Ginestous (Ophtal. Provinc., T. IX, p. 149), a case in which a chip of metal lodged in the lens and ultimately permitted of full vision.

Laqueur (Arch. f. Augenheilk., Bd. LIII, S. 97), two cases in which chips of glass were embedded in the lens and permitted of useful vision for several years.

Nottage (Ophthalmic Record, 1899, p. 78), a case in which a chip of metal was seen in a lens thirty years after injury; corrected vision 6/18.

It is true that Elschnig has recorded a case (Klin. Monatsbl. f. Augenheilk., 1913, June), in which a chip of metal was successfully extracted from a lens (near its posterior pole), and in which normal vision was ultimately attained. Such a result must surely be even more rare than in the cases in which the metal is not extracted.

Doyne (Transactions of the Ophthalmological Society U.K., Vol. X, p. 198) mentioned a case in which metal had passed through the lens and lodged in the retina, leaving only a faintly visible track. Similar cases have been recorded by other writers, and Praun ("Die Verletzungen des Auges," Darmstadt, 1899) notes several instances in which lenses injured by needle-prick and other somewhat similar causes, have become hazy and ultimately cleared practically completely.

In nearly all the cases referred to the subjects have been quite young at the time of injury, and it seems safe to conclude that the age of the patient is a determining factor in the favourable result. Certainly, a most important point is that the metal should be aseptic.

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ABSTRACTS.

I.—ANATOMY.

Wallis, G. F. C. (Margate.)—Some observations upon the anatomical relations of the optic nerves and chiasma to the sphenoid bone. Practitioner, January, 1917, p. 41.

This study is from the point of view of the rhinologist in regard to disease of the post-nasal sinuses, especially the sphenoidal. Eleven subjects were examined, the method followed being to remove the calvarium and then dissect away the brain piecemeal. The results, which showed considerable variation, are presented in a table. In no case did the chiasma rest wholly upon the optic
groove. In one case rather more than half of it rested upon the optic groove and olivary eminence, the posterior part lying on the pituitary body, and in another it was far enough forward just to touch the olivary eminence. The author concludes that while the chiasma does occasionally lie upon the optic sulcus, it is nearly always completely posterior to it. The chiasma measured from 7 mm. to 11 mm. anteroposteriorly and about 3 mm. less laterally, so that at most only a small part of it could ever lie upon the optic groove. The intracranial part of the optic nerves was found to vary between 7 mm. and 12 mm. in length, and the angle formed by their junction became more acute, the more posterior the situation of the chiasma. When the latter was relatively far forward the angle became U-shaped or even like a bent bow. Several other points are discussed, such as the extent of the bony surface between the limbus sphenoidalis and the anterior margin of the sella Turcica, the antero-posterior measurement of the latter, the length of the optic canals, and the extent and condition of the sphenoidal sinus. A relationship, which is of interest to ophthalmologists, namely the height at which the chiasma is suspended above the diaphragma sellae, is unfortunately not mentioned; indeed, the reader is led to believe that the chiasma normally, to some extent, rests upon the pituitary. This is contrary to the findings of other observers. It is probably impossible to ascertain this point with accuracy by removing the brain from above, and no doubt it was omitted on this account.

H. M. Traquair.

II.—RADIOGRAPHY.


(1) As Johnston himself points out, the title of this article is somewhat misleading, inasmuch as it is but rarely that the pituitary body can be observed radiographically. Under ordinary circumstances we observe merely the bony pocket that lodges the gland, and not the gland itself, unless the latter has undergone marked pathological changes.
The article covers much ground, and a résumé of its chief contents may be of service to our readers.

The technique found most satisfactory by Johnston has comprised the employment of finely focused heavy anode transformer tubes, lately of the hydrogen type, working at a voltage not exceeding 60,000, and usually less, with an exposure of 200 m.a. seconds and fairly fast plates with fine grain. Other necessary requisites are absolute immobilization of the head, and small diaphragms. The centre of the sella Turcica is determined by indicating a line from the glabella to the external auditory meatus. At a point 1½ inches anterior to the meatus on this line a perpendicular ¾ inch high is erected, and through the point established at the end of this perpendicular the principal ray is passed, so as to emerge at a corresponding point on the opposite side of the skull. Johnston has found the foregoing method of location to be accurate enough in the majority of cases to produce a test plate. By "test plate" he means a plate in which the floor of the sella appears as a sharply-defined white line and the anterior and posterior clinoid processes are superimposed upon their opposites. This plate having been obtained, a stereoscopic pair may be made as well, it being recommended that the stereoscopic movement be from above downward towards the base rather than from the glabella towards the occiput.

