectomy according to circumstances, provided that a sufficiently large part of the anterior capsule be removed.

HAROLD GRIMSDALE.


(3) Yanes stresses the importance of taking the ocular tension with a tonometer before every cataract extraction and of continuing to do so until the patient is discharged.

He quotes Ferrer, who always insists that the tension shall be taken as a routine in all cases for operation. He takes as normal any tension lying between 22 and 40 millimetres of mercury. When the tension is a low normal, on opening the anterior chamber the lens does not come forward spontaneously and manoeuvres for its expulsion can be performed without danger of vitreous loss. When the tension is low, atropine must be used, and with a simple extraction there is no danger of iris prolapse. In those cases in which the tension, though normal, is on the high side, as soon as the cornea is incised the iris bulges forward, and there is a tendency for the lens to be expelled spontaneously, and here there is more danger of vitreous loss. Combined extraction should be performed in these cases.

When the tension is above or below the normal limits, then something must be done before the operation to guard against accidents. When the tension is lower than normal, it must be raised, and the operation should only be performed when it is above 20 mm. Hg. In order to do this, atropine must be used for a time varying from days to (rarely) weeks before the operation. Normal eyes show variations in tension. In eyes of low tension iridectomy is unnecessary and atropine must be applied immediately after the operation and during convalescence.

It is in the early days following the operation that there is cause for anxiety, and during these days the tension cannot be
taken by any means. If the hypotension has been treated, sometimes atropine is not used after the operation for fear of hypertension. In those cases in which the tension shows no variation, and is always low, *i.e.*, below 20 mm. Hg, atropine must be used. On the other hand, atropine should never be used in post-operation cases where the tension has previously been high. In those cases in which the tension is above 40 mm., eserine or pilocarpine should be used as a preliminary, and if the high tension still persists, a preliminary iridectomy should be performed.

If it is thought advisable to perform only one operation, the combined method should be used. Atropine should not be used after the operation.

Intra-capsular extraction is easier and less risky in eyes with low tension, but in these cases it is not so beneficial as in those with a previously high tension, because it is the remaining capsule and cortex that tend to increase the intra-ocular tension.

The author thinks that tonometry is of extraordinary importance in cataract cases. He attributes the accidents he has seen, even in cases operated upon by experienced surgeons, to a lack of study of this point. However skilful they may be, operating upon an eye with a high tension, even within normal limits, gives rise to unavoidable dangers.

E. E. Cass.

IV.—RETINAL DETACHMENT


(1) The new method of treating detached retina with electrolysis through the cathode, which is here described, is claimed by Vogt to be less damaging to the tissues, more simple (any apparatus for the removal of cilia suffices if the needles are fine) and more successful than any other method yet put forward to combat this disease.

Cathode electrolysis produces fine gas bubbles along the track of the needle through the tissues to the surface of the detached retina; hence catholysis offers this great advantage that one can observe with the ophthalmoscope the point of entry of the needle by this formation of gas or foam on the retina at the time of operation, and thereby obtain guidance as to its position in relation
to the hole in the retina and its repeated application in the region required, viz., round the edges and in the floor of the hole or holes.

He emphasizes the importance of keeping the cornea clear for ophthalmoscopie examination; for this purpose he uses only a subconjunctival injection of novocaine and adrenalin as anaesthetic over the area to be attacked, and avoids any loss of time in performing the operation.

By this method, in which a current of only 0·5-1 milliampère is momentarily applied at each point of insertion of the needle, he claims that the adhesions of the conjunctiva and orbital tissues to the sclerotic are not so dense as with other operations (and hence it can be repeated more easily), the reaction in the retina and choroid produces far less extensive scarring, and the escape of vitreous is minimal. The danger of muscle paresis is also avoided, as it is only exceptionally necessary to resect a muscle. The resection of half the tendon is all that may be required, or the muscle may be drawn to one side; indeed, the tendon or muscle itself can be pierced with the needle if necessary.

Extreme old age or long duration of the detachment appears to be no contraindication to this operation.

