solutions of this are equal to 2 per cent. solutions of atropine for ophthalmic purposes." The Extra Pharmacopoeia states that while prior to the war atropine was derived from Central Europe it is now being made from Egyptian henbane in this country in larger quantities. From all this it seems clear that mistakes are possible, but since no overdosage has ever been suspected in the B. W. preparation it seems much more likely that the dosage is completely standardised and that the occasional run of failures is merely coincidental.

**ABSTRACTS**

**I.—TUMOURS**

(1) Barletta, Vincenzo (Catania).—The value of raised intraocular tension in the differential diagnosis between glioma and pseudoglioma. (L’ipertensione del bulbo nella diagnosi differenziale tra Glioma e Pseudoglioma.) *Ann. di Ottal. e Clin. Ocul.*, Year LVII, p. 66, 1929.

(1) While it is usual to find that cases of glioma have raised tension, and cases of pseudoglioma are hypotonic, or tend to become so, the rule is not an absolute one and Barletta describes a case in which in a true glioma the tension in the early stages fell as low as 12mm. Hg. In the later stages, the tension was raised. In discussing the possible causes of this lowered tension, he admits the possibility of detachment, but suggests also, that there may be atrophy of the iris and ciliary body and consequent diminution of aqueous secretion.

Leslie Patón.


(2) Schuster describes a case of psammoma of the optic nerve occurring in a man aged 20 years. The ophthalmoscopic appearance was that of complete optic atrophy with chalky white discs and thin or partially obliterated arteries; there was also the appearance of retinal pigmentation characteristic of old chorioretinitis. There was a history of a slow and gradual loss of vision. X-ray photographs of the optic nerve showed the presence of a well-differentiated granular shadow with a sharp outline; on the appearance of this shadow with its clear-cut characteristic nature, a diagnosis of psammoma was made, which was confirmed on subsequent histological examination.
Schuster points out that the majority of optic nerve tumours originate in the nerve itself and are gliomatous in nature; a minority—endotheliomata and psammomata—originate in the sheath. When the latter arise on the outside of the sheath they do not necessarily injure the fibres, but intrathecal endotheliomata are prone to injure the nerve and also to spread outwards through the dura. Occasionally they may spread intra-ocularly. Such a tumour may originate intra-cranially and spread secondarily into the nerve; but in the present case an accurate diagnosis was precluded by the presence of old chorio-retinal lesions which made it impossible to take reliable visual fields.

W. S. DUKE-ELDER.

(3) Hudson, E. Charlton (Bengal).—A case of gliosarcoma of the retina. _Lancet_, September 22, 1928.

(3) Hudson, who is Medical Superintendent of the Santal Missionary Hospital, Bengal, reports a case of unilateral “ulcerating tumour, the size of a lemon, protruding from the orbit and evaginating the palpebral conjunctiva.” The fellow eye was sound and there were no signs of any secondary deposits elsewhere in the body, glands or otherwise. The orbit was extirpated and the case did well. Unfortunately the parents moved the child a month later to their home thirty miles away, so that there is no further record. An excellent photograph of the mother and child accompanies the article and shows well the very large size of the tumour. There is no pathological report.

Ernest Thomson.

(4) Gourfein, D. (Geneva).—Epibulbar papilloma in course of transformation into malignant tumour on an eye injured more than forty years previously. (Papillome épibulbaire en voie de transformation en tumeur maligne, sur un œil traumatisé plus de 40 ans auparavant.) _Rev. gén. d'Ophthalm._, January, 1928.

(4) In the light of a case of his own Gourfein discusses the vexed question whether an ocular traumatism can give rise to a malignant tumour. Authors are divided on the point. Since this tumour, a papilloma which pathological examination showed to be becoming malignant, did not attract the patient's attention until some forty years after injury to the sclero-corneal region with a pair of scissors, Gourfein indicates that, under ordinary circumstances, he does not consider that the injury (which had resulted in a leucoma adhaerens at the corneal limbus) could be responsible for the malignant growth so long afterwards. On the other hand, a brother of the patient had died of cancer of the stomach. He discusses the question _pro_ and _con_ and comes to no conclusion.
Gourfein, however, indicates the salient points of the case in the following words:—"No doubt this observation is not capable of solving the problem but it presents two points of interest. The first point is that here is a new case where, in an individual hereditarily predisposed and having a wounded organ, a neoplasm develops in this organ and nowhere else. The second point is equally interesting, namely, that a papilloma, which is characterised by frequency of recurrence, has not recurred in this patient, operated on nearly three years ago, in spite of the fact that this papilloma was already in course of carcinomatous transformation."