In considering the types of sellar deformation that may be considered to lie within the limits of the normal, Johnston points out that the first consideration is the examination of the relative size of any sella. He claims that an observer who has examined a few hundred sellas will at once notice any disparity in size as compared with the rest of the skull. The average size of the pituitary is given as about 12 mm. transversely, 5 mm. from above downward, and about 7 mm. in the sagittal direction. There appears to be a rather constant relation between the thickness of the floor of the sella and the size of a sphenoidal sinus, of which it forms the roof. The larger the cubical contents of the sinus, the thinner is usually the floor. If the floor of the sella be thick, a diseased pituitary body may be expected to enlarge at the expense of the clinoid processes. Enlargement will progress in the direction of least resistance. Thus, if the anterior clinoids are well developed, and the posterior clinoids rudimentary, enlargement will be backward, and absorption of the posterior clinoids may be the only evidence. On the other hand, if the opposite conditions obtain, then the enlargement will be forwards. In the third instance, where all the clinoid processes are of heavy construction, pressure will be manifested downwards. In that event the clinoids will not suffer pressure-atrophy, but the pituitary body will embed itself in the sphenoidal sinuses, destroying the roof in this slow journey
downwards. Were it not for the presence of the dural process stretching between the anterior and the posterior processes, we should be unable to make an early Roentgen diagnosis of pituitary “struma,” since the gland would simply grow upwards and sellar deformation would be a very late phenomenon.

In considering the changes induced in the region of the sella by pathological alterations in the pituitary body, we shall be at once struck by the difficulty experienced in obtaining satisfactory Roentgenograms. The author explains this as due to the fact that as the pituitary begins to enlarge, a pressure-atrophy is manifested upon the entire portion of the sphenoid which surrounds the hypophysis. The clinoid processes become relatively transparent, and consequently the detection of the outline of the sella becomes increasingly difficult. Stereoscopic plates do not aid us as much as we could desire.

If the anterior processes disappear first, we may expect marked ocular symptoms, with temporal hemianopsia, progressing to complete optic atrophy. If the posterior clinoid processes be destroyed first, there may not be the same degree of optic atrophy, but there will be interference with the functions of the posterior lobe, as shown by epilepsy, etc.

In rare instances the tumour itself may be seen, elevating the membranous roof of the sella. In many instances the pressure is directed downwards and the roof of the sphenoidal sinus has yielded, so that the tumour occupies a large portion of the sinus itself. In other instances the great size of the tumour completely destroys all landmarks. It is impossible to differentiate basilar tumours of the middle cranial fossa lying in the middle line by X-rays alone from tumours of the hypophysis. Where there exists an erosion of but one of the clinoid processes, it is sometimes possible to diagnose tumours of the anterior and posterior cranial fossae.

Johnston draws attention (not for the first time) to certain variations met with frequently in the sella and the anterior fossa of the skull in idiopathic epilepsy. These changes consist in a more or less pronounced hyperostosis involving the clinoid processes, the anterior fossa, and in some instances the post-clinoidal region.

All cases of optic atrophy where increased intra-cranial pressure is suspected should be examined with care in order that internal hydrocephalus, if present, may be diagnosed at the earliest moment. He believes that in every case evidence of pressure, as shown by the moulding of the internal table to the contour of the convolutions of the anterior lobes, will be found to be present, at least by the time that any considerable degree of contraction of the visual field is present. These markings are very faint in the beginning, but later the characteristic impressions make their appearance. They
may be masked by the simultaneous occurrence of internal and external hydrocephalus. In such cases the existence of pressure may be suspected by the change in angle in the middle fossa of the base.

(2) This valuable article is one which should be read by the neurologist, the ophthalmic surgeon, and by everyone interested in cerebral surgery, while to radiographers it must be of supreme interest, and to British radiographers it may be hoped that it will serve as an incentive to achieve better results in this branch of their art than they have for the most part hitherto achieved.

The very useful plan has been adopted of reproducing the X-ray picture in duplicate. Under each untouched print appears a second picture, in which details lost in reproduction have been intensified. This appears a very practical and absolutely fair way of bringing before the reader features which, although undoubtedly present in the untouched picture, are with difficulty identified in the absence of personal demonstration by the author. A large number of cases deal with variations in the sella Turcica, and the authors have proved by autopsy in certain cases, that shadows in or directly above the sella are due to areas of calcification.

A general conclusion is reached that uncalcified brain tumours do not cast shadows unless the tumour tissue has invaded the accessory sinuses, although possibly an exception has to be made in regard to some hypophyseal lesions which are viewed against a dark temporal fossa.

Calcified or bony tumours cast shadows which are readily recognised; such shadows may occur as frequently as in 6 per cent. of all patients with brain tumour. One case of exceptional interest is that of a large aneurism of the internal carotid artery, in which two calcified areas gave shadows in the shape of more or less concentric thin lamellae. The authors point out that erosion of the sella Turcica and destruction of its posterior clinoid processes are not conclusive evidence of pituitary tumour. Such bony changes may be due to the local pressure of tumours arising in an adjacent part, or even to a general increase of intra-cranial pressure arising from cerebral or sub-tentorial lesions; while, on the other hand, pituitary tumour may be present with very little or no change in the sella Turcica. These two facts emphasize the necessity for the combined study of clinical and radiographic signs in all cases.