**Thomas Snowball.**


(2) v. Szily and Machemer cauterized small areas of sclerotic by means of two platinum electrodes close to each other; a current of 2 to 20 milliampères was used for 10 seconds, inducing a discolouration of the sclera. They hold that the procedure is devoid of danger and that the chemical changes induced are helpful. Anatomical preparations illustrate this paper and on the results obtained in animals the method was adopted clinically "for the past half year, to some extent with encouraging results."

**Arnold Sorsby.**


(3) To localize these holes, Pavia suggests that their position should be referred to the optic disc as well as to the macula; thus, a hole may lie at "10 o'clock" from the disc and "6 o'clock"
from the macula. In treating the hole, he applies a curved glass conductor, which is passed so that its end abuts against the sheath of the nerve, while the shaft lies in the line of the hole as related to the disc; the convex side of the conductor is grooved, and at some distance from the end the groove terminates in a perforation. There are a series of conductors with perforations at varying distances from the end. The appropriate one is selected. Down the groove the electrode is passed until its point engages in and emerges through the hole into contact with the sclerotic at the estimated place. The current is then turned on. To calculate the distance which separate these ruptures from the limbus, the author suggests that we should subtract the distance of the rupture from the macula, from the total limbo-macular distance, which varies between 32 and 35 mm.

Harold Grimsdale.


(4) In the 21st of the articles contributed by invitation, Goulden contributes a short dissertation on the history of modern methods of dealing with detachment of the retina. He gives all credit to Gonin as the pioneer. So far as Moorfields is concerned, the author relates how Gonin’s operation was followed by Guist’s, in which the sclera is trephined and caustic potash applied to the exposed choroid. This gave 50 per cent. of successes to Gonin’s 53 per cent. Guist’s operation was followed by that of Larsson, which is the same in principle, but produces the effect on the intact sclera by diathermy. On puncturing the sclera and choroid the subretinal fluid escapes and the retina comes in contact with the patch of choroiditis which has been produced by the diathermy. This method has given 76 per cent. of successes. The prognosis in the case of involvement of the macula is considered and also the case where a quite recent detachment has occurred. The latter gives a good prognosis. Detachment following an operation of extraction of cataract gives a poor prognosis (about 19 per cent.), but after an operation for soft cataract by needling, no results seem to have been obtained.

Ernest Thomson.
V.—REFRACTION AND OPTICS


Lindberg recalls the work of Kodama in questioning the accepted belief that astigmatism with the rule is the more frequent type. The author gives exhaustive analyses of 2,122 cases in his private practice, showing astigmatism of over 0.5 D. These cases constitute 12 per cent. of the total and it appears that astigmatism with the rule is the commoner condition only if cases over 1.0 D. are considered. Amongst the lower errors the opposite is true. One point of interest is brought out by a small group of 19 cases in which the astigmatism was in contrary direction in the two eyes; more than half of these cases were myopic and astigmatism against the rule was present in the more defective eye. It is concluded that these cases lend support to the view advanced by Steiger that this type of astigmatism is an acquired condition and develops during the transition from hypermetropia to myopia.

Arnold Sorsby.


The object of this research by Gassowsky and Samsonowa was to determine how far the total astigmatism of the eye could be judged by an examination of the astigmatism of the anterior surface of the cornea. They employed the refractometer, supplemented by the subjective test, and the ophthalmometer, and, incidentally, they note that the difference in the direction of the meridians as determined for the corneal and total astigmatism never exceeded 20 degrees.

Out of 300 eyes examined it was found that the total astigmatism of the eye differed from that of the anterior surface of the cornea by not less that 0.5 D. in 167 cases; in some cases this difference amounted to 2 to 3 D.

Of these 167 cases the total astigmatism was less than that of
the cornea in 40 per cent., which would indicate that the corneal astigmatism can be partially neutralized by other factors capable of producing astigmatism.

The authors conclude that the ophthalmometer is not a suitable instrument for measuring the total astigmatism of the eye, because the difference between it and the corneal astigmatism may be too great to be ignored in correcting the ametropia.

THOMAS SNOWBALL.

VI.—MISCELLANEOUS


(1) Herrenschwand records a successful cataract extraction in a case of heterochromia from cyclitis, coming, however, to excision 10 years later on account of ectropion uveae, vitreous haemorrhage and early phthisis bulbi. Histological examination showed infection with either streptothrix or leptothrix (no cultures were made), and as the operation scar was free from infection, the author holds that the infection was metastatic (as in the cases of Fuchs and Verhoeff). He discusses whether the heterochromia and cataract were originally caused by the fungus.