ERNEST THOMSON.


(6) Cohen's paper opens with a general description of chloroma which is a relatively rare disease, but malignant, having a predilection for the skull, upper lids and orbit in children. It is probably a form of myelogenous leukaemia, as blood changes are associated with formation of the tumours whose greenish colour is due to a haematogenous pigment. The colour is bleached by exposure to the air for a few minutes. Treatment is of little value but X-rays, radium and blood transfusion have been tried. Cohen's case was in a Jewish boy, aged 4½ years, who had had his tonsils and adenoids removed. Following the operation he became anaemic and very restless. Ten days later there was bilateral proptosis with swelling of the lids and the condition progressed steadily. A differential blood count at this time was not characteristic but a later examination showed 7 per cent. of myelocytes and 4 per cent. of myeloblasts. The conjunctivae, media and vision were normal at the time the proptosis was first discovered and there was slight improvement under X-ray treatment. About 6 weeks later the proptosis increased and there was involvement of the optic nerve, the facial and the ophthalmic division of the fifth, causing papillitis, exophthalmos, lagophthalmos, and corneal infiltration with anaesthesia. A flat infiltrating mobile mass could be felt in the orbit below the supra-orbital ridge. The eye was enucleated, exposing a greenish coloured mass which was dissected out of the orbit. The patient's general condition became worse and he died 16 days later. No autopsy was permitted. The pathological changes in the eye consisted chiefly in infiltration of the uveal tract with nodules made up of myelocytes and myeloblasts; these cells were also present in large numbers in the intervaginal space of the optic nerve and in the retrobulbar space.

F. A. WILLIAMSON-NOBLE.

Nakayama here first refers to the unsuccessful attempts made by several writers to produce by transplantation a primary malignant tumour in the cornea of animals of the same species. His own experiments with spindle-celled rabbit sarcoma were at first also unsuccessful, and he attributed this failure to the insufficient nutrition provided by the cornea for the tumour cells: but he finally succeeded by performing repeated paracentesis of the anterior chamber after inoculation of the cornea, and thereby increasing its nutrition.

A circular opacity appeared round the point of inoculation and gradually increased in extent and density: 2 to 4 weeks elapsed before definite signs of new growth formation could be clinically observed. The developing sarcoma with its new-formed vessels was of a greyish-red colour, relatively sharply defined, and presented a smooth surface.

Microscopical examination showed that the new growth was confined to the central or deeper layers of the cornea. The growing tumour cells in the early stages spread towards the periphery along the interlamellar lymph spaces in the form of chains which formed anastomoses with one another, and in the further development of the tumour the formation of new vessels from the conjunctiva played an important part.

The author studied the effect of radium on these new growths and found that, while it had a destructive action on the sarcoma cells in the more superficial layers, the deeper parts of the tumour were more resistant.

Thos. Snowball.

II.—ANATOMY AND PHYSIOLOGY

(1) Creed, R. S., and Grant, R.—On the latency of negative after-images following stimulation of different areas of the retina. Jl. of Physiol., November, 1928.

Creed and Grant confined themselves to the ordinary persistent after-image, using white discs as test objects. The latency was longest at the fovea, and shortened rapidly, and then lengthened to a new maximum at 2.5° from the fixation point, giving a characteristic “hump” on the curve. It then gradually shortened to the periphery. They interpret this as follows: The
initial steep fall is exclusively a cone curve, and is indicative of functional differences between the cones in the centre of the fovea and those further out; the "hump" is due to the rods replacing the cones as the dominant receptor organ in and beyond this area.

The after-images of discs of varying size in the centre of the field were investigated, and the latency of the after-image of the disc as a whole was found to correspond to the region of retina on which the image of its edge falls. Juliasz found that the latency shortens as the size of disc increases: they confirm this only when the centre of the disc is the fixation point; outside this the areal extent of the primary image is devoid of influence. The explanation of Juliasz's finding is that at the macula the edges of the disc are falling successively on receptors of changing character.

They agree with Juliasz that within wide limits the latent period is not dependent on the intensity of the primary image, and that for short durations of primary stimulus the latent period shortens as the duration is lengthened.