The X-ray work at the Johns Hopkins Hospital has been brought to such a state of perfection that the authors are able to recognise and to illustrate such valuable signs as general enlargement of the skull, allowed for by opening up of the sutures of the calvarium, and thinning with general convolutional atrophy of the skull, and they point out that such manifestations are generally associated with lesions below the tentorium cerebelli, which have induced
hydrocephalus, although one such case in their series was due to a supra-sellar lesion causing an obstructive hydrocephalus, initiated in the third ventricle. They have also been able to identify in their X-ray pictures such remarkable conditions as calcification in the choroid plexus, calcification in the pineal gland and in the falx cerebri, enlargement of the internal auditory meatus, and the presence of an enlarged intracranial vein and its tributaries.

J. H. Fisher.

III.—THE RETINAL CIRCULATION IN ARTERIO-SCLEROSIS.


Following the teaching of Gull and Sutton (1872), Moore regards the primary change in arterio-sclerosis as a general disease, commencing in the arterioles and smaller arteries and producing secondarily increased resistance to the onward passage of the blood, causing the tissues to suffer in their nutrition. This leads to an increase in the force of the heart-beat, and hypertrophy, together with increased pressure in the large arteries, follows.

In the present communication the author adduces reasons for believing that, at any rate in some cases of arterio-sclerosis, the pressure in the intra-ocular vessels so far from being raised, may be actually less than normal. It was shown by Gull and Sutton that so-called "arterio-capillary fibrosis" affected the vessels of the pia mater, kidney, spleen, lungs, etc. But if Moore's suggestion with regard to the pressure in the small vessels of the eye can be substantiated, it is also doubtless true of the other vessels. It is pointed out that the conditions in the eye can be investigated upon lines that are not available in other parts of the body, owing to the ophthalmoscope and Schiötz tonometer. Normally, the blood enters the eyeball through the central retinal and ciliary arteries at a pressure of 100 mm. of mercury (Leonard Hill), and is opposed by an intra-ocular pressure of about 20 mm. of mercury. Pulsation is not seen in the retinal artery, although if the intra-ocular pressure be raised by finger pressure, it will be found that when the intra-ocular pressure is raised by that means to a point in excess of the diastolic arterial pressure, blood enters only during systole, and the central artery, as observed with the ophthalmoscope, pulsates. Moore points out that in some cases of arterio-sclerosis, with very high pressures in the larger arteries, a degree of pressure with the finger is sufficient to produce pulsation, which is
less than that required in a healthy patient. The inference is that in such cases the diastolic pressure in the retinal artery is less than that of a patient with a normal blood-pressure. There are special difficulties in the way of estimating the systolic pressure in a similar manner. Evidence from a consideration of variations in the intra-ocular pressure bears upon the mean pressure in the intra-ocular vessels, but does not differentiate the systolic from the diastolic. Its bearing, also, is upon the pressure in the ciliary vessels, since it is upon them that the intra-ocular pressure depends.

In connection with the conclusion that the mean pressure in the ciliary arterioles and capillaries is not raised as a result of a very high pressure in the large vessels, the following additional observations are of some importance.—The pulse wave from inside the eyeball is transmitted to the lever of the Schiötz tonometer. In the presence of severe arterio-sclerosis the lever shows less amplitude of movement, and in a few cases no pulse is to be seen. Sixty-one patients were examined from this point of view, and the average systolic blood-pressure of the three groups into which they were divided was afterwards worked out. The figures were as follows:—

<table>
<thead>
<tr>
<th>Pulse movement of lever</th>
<th>Number of Patients</th>
<th>Average systolic blood-pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well seen ...</td>
<td>25</td>
<td>168 mm. Hg.</td>
</tr>
<tr>
<td>Poorly seen ...</td>
<td>29</td>
<td>190 &quot; &quot;</td>
</tr>
<tr>
<td>Not seen at all ...</td>
<td>7</td>
<td>225 &quot; &quot;</td>
</tr>
</tbody>
</table>

From the foregoing figures, it will be seen that the amplitude of the pulse movement is inversely proportional to the degree of arterio-sclerosis as judged by the blood-pressure, and allowing for the fact that local changes in the vessels would tend to prevent the transmission of the pulse to the other contents of the eyeball, the observations are at least compatible with the view that the pressure in the ocular vessels is not raised.

If the ocular vessels are the subject of sclerosis and the blood-pressure within them is not compensatorily raised, the retinal functions are likely to be impaired, and this may be brought about in two chief ways: (1) there may be thrombosis in the artery; (2) there may be a gradual impairment due to a relative starvation of the tissues.

Moore has watched five belonging to the first group of cases for several years. He notes that all the patients were the subject of marked arterio-sclerosis, with obvious disease of the retinal vessels. The onset usually occurred at night. He has recently seen a man
RUPTURE OF DESCemet's MEMBRANE.

who complained of defect of sight as soon as he recovered from an anaesthetic, given for the performance of a somewhat severe operation. The immediate cause of the thrombosis was doubtless the lowered blood-pressure during somewhat prolonged anaesthesia. As regards the second group of cases, deterioration of sight is gradual, and such patients may develop thrombosis of the artery.

It appears probable that the only sites in the body other than the eye in which thrombosis of a vessel of the size of the retinal artery would give rise to immediately noticeable symptoms are the heart, the internal ear, and parts of the central nervous system.