ARNOLD SORSBY.


(2) Seefelder draws attention to rise of tension following capsulotomy (which he carries out with the pupil undilated). He describes three varieties.—(1) A mild rise of tension, subsiding within a few days and often passing unobserved; (2) acute glaucoma, generally of short duration and controlled by miotics—he holds this to be caused by entry of vitreous into the anterior chamber; (3) tension with propulsion of the iris, due to strangu-lation of prolapsed vitreous in the pupil. The author also describes
a case of corneal marginal abscess which occurred consistently after every operation on a patient's eye. He holds that it is not the operation trauma, but the pre- and post-operative procedures which were responsible.

ARNOLD SORSBY.


(3) Caramazza has examined with the slit-lamp and the microscope the vitreous in eyes with detached retina. It is not easy to distinguish the changes due to myopia from those due to detachment and still more difficult to decide whether any given change is the precursor or the consequence of the detachment. There are frequently seen in these cases comparatively large pigmented opacities as well as much smaller, almost dust-like bodies. The larger, the author believes to be cells of the pigment epithelium. He finds the vitreous notably altered; it is more fluid than normal and there are constantly striated opacities.

The paper is illustrated by a number of drawings representing the various conditions found.

HAROLD GRIMSDALE.


(4) Bhaduri reports the first case of choroideremia seen in India to date, and gives a brief survey of the literature. A Hindu boy, aged 17 years, was seen in July, 1932, complaining of defective vision which became worse at night and dazzling in bright light, while the father stated that the boy often stumbled against objects to either side of him. Symptoms had been noticed since the age of 3 years. The family history was negative, all other members being normal. In a Hindu family there can be no question of consanguinity. The general health of the boy was good and the Wassermann reaction negative. Each eye showed a low degree of compound myopic astigmatism, with corrected vision no better than 6/18. There was a general contraction of the fields of vision to the 20° circle. Ophthamoscopic examination showed gleaming sclera visible everywhere save at the macular region, which was of normal appearance. The retinal vessels ran in a normal manner over the white fundus, and here and there a few pigmentary patches were seen to obscure the view of the vessels.

The iris was of dark brown colour. A bibliography of 14 items is appended.

R. R. J.

Kravitz gives a brief review of the anatomy and physiology of the retinal and cerebral blood vessels and quotes the experimental evidence which shows that these vessels are innervated by the sympathetic nervous system and that the capillaries possess Rouget cells also receiving their nerve supply from the same source. He describes the importance of the vaso-motor system in its relation to the functional integrity of the retina and the brain.

Some interesting cases of spasm of the branches of the central retinal vessels are cited.

**H. B. Stallard.**


Haemorrhages in myopic eyes have not been studied very exactly and their causation is not clear. Most writers have been content to assume that they depend on the anatomical alterations secondary to the myopia; others have suggested that the cause is rather to be sought in some general diathesis. Giannoni and Focosi consider that many of the subjects come within the group of diseases affecting the venules, which are characterized by a tendency to varicosity, weakness of the vessel walls and lowered tension.

**H. Harold Grimsdale.**


Stern investigated the fundus appearances in nine uni-ovular and three binovular twins, employing photographic records for comparison. He found that in the distribution of the vessels there was no symmetry, even of the mirror type. In contrast to the vessels, the structures derived from ectoderm gave considerable symmetry in both types of twins: the form and size of the disc, the physiological cup, the colouration of the fundus were similar. Congenital abnormalities, such as temporal conus, scleral ring, abnormal entry of vessels were similar in twins. The author concludes that the similarity in ectodermic structures does not help to distinguish the uni-ovular from the binovular twins.

**Arnold Sorsby.**

The extent of the retina which can give rise after stimulation to the pupil light reflex has been very differently estimated by the various observers who have investigated it. Some have stated that only the region immediately surrounding the macula is able to evoke the reaction, others have allowed a much wider region to be competent. The matter is of some clinical importance since the question of Wernicke’s pupil reaction depends on the supposed activity of the peripheral retina. **Bidfis** investigating the reflex in patients who showed a large central scotoma has found that up to a distance of least 50° from the centre the retina is capable of evoking the reflex; since the pupil is practically narrowed when light falls very obliquely on the eye, the stimulus required is necessarily greater, the more eccentric the incidence.