G. G. PENMAN.


(2) A piece of research work of considerable interest and fundamental importance on the action of light on the eye has been carried out by Adrian and Mathews in the physiological laboratories at Cambridge. It forms part of a study of the physiology of nerve impulses generally, which is being pursued by Adrian. The research consisted essentially in the observation of the optic nerve currents under varying conditions. The action currents were picked up by two electrodes and the electrical variations were recorded by a capillary electrometer whose variations were traced on a moving film. In the dark the nerve is usually free from action currents but when the eye is illumined, after a latent period, the record shows a series of oscillations, whose frequency is greatest immediately after the commencement of stimulation, and then declines, at first rapidly and then more slowly. If the illumination has lasted for some time there is a renewed outburst of impulses when the light is turned off. The important thing about these action currents is that they do not differ appreciably in time relation or in grouping from those in other sensory nerves. Their
size is not affected by the strength of the light stimulus, that is, they conform to the all-or-nothing principle.

When the retinal image is small the effects of an increase in the size of the image are the same as those of an increased intensity of illumination. The latent period before the discharge of current commences and the nature of the discharge itself are therefore dependent on the quantity of light which reaches the retina in unit time: that is, the quantity of the discharge in the optic nerve varies as area of retina stimulated \( \times \) intensity of light. A similar relation holds good with regard to the duration of the stimulus. If flashes of light are used it is found that a definite quantity of light (i.e., intensity \( \times \) duration \( \times \) area) produces the same type of reaction although the retinal area illuminated is made to vary as widely as from 0.08 to 0.9 mm. diameter. This relation is an important finding and it must mean that the total effect of the light is transmitted to some region whose extent is independent of the area which is illuminated. Such an effect might be due to a spread of the photo-chemical processes which occur on the stimulation of the retina by light, or, on the other hand, the effect might be the result of an overlapping distribution of the nerve paths which conduct the stimuli from the sentient layer.

When the entire retina, on the other hand, is exposed to uniform illumination, the currents in the optic nerve tend to lose their usual irregular character and may consist of a series of regular waves travelling with a frequency which usually varies from 15 to 5 a second. This type of discharge occurs, of course, when the illumination of the retina is entirely uniform. Adrian has shown that these rhythmic waves, which are obviously due to a rhythmical waxing and waning in the number of impulses travelling along the optic nerve, are due to the fact that the ganglion cells of the retina are all working in unison, with alternating periods of rest and activity. This co-ordinated action is brought about by a close nervous inter-connection between the individual ganglion cells. Thus after the administration of strychnine the rhythmic discharge is greatly accentuated, much in the same way as synchronous discharges can be elicited from large groups of neurones in the spinal cord after the exhibition of this drug.

Adrian has demonstrated the influence of this inter-connection between the ganglion cells in another way. When four points on the retina are stimulated simultaneously their effects are summed so that the reaction time of the discharges in the optic nerve is shorter than when any one of the points is stimulated alone, provided the different points lie fairly close to one another. Contiguous areas of the retina thus appear closely related. The fact that this inter-relation is nervous is proved by the observation that strychnine causes a marked increase in the area over which the
inter-action can take place, for after the administration of this drug the effect of the illumination of four points can be summated when they lie very much further apart than the maximal distance which allows any such effect in the normal retina. The parallel effects of the increase in the stimulating light and the increase in size of the illuminated area must be due in the same way to a nervous summation in the region of the ganglion cells of the excitation from the various points.

As far as concerns the physiology of vision the main bearing of these experiments is to emphasise the fact that the retina is not a mosaic of receptors or groups of receptors with each group leading by an independent pathway to a corresponding nerve fibre. No doubt there is a closer connection to one particular fibre, but the same fibre is open to the spread of excitation from others parts of the synaptic layer. The histology of the retina would certainly support this view, for the elaborate branching processes of the retinal neurones and those of the amacrine and horizontal cells would give an ample structural basis for communication between the different regions. The retina in fact shows many of the properties of the grey matter of the central nervous system. The existence of a considerable amount of inter-action is shown by the way in which the size of the retinal image influences the threshold for colour and the fusion point of flicker as well as the threshold for colourless light. These facts by themselves are enough to throw doubt on any theories of vision in which the cones and their connections with the optic nerve fibres are treated as independent units.