Moore, in conclusion, suggests that vigorous measures directed towards the lowering of blood pressure, whilst they may relieve a failing heart or avert a cerebral hemorrhage, are liable to act inimically towards the nutrition of the tissues of the body, by further reducing the already curtailed blood supply, and making the occurrence of thrombosis in the small vessels more probable. S.S.

IV.—RUPTURE OF DESCemet's MEMBRANE.

(1) Bergmeister, Rudolf (Vienna).—Rupture of Descemet's membrane with partial necrosis of the cornea in eyes affected with glioma. (Ruptur der M. descemeti mit partieller Nekrose der Hornhaut im Gliomauge.) Zeitschrift für Augenheilkunde, Bd. XXXII, 1914, S. 205.


(1) Bergmeister states that rupture of Descemet's membrane is chiefly seen in cases of buphthalmos and keratoconus. Winternsteiner described it in gliomatous eyes, and Coats found it in a specimen of high myopia. He suggested that the tension must have been raised in this case, for he invariably failed to detect any ruptures in pure myopia.

The consecutive changes which take place in the cornea when there are ruptures in the membrane are of interest, and led the author to publish his case.

The first part of the paper is devoted to a minute account of the histology of a case of glioma in a child. The parents had refused to allow the eye to be removed until the tumour had spread widely into the anterior segment. The optic nerve was infiltrated, and there was evidence of long continued high tension. The scleral capsule was distended by the pressure, and the lens deformed. The absence of tumour cells in the choroid was remarkable. This
structure was highly atrophic. The ciliary body was infiltrated, and the iris replaced by tumour growth. The muscular tissue in the ciliary body and iris showed a marked resistance to the new growth. It is noteworthy that there were no signs of any inflammatory reaction in the globe. The membrane of Descemet was ruptured, and there was an area of necrosis deep in the cornea. The corneal tissue exposed by the ruptures was covered with a new connective tissue growth or transformation.

The ruptures were caused by the very high tension and stretching of the cornea. This was manifested by megalo-cornea and intercalary staphyloma.

Living glioma cells have no action upon the endothelium of the cornea.

Fuchs has pointed out that the cytotoxines of carcinoma cells cause inflammatory reaction, but this is not the case with living sarcoma cells from the retina. These tumours can attain a large size in the globe and yet give rise to no inflammatory signs. When, however, the tumour begins to necrose, toxins are liberated, which cause inflammation.

The partial necrosis of the corneal tissue found in the author’s case must be ascribed to toxins from degenerating glioma cells.

The same toxin acted as a stimulus, and new connective tissue was formed.

(2) The peculiarity of this case by Walker lies in the fact that the “fracture” of Descemet’s membrane followed injury by a blunt object.

The patient, a man aged 32 years, was first seen a week after the injury. The cornea was slightly hazy, and with oblique illumination, five almost vertical striae, resembling cracks in ice, could be readily seen on the posterior surface of the cornea. V. = 5/200. Pain and marked ciliary redness. Under local treatment by cold packs and atropine and dionine, vision became worse, dust-like deposits appeared in the cornea, and there were many opacities in the vitreous. Tension fell to — 2. After about two months’ treatment, matters were complicated by detachment of the retina. The ruptures in Descemet’s membrane could no longer be found or seen.

Walker concludes that; (1) Fracture of Descemet’s membrane from blunt force is relatively rare. (2) it is usually complicated by intra-ocular haemorrhage, cataracts, etc.; (3) it is more likely to happen in youth than in old age; (4) it usually leaves permanent scars, but they may at times disappear soon.

T. HARRISON BUTLER.

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S. S.


Macleish, whilst working at the Royal London Ophthalmic Hospital, had his attention directed by S. H. Browning to the value of the use of an autogenous vaccine in case of marked keratitis, due to infection with bacillus coli.

Since then, he has met with no fewer than five cases of the same kind in private practice. Each showed a keratitis of a vesicular type, accompanied by a chronic cystitis, or by a recurrent diarrhoea, or by both. In each, a pure culture of bacillus coli was obtained from the urine, and in one case also from the aspirated contents of the anterior chamber. The youngest case was over 60, and the
eldest over 78 years of age. The longest duration of any one case was seven years, and the shortest one year (at intervals). The results of vaccine treatment were decidedly encouraging, but the patients seem to have been difficult to manage, which is scarcely surprising, considering their ages. R. H. Elliot.

(2) MacGillivray sets forth the results of a bacteriological examination of eyes, and especially of conjunctivæ, in the Dundee area. His objects were (1) to compare the findings in Dundee with those previously made in Aberdeen and Glasgow; (2) to determine the relations between clinical characteristics and bacteriological findings, with a view to arriving at a scientific diagnosis in each case; (3) to enable us to forecast the particular micro-organisms concerned from a careful and systematic examination of the symptoms in each case; and (4) to determine systematically and chronologically the micro-organisms producing various affections of the eye and its adnexa.