**HAROLD GRIMSDALE.**


Riegel and Vogelsang describe six cases of central scotoma in lesions of the chiasma seen during the last two years; five of the patients were aged 16 to 26 years, one, 43 years of age. They hold that this sign is by no means infrequent, so that in cases of retrobulbar neuritis a lesion of the chiasma has to be considered. The six cases are described in detail; one was a pituitary tumour, one a glioma, and four tumours of indefinite nature. The post-mortem findings in two cases are given.

**ARNOLD SORSBY.**


Spiratos describes the varieties of flies which provoke myases and discusses five cases of his own in which external ophthalmomyiasis was caused by the larvae of oestrus ovis. He points out the seasonal incidence (in October), the fact that the fly deposits its larvae directly into the conjunctival sac, and that sometimes there is no conjunctival reaction so that the patient is unaware of the larvae.

He describes a method for keeping larvae alive for microscopic examination.

**H. B. STALLARD.**

Mazzi has experimented with acetylcholine in cases of dogs made amblyopic by quinine. After an interval of some months, he removed one eye and treated the animal with acetylcholine; then the second eye was removed and examined and compared histologically with the first. No noteworthy differences were found. The author concludes that acetylcholine may have a good effect which is found constantly in these cases, but that it does no good in the late stages. He concludes further that the vascular change is not of primary importance, but that the toxic effect is directed against the nervous elements of the retina and the optic nerve.


Possenti finds that acetylcholine has little effect on the visual acuity in emmetropia and hypermetropia; what little it has he attributes to its power of diminishing the spasm of the ciliary muscle. He finds a slight improvement in myopes, which is probably due to the same antispastic action. After a mydriatic, acetylcholine has no appreciable effect on the acuity.


Although in this article Rees speaks about Mikulicz disease and does not mention Heerfordt, so also in the previous article Tait makes mention of Heerfordt and says nothing about Mikulicz. The author states that Thursfield gives a very full review of the whole subject up to 1913. He suggests the following classification:

1. A congenital, hereditary or familial affection.
2. Mikulicz disease with involvement of the lymphatic apparatus.
3. Mikulicz disease proper.
4. Leukaemia.
5. Tuberculosis.
6. Syphilis.
7. Gout.
8. Sialodochitis fibrinosa.
Recently Garland and Thomson have suggested that the two conditions previously regarded as separate—namely Mikulicz disease and uveo-parotitis—are, in fact, one and the same thing and this report (by Rees) is of a case of Mikulicz syndrome which appears to be of tuberculous aetiology and may be classified as a case of uveo-parotid fever.

Ernest Thomson.

BOOK NOTICE


All ophthalmologists and neurologists owe a debt of gratitude to Dutch scientists for the most excellent scientific work which has appeared in the last half-century on the control of eye movements and body posture. Magnus and de Kley, Kappers, Brouwer, Winkler, van der Hoeve and others, anatomists, neurologists and ophthalmologists have all contributed by their work to build up our knowledge of the relationship of the vestibular apparatus to ocular movements. Among these workers Muskens must be reckoned as one of the most diligent. Some of his ideas have not always met with general acceptance. In the present beautifully printed volume he brings together under one cover the results of over 40 years research on ocular movements and body positions and their dependence on vestibular function and the integrity of their nervous connections.

So far as I can trace, Muskens’ first paper appeared in 1892 on rolling movements in roach (or stickleback) embryos after injury to the brain stem with a needle. In the ensuing years he has written many papers in various languages on similar subjects. A long experimental paper on the part played by the posterior longitudinal bundle in joining up the vestibular apparatus with oculomotor centres appeared in Brain, Vol. XXXVI (1914). A later paper in Brain, Vol. XLV (1922) dealt with the vestibular connections with the corpus striatum. The results of these and many other investigations are now available in this one volume which will be invaluable to any ophthalmic surgeon wishing to learn about the control of ocular movements. We have to congratulate both author and publishers on the format and printing of the book.