W. S. Duke-Elder.


(8) From extensive measurements determined objectively on a considerable number of animals, Tschermak has drawn up values of the relative extent of their binocular and uniocular visual fields. He points out that many vertebrates have a well defined area in which the fields overlap and in which binocular vision is therefore possible, and that this occurs whether or not there is a partial or complete decussation of nerve fibres in the chiasma. In the lower vertebrates complete decussation occurs and in these the eyes are directed laterally; it is obvious that the binocular visual field is more limited in these than in the higher animals in which the eyes tend to be directed frontally and in which a more or less definite semi-decussation occurs. In the binocular visual area of these animals the sensorial co-operation of the two eyes is probably not unlike that which occurs in man, the essential difference
between them being that the fovea in the lower animals lies outside of the binocular area and is directed laterally. Tschermak’s work on this subject is well known and dates from 1902. A general discussion of the literature with the bibliography is included in the paper.

W. S. Duke-Elder.


(4) Gasteiger and Hidano approached this problem along two different lines of laborious research, viz. by producing grave disturbances of internal secretions in white rats, and by exposing white rats and mice to X-rays. In the first case extirpation of the suprarenal and the thyroid glands was performed, and in later experiments thymus extract was administered.

The results on removal of the thyroid glands and on giving thymus extract were negative, but in the litters of some animals from which the suprarenals had been excised, malformations—anophthalmos, coloboma of the iris, microphthalmos with coloboma—were found.

In the X-ray experiments on rats complete anophthalmos occurred in several cases, in one animal microphthalmos with irideremia; in the mice iris coloboma was observed.

These experiments conducted on different lines gave surprisingly similar results that are not attributable to mere chance. In the second series, in which positive results were obtained by exposure of females to X-rays, they consider that the follicles were affected by the radiation, but they offer no explanation as to the effect of the disturbance of internal secretion upon the production of these “parakinetik” malformations.

Thos. Snowball.

(5) Ishikawa, F. (Sendai).—On the effect of tenotomy of the ocular muscles on the intraocular pressure, together with remarks on the existence of the anterior ciliary arteries in the rabbit. (Ueber die Einwirkung der Tenomie der Augenmuskeln auf den intraocularen Druck, nebst Bemerkungen über die Existenz der vorderen Ciliararterien beim Kaninchen.) Arch. f. Ophthalm., Vol. CXIX, 1927.

(5) Ishikawa found that immediately after tenotomy of the extraocular muscles the intraocular pressure fell considerably, but very soon it rose again, and in 20 minutes was usually slightly higher than before operation. This was followed again, after 3
hours, by a hypotony of varying degree, which persisted with slight variations for 7 to 14 days, and it was not till after this period that the tension of the eyeball returned to normal. These changes in tension were mainly due to the tenotomy of the superior and inferior recti muscles and in much less degree to that of the other recti, whose insertion into the sclerotic is situated much further behind the limbus than that of the former. The fall in the intraocular pressure, which, with proptosis of the eye, immediately follows the tenotomy, is most probably due to the sudden release of the traction of the muscles on the eyeball, and this will, in the next few moments, induce hyperaemia of the ciliary processes with accelerated flow of the aqueous, and a consequent temporary rise in tension.

The diminished tension that persists for two weeks he considers to have a close connection with the post-operative chemosis of the bulbar conjunctiva and the hyperaemia at the sites of operation, which continue for the same period.

As regards the existence of anterior ciliary arteries in the rabbit his experiments confirm Leber's findings that the arteries running in the recti muscles send no branches through the sclerotic into the iris and ciliary body; their blood supply is solely provided by the long ciliary arteries.

THOS. SNOWBALL.

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III.—MISCELLANEOUS

(1) Colbat, A. (Lyons).—The eye and the sympathetic system. ("L’œil et le sympathique.") Jl. de Méd. de Lyon, March, 1928.

(1) In the course of an article reviewing our knowledge of the sympathetic system in its relationship to the eye, Colbat discusses the problem of spasm of the retinal vessels. That the retinal arteries carry vaso-motor fibres appears to be established. Experimentally, irritation of the sympathetic in the neck leads to constriction of the retinal arteries in the case of the rabbit, though it gives rise to the contrary effect in the dog and the cat. In man the evidence is not quite clear, but in all probability sympathetic irritation leads to vaso-constriction. The presence of these fibres does not indeed explain the whole problem of spasm of the retinal vessels and its clinical course, but is of considerable assistance. The rationale of the use of amyl nitrite in cases of arterial spasm is its action on the sympathetic; dionine, in powder form or concentrated solutions has been used with a fair degree of success in
a case under the author's observation—its mode of action being the induction of congestion which takes the place of anaemia produced by the arterial spasm.