The investigation occupied nearly three years, during which 539 cases were examined. The period was free from any epidemic. An excellent schedule was drawn up and used, to ensure that no clinical symptom or other evidence would be overlooked. It was found that a reliable diagnosis of the micro-organisms concerned could usually be arrived at with certainty by the examination of smears alone, so that towards the end of the investigation, cultural experiments were resorted to only in exceptional cases. The technique used is carefully described. Tables showing the clinical diagnosis of the cases and the bacteriological diagnosis are given separately. The report contains a large amount of valuable information, and will well repay careful study. Some of the conclusions arrived at may be shortly stated.—The Morax diplo-bacillus was the most common micro-organism, whilst pneumococci and diphtheria bacilli were very rare. Tuberculous affections of the eye are practically unknown in Dundee. Most cases of chronic conjunctivitis are due to the diplo-bacillus, and those of acute catarrhal conjunctivitis to the Weeks organism. These two conditions can be diagnosed from the clinical signs alone.

The importance of a diagnosis based on the recognition of the causal micro-organisms is of the utmost value. This point is best illustrated in dealing with cases of hypopyon-ulcer of the cornea. Here the micro-organisms chiefly concerned are the pneumococcus and the diplo-bacillus. The treatment of the former by the cautery and of the latter by zinc salts is most satisfactory.

The presence of conjunctival discharge does not necessarily argue a bacterial cause, but, should a discharge be present, it must be regarded as a contra-indication to operative interference. A bacteriological examination should be made, and vigorous treatment
BACTERIOLOGY.

should be undertaken as a preliminary to operation. A mild unilateral muco-purulent discharge in an infant suggests congenital atresia of the tear duct, and the presence of a mucocele confirms the diagnosis. In the absence of a mucocele, the case may be one of mild unilateral blennorrhea neonatorum. If pneumococci be found in the discharge, atresia of the tear duct may be diagnosed, since a pneumococcal conjunctivitis is always bilateral.

Despite the dust of Dundee, the town is comparatively free from cases of conjunctivitis, and for at least twenty years, no epidemic of Weeks ophthalmia has visited the town.

Gonorrhoeal conjunctivitis is not common amongst adults, and ophthalmia neonatorum is on the decline, as a result of the measures which have been taken, and which include the instillation of a 25 per cent. solution of argyrol into the eyes of each new-born child.

R. H. ELLIOT.

(3) In October, 1913, writes A. Fuchs, there came to the clinic a case of corneal infiltration, J. St.—, aged 17 years, with the following history: five weeks before, while pitching hay, he had been struck in the right eye. He experienced severe pain, which, however, quickly disappeared, so that he felt his eye had not been injured. However, after about a week, the eye became red, and the patient noticed that he could not see so well with it.

He was treated by his local doctor with ointment, and then with drops. This quieted the eye for the time, but the inflammation continued to return, and he noticed his vision slowly diminishing.

Examination showed the conjunctival vessels slightly injected. In the centre of the cornea there was seen a tiny epithelial defect, and at this point, under the superficial layers, a sharply-marked opacity, about the size of a pin's head. The iris was normal, the pupil, under atropine, was widely dilated; the fundus was normal.

Vision = fingers at 4 metres.

From a little pocket in the corneal infiltrated area, a tiny particle of thick white pus was obtained, and transferred to tubes of agar. On all the tubes, a pure culture of a Gram-negative spore-producing bacillus was found.

After eight days, the patient was discharged. In less than one month the patient appeared again with an attack of eczematous conjunctivitis in the left eye. This quickly cleared up, and the patient was discharged in four days.

Morphology of the micro-organism:

A bacillus, 1-2 μ. long and '5 μ. wide, which was actively motile. In stained preparations it appeared of uniform length—somewhat plump, with the ends rounded. Diplo-forms and filament forms are seldom seen. It stained well with the anilin dyes and was
Gram-negative. The organism was strongly aerobic. Grew well at room temperature, and in bouillon produced a snow-white scum. The growth in gelatin plates, blood serum—agar plates—agar stab cultures—potato and in milk, is described in detail.

Inoculation of the rabbit cornea was tried by three methods:—

(1) The epithelium of the cornea was abraded and this point inoculated with the bacillus. Following a mild inflammation, there appeared an abscess with marked infiltration at the border. After three days, this quieted, leaving a long-standing opacity.

(2) Some drops of the bacillus culture were put in the parenchyma of the cornea by means of a Pravaz syringe. No reaction was noticed, only a very fine streaky opacity, which in the course of a few days, became more marked, and which after six weeks, remained the same as it was after one week.

(3) In the centre of the cornea, a pocket was made with a lance and some of a culture with spores was inoculated. Four days later, noticeable photophobia, with purulent discharge. The corneal epithelium was replaced and smooth, but a snow-white bordered opacity was seen in the deeper tissue. No hypopyon. Iris normal, pupil wide.

The eye was enucleated and a microscopic examination made.

Classification: The bacillus, in morphology and biology, belongs to the hay bacillus group. It differs from this in being Gram-negative. Fuchs thinks this bacillus can set up a keratitis with characteristics peculiar to this infection.

There are two illustrations of cultures, and one of a section of the rabbit's cornea.

S. HANFORD McKEE.

(4) Scarlett, of the Lariboisière Hospital, gives histories of a couple of cases of corneal ulceration due to two diplobacilli resembling morphologically the Morax diplobacillus and the diplobacillus of Petit, but differing from them in cultural and in staining characteristics. One of these, which the author names the bacillus duplex non-liquefaciens because it does not liquify gelatine or coagulated serum, caused a severe painful ulcer with hypopyon, which took a month to heal, and caused almost complete loss of sight in the affected eye from adherent leucoma. The second organism was distinguished from the other members of the group by being Gram-positive, and caused a relatively benign secondary infection of the cornea with slight infiltration and hypopyon in a tuberculous patient who had had an attack of herpes corneae. The infection was completely cured in less than a fortnight. The appended table shows the characteristics of the four organisms belonging to this group in smears and cultures:
(5) Brown, Irons, and Nadler, obtained haemolytic streptococci from the tear sac of a patient, and after various periods of growth on laboratory media, injected the organisms intravenously in rabbits. They found that the power of the haemolytic streptococcus to localise in the eye and produce irido-cyclitis in rabbits was lost in a relatively short time, either in the tear sac of the original host, or in cultures, or in its passage through animals. This change in tissue localisation was not associated with any demonstrable decrease in lethal power. The haemolytic properties and fermentative reactions of the streptococci were studied from time to time; the failure of the later cultures to produce lesions in the eyes of rabbits did not appear to be accompanied by any constant alteration in the fermentative power, but some decrease in haemolytic properties was noted.

R. H. Elliot.

(6) Pyocyaneus keratitis must be a rare condition. Lamb, Colhoun, and Alt, record two cases in each of which the infection was mixed. In the first case, that of a woman, aged 29 years, the bacillus pyocyaneus was only isolated after several animal inoculations, the staphylococcus aureus being extremely prominent. In the second, that of a girl, aged 11 years, the authors did not get the case until five days after the infection (with a piece of firewood.) Here, having had experience of the clinical appearances in the previous case, they suspected the pyocyaneus, looked for it at once and found it, though mixed with staphylococcus albus. Leaving on one side the description of the methods employed in finding
the bacillus, one may profitably quote the authors’ remarks as to
the characteristics of infection with this organism.

"It would seem that ulcers caused by the B. pyocyaneus have a
distinct pathology of their own. Typical corneal infections by this
organism when once observed and identified are easily recognised
when met again. They are distinguished most certainly by their
very rapid and extensive progress over the surface and into the
substantia propria of the cornea, three to seven days sufficing for this
bacillus to destroy corneal tissue over its almost entire extent, and
in depth from one quarter of the corneal thickness to Descemet’s
membrane. The suppurating process is apparently self-terminating,
being unaffected by the ordinary measure (? measures) for corneal
ulcer. At the termination of the tissue destruction the slough is
ten entire thrown off and the clean transparent floor of the ulcer appears
in strange contrast to the surrounding hazy infiltrated margins. The
extracellular toxin produced by the B. pyocyaneus is said to contain
a trypsin-like ferment which would explain its amazing power of
destroying corneal tissue. Its poison being extracellular suggests
the possibility of obtaining an antitoxin by injection of the bacillus
into animals, just as in the case of diphtheria and tetanus.
Fortunately these ulcers are too rare to warrant the formation and
keeping on hand of stock preparations of pyocyaneus antitoxin."

Ernest Thomson.

(7) Apropos of the communication abstracted above (see No. 4)
Scarlett has now established the fundamental difference between
the bacillus duplex non-liquefaciens and the Morax diplobacillus
and that of Petit by means of agglutination and precipitation tests.
He adopted the method employed by Chaine (Ann. d’Oculistique,
1914, T. 152, p. 330) in his comparative study of the diplobacilli of
Morax and Petit respectively. Chaine showed that the serum of a
rabbit inoculated with the Morax bacillus produced agglutination
with that organism and occasioned precipitation in certain dilutions.
On the contrary, the serum failed to yield the same results with the
Petit diplobacillus. It was further shown that Petit’s diplobacillus
yielded a serum specific as regards that organism, but one which
caused neither agglutination nor precipitation with the Morax
diplobacillus. Following the same lines of research, Scarlett now
shows that the diplobacillus duplex non produces a serum, specific
for that micro-organism, but having no action as regards the two
others.

S. S.
VI.—TUMOURS OF THE OPTIC NERVE.


(1) Segi’s case was in a female child, seven years old, of rickety constitution. There had been increasing prominence of the left eye for two years. The left eye was markedly prominent and rotated down and out. There was great limitation of movement. There was complete blindness of the eye, and ophthalmoscopic examination showed optic neuritis subsiding into atrophy. The right optic disc also showed atrophic pallor. Fingers could be counted at four metres, and there was contraction of the field of vision. The contents of the left orbit were removed, and showed a large egg-shaped tumour embracing the optic nerve right up to its entry into the globe. It was found to be a fibro-myxo-sarcoma of the nerve taking origin from the inner sheath and the perineurium.