The author also believes that the sympathetic plays an important part in cases of retro-bulbar neuritis. He would regard these as the result of arterial spasm of a less severe type. This spasm is to be diagnosed not by the ophthalmoscope but by the increase of the arterial tension of the eye. In cases of retro-bulbar neuritis the author has found the retinal arterial tension always to be increased; when the disease is subsidiary, either as a result of operative interference on the sinuses, or spontaneously, the retinal arterial tension falls. The changes in the tension can be recognised ophthalmoscopically owing to obvious vaso-dilatation. Operations on the sinuses and the nose cure many cases of retro-bulbar neuritis: where frank sepsis has been relieved it is easy to see why cure should have resulted; but in many cases the lesion of the sinuses or of the nose are by no means marked. The favourable results obtained in these cases in spite of expectation to the contrary are, in the author's opinion, to be explained by the existence of a nasoocular reflex, called into play by operative interference in the nose. This reflex acts on the sympathetic fibres along the retinal arteries and relieves the spasm. The author brings forward some evidence to prove the existence of this reflex. His conception of the pathology of retro-bulbar neuritis is interesting, if not very convincing.

A. Sourasky.

(2) Bartels, Martin (Dortmund).—Affections of the interior of the eye associated with affections of the ear. (Erkrankungen des Augeninnern mit Erkrankungen des Ohres.) Zeitschr. f. Augenheilk., Vol. LXVI, 1928.

(2) Affections of the conjunctiva associated with deafness appear to be coincidences. This, however, is not the case with the deafness seen in conjunction with the interstitial keratitis of congenital syphilis. In the experience of Bartels it is intimately related to the degree of iridocyclitis present; the deafness appears subsequent to the iridocyclitis; the cyclitis clears up but the deafness progresses. The deafness is generally of the labyrinthine type. Deafness may also appear in any other variety of iridocyclitis: the two probably appear simultaneously, but as minor disturbances of vision are more troublesome than slight degrees of deafness, the ocular symptoms are noticed first. In the author's series no particular variety of iridocyclitis seems to be specially prone to the association with deafness. Deafness is also seen in another group of cases in which the choroid is mainly affected:
this seems to occur both in inflammatory lesions of the choroid and in cases of choroidal degeneration of high myopia.

The association of deafness with lesions of the uveal tract raises the question whether there is a disease that attacks both the uvea and certain parts of the auditory apparatus. What part of the ear it is that is affected is not easy to determine, as minor degrees of vestibular disorders are difficult of diagnosis: in the eye it is clear that it is the non-nervous part that is implicated. In some cases the exciting cause of the double lesion is fairly obvious; this is the case in congenital syphilis, in which it must be ascribed to the spirochaete. It is less obvious in gonococcal and tuberculous lesions; whilst in central choroiditis and high myopia it is not at all obvious.

Glaucoma and deafness are also sometimes associated. In a case of secondary glaucoma under the author's observation the degree of deafness used to vary correspondingly with the variations in the tension of the eye. Retrobulbar neuritis and labyrinthine nystagmus form another association pointing to the intimate connection of the visual with the auditory apparatus, but this, like the papilloedema in intra-cranial lesions, may merely be the consequence of a disturbed intracranial pressure.

Pigmentary disturbances of the fundus associated with deafness forms yet another group. This applies equally to retinitis pigmentosa and albinism. Degeneration of the pigment of the retina has been demonstrated in waltzing mice (which have defective labyrinths). Deafness in albino cats and dogs is well known; anatomically the organs of Corti are absent and the auditory areas of the temporal lobe atrophied. It is possible that the deafness seen in high myopia is to be ascribed to the pigmentary disturbances of the retina.

A. SOURASKY.

BOOK NOTICES


The fact that a second edition of this work has been called for within less than two years of the publication of the first is sufficient indication of the popularity of the original volume.

The author has incorporated a considerable quantity of new matter and in order to maintain reasonable proportions has omitted