From a review of the literature in general, and the work of Salzmann in particular, it appears that myxosarcoma does not possess the power of unlimited growth. It may, therefore, be placed among the benign tumours, the prognosis after removal of which is good. Since these form the majority of tumours of the optic nerve, the prognosis after removal of optic nerve tumours, in general, may be said to be favourable. The exceptions are chiefly those of the dural sheath, which are apt to be sarcomata or endotheliomata of great malignancy.

A. J. BALLANTYNE.
(2) This elaborate paper by Hudson, is written for the purpose of making a fresh classification of this group of tumours, based on a critical examination of records of cases, and especially of the histological features. The groups are as follows:—

(i) "A degenerative gliomatosis, implying a generalized over-growth of neuroglial tissue, of infiltrative character, dependent on some degenerative change in the tissue of unknown aetiology." These are found chiefly in the young, are of slow growth, and may not involve the anterior part of the optic nerve, and in many instances have intra-cranial extensions. The growth occurs within the dural sheath, affecting the pial sheath and the nerve; there are certain typical cells, and often a mucinous material between them, and sometimes a fibrillated material. Defect of vision generally precedes exophthalmos, which is of slow development, and mostly in the direction of the axis of the orbit. Movement of the eye is most often only slightly limited, but may be abolished. The optic disc may show papillœdema or post-neuritic atrophy, and the visual defect may be out of all proportion to the ophthalmic signs. Intracranial growth may be very slow, and not give rise to severe symptoms; the patient may succumb to some other illness. Removal after division of the external canthus is advocated rather than by Krönlein's operation, and local recurrence is unknown.

(ii) Fibromatosis of the nerve sheath. The marked feature in this set is the large development of fibrous tissue. These also appear early in life, and are of slow growth; exophthalmos precedes visual defect, and the fundus change suggests obstruction of retinal circulation, followed by atrophy of the nerve.

(iii) Endothelial tumour of the nerve sheath. This resembles the endothelial tumour of the cerebral meninges, with whorled arrangement of cells and central laminated concretions. The growth may form a cup, in which the globe rests. The arachnoid endothelial cells are probably the origin of some of these growths, although, in the opinion of some, they may also arise in the dura. These tumours appear later in life than those of the previous groups, failure of sight is secondary to tumour formation, exophthalmus having existed without alteration in vision. The rate of growth is slow, protrusion is often down and out; movement is, as a rule, limited, as the anterior part of the nerve may be affected; the fundus shows vascular obstruction and nerve atrophy. Extension may occur into neighbouring parts and the cranium. Local recurrence is not frequent after operation, and it is probably advisable to remove the globe.

A. H. PAYAN DAWNAY.

(3) The case reported by Heed, occurred in a girl, aged ten years, whose left eye was noticed to be prominent almost coincidently with vaccination. In four months the eye had become very prominent, and sight was reduced to perception of light. The
protrusion of the eyeball slowly increased, despite treatment carried out with mercury and iodides for a period of six months.

When examined by Heed, twelve months after the onset, the left eyeball was thrust forward approximately 2 cm., and the summit of the cornea was directed down and in. Rotation was limited externally and absent in an upward direction. V. = no p.l. Palpation failed to discover any growth in the orbit. Posterior synechiae. Optic disc greyish-white.

As to treatment, after an external canthotomy had been performed, a tumour was found to extend from the globe well back to the optic foramen. The tumour, together with the eyeball, was enucleated. The appearances of the tumour are shown in the accompanying figure. It was a spindle-shaped mass of dark-red colour, measuring 35 mm. in length and 26 mm. at its point of greatest thickness. Its capsule was formed by the dura. It was believed that the tumour in this case might properly be classed as an endothelioma.

Heed points out that his case agrees in history, symptoms, and general characteristics with the majority of those already reported—early age of patient, absence of pain, no injury, slow development of the proptosis, good health of the patient, presence of a post-neuritic atrophy, and, lastly, the inability to palpate any orbital growth.

S. S.

(4) Arnold Knapp adds another case of tumour of the optic nerve.

The patient, aged nine years, had suffered for a year from a slowly increasing prominence of the right eye. The eye was pushed straight forward in the axis of the orbit; the mobility of the eyeball was normal; no tumour could be found in the orbit; but sight was
reduced to perception of light in the extreme temporal field, owing to a neuritic atrophy of the optic disc.

Krönlein's operation was performed and a bluish mass extending from the eyeball to the apex of the orbit was removed, the eyeball being left in place. An infection, apparently localised to the subcutaneous tissue, followed the operation, but it rapidly subsided and the patient made a good recovery. Finally, except for a dilated pupil, the eye looked perfectly normal. The optic nerve was completely white; some of the retinal vessels were narrow to the point of obliteration; there were atrophic and pigmentary changes in the region of the macula and on the nasal side of the optic disc.

The excised part of the optic nerve and tumour consisted of an irregular, cylindrical-shaped mass, 3 cm. long, by 2 cm. wide at its broadest part, entirely surrounded by a connective tissue capsule, which represented the extended dural sheath. The microscopical appearance of the growth suggested a haemangioma.

In commenting upon the foregoing case, Knapp draws attention to the changes in retinal circulation which occur. For example, in his case, notwithstanding complete division of the optic nerve and its blood-vessels, the retinal arteries and veins were of normal size for at least three weeks after operation, although subsequently some of them became narrow and obliterated. It has been shown by Schlodtmann that the changes in the ophthalmic picture of the retinal circulation depend upon whether a collateral circulation has been established or not. He also draws attention to the ofttimes incomplete removal of these tumours of the optic nerve, which, according to Hudson, occurs in no less than 50 per cent. of the cases. Thus, in his own case, the tumour was not limited to the apex of the orbit, and had, without doubt, extended into the cranial portion of the optic nerve. There are no clinical signs, however, of any intra-cranial extension, but then about six months only have elapsed since the date of operation. In connection with the general impression that these tumours are almost benign, it is significant that not a single instance of orbital recurrence has been recorded. As X-rays seem to possess a distinct effect on the growth of gliomatous tissue (Axenfeld), Knapp enquires whether the systematic use of X-rays should not constitute a part of the treatment of these cases.

(5) In the course of a brief abstract it would be impossible to do justice to this communication by de Schweinitz, dealing with certain tumours of the eyelid and of the orbit. The contribution is most liberally illustrated.

The first of de Schweinitz's cases was an example of myxosarcoma of the upper eyelid in a boy, aged 4 years. It had been mistaken for a haematoma, and twice operated on. The child died three and
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a half to four months after these operations. The growth (examined after death), which much resembled in appearance the cerebellum, had a weight of 247 grammes and measured 10 cm. by 8 cm. by 6 cm. Microscopically, it was found to be a myxosarcoma.

The second case, one of small round-cell sarcoma of the orbit, occurred in a woman, aged 49 years. During the fifth year of its existence, purulent keratitis of the corresponding eye developed. The contents of the orbit, including the tumour, were eviscerated, and six months later, the patient was in excellent general condition.

A third case, one of tumour of the optic nerve, was in a girl, aged 11 years, whose right eye had been growing prominent for some years. On examination, V. = no p.1. Eye divergent and slightly depressed. Movements upward and outward limited. Optic disc atrophic, without evidence of preceding neuritis. Pupil failed to respond to light. Operation advised but declined. Four years after the first examination, and about eight years after the signs of proptosis had first appeared, an increase in exophthalmos was evident, and the patient began to experience orbital, periorbital, temporal, and parietal pain. Occipital headaches were also present. Consent for operation having been given, the eyeball, together with an attached growth, was removed. The appearances are shown in the figure. The tumour was dense in structure, reddish-yellow in colour, and 2.5 cm. in length by 2 cm. in width. Some two months after operation, there was a return of periorbital pain, and a suggestive fulness in the orbit, especially upward and inward. A month later, there seemed to be no doubt that a recurrence of the growth had taken place; but the swelling was lessened, and the pain decreased, by two applications of radium. Evisceration of the orbital contents, however, became necessary, and much difficulty was experienced in removing
the mass, since it was almost cartilaginous in its consistence. Two months after evisceration (with no signs of local recurrence), there were attacks of cerebral vomiting, suggestive of intracranial extension; but these gradually ceased. At the time of the report, ten months after the evisceration of the orbit, the patient was in excellent health.

The last case was one of epibulbar lipoma, met with in a woman, aged 41 years. It extended into the orbit for a considerable distance, and was removed with some difficulty. It measured nearly 3 cm. by 2½ cm. in width. As regards structure, it was frankly adipose. As regards diagnosis, Lagrange states that if the tumour is a pure lipoma, the conjunctiva moves freely over it; whereas if it be a dermolipoma, the conjunctiva adheres to it.

(6) A negro girl, aged 3 years, was admitted under Ellett, on account of exophthalmus affecting one eye. The lesion was supposed to follow a blow upon the eye, and had been present for a few months. On examination, there was found to be 12 mm. of protrusion of the right eye, the vertical movement of which was entirely lost. The pupil was slightly dilated and did not respond to light, but nothing could be found in the fundus to account for the blindness which was believed to be present. Ophthalmoscopic examination, X-ray examination, and nasal examination all yielded negative results.

It was determined to remove the tumour. As soon as the nerve was located, it was found that this structure was materially enlarged, and in following it backward, the enlargement persisted until the optic foramen was reached. The nerve was cut level with the foramen, and apparently the intracanalicular part of the nerve was affected by the same process which caused the enlargement of the orbital portion. The tumour, when removed, measured 3 cm. in length and 0·5 cm. in thickness.

The microscopic report of the case was to the effect that the tissue affected is neuroglia, as shown by the differential staining. For example—(1) Van Gieson’s stain showed that the major portion of the hyperplastic tissue was not connective tissue. (2) With Mallory’s aniline blue stain connective tissue appears blue, while the neuroglia fibrils appear red or light-red. In sections of the tumour under discussion practically the whole of the hyperplastic tissue took this red or light-red stain. (3) With phosphotungstic acid hämotoxylin connective tissue appears red or reddish-brown, while glia tissue appears blue. Practically all the hyperplastic tissue in this specimen appeared blue.

The communication is extremely well illustrated.

S. S.