portion of the disc margin or papilloedema was present. All these patients had facial oedema. The retinal change and the facial oedema appeared to clear up at the same time. No case was under observation at a sufficiently late stage for chronic changes to be manifest. Transient blindness occurred in two cases as one of several uraemic symptoms. Difficulty in reading was complained of by a few patients early in the disease, and some of these had slight blurring of the disc; but it is doubtful whether this disability could not be explained by general causes.”

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ABSTRACTS

I.—WRITING IN ORDINARY CHARACTERS FOR THE BLIND


The reviewer, who, it may be remembered, had the pleasure of translating into English the late Emil Javal’s “Entre Aveugles,” has been very greatly interested in this article by Cantonnet, in which is described an embossed writing, after the fashion of Braille, but in such characters that the writing may be read by eye as well as by touch without any previous knowledge of embossed writing. For blinded soldiers, who, for the most part, come from the less educated classes, and for their friends, this is an enormous advantage. It is true, the author says, that Braille has a number of advantages over this writing of his; it is universally known, it is briefer, it is quicker, it has been applied to stenography and to music, but, on the other hand, it cannot be read by everybody. The two procedures are not mutually exclusive; they are complementary to one another. “The blind person who knows Braille and wishes to study, or who corresponds with those who know Braille, will employ Braille. The less educated individual, or the man who does not know Braille, will use my method of writing.”

The main features of this method are extremely simple, although perhaps not so easy to describe without the author’s illustrations of the frame required and of the letters and numerals. Essentially, it amounts to this, that each capital letter of the ordinary alphabet can be represented by the use of a certain number of the nine points in a square of which each side is composed of three points. In illustration,
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if the reader of this abstract will make a nine-point square with his pencil and then rub out the three points at the bottom right hand corner of it, he will produce the letter F. In half-an-hour at the most he will in all probability have produced Cantonnet's alphabet, if he chooses to try. Punctuation signs seem to be slightly more empirical, but numerals are perfectly simple: one dot representing the figure 1, and the whole nine dots the figure 9, and so on.

The blind individual, then, with a special little piece of apparatus after the fashion of the Braille frame (in Braille the writing is six point, not nine point), prints a letter to his friend in representations of ordinary type, from left to right. If the friend is sighted, he can read the letter straight away from the depressed side; or, if found simpler, he can hold it before the glass and read it from the embossed side, left to right in each case. If he is blind, he must arrange in one way or the other to be able to get his fingers underneath and read the writing from the under (embossed) side by touch, left to right again. Braille, it may be recollected, has to be written from right to left in order to be read from left to right on the embossed side.

Bearing in mind the enormous advantage of easy reading by sight, those interested in work for blinded soldiers should study this extremely simple method from the original article.

Ernest Thomson.

II.—INJURIES OF THE EYE, ETC., IN WAR
(Third Notice.)


(3) Weekers, L. (Liége).—The lessons of the war with regard to sympathetic ophthalimia. (Les enseignements de la guerre au sujet de l’ophtalmie sympathique.) Arch. méd. belges, March, 1917.

(4) Lacroix, A. (Bordeaux).—Notes on the work of an Ophthalmic Clinic in the ambulances of the front line. (Notes sur le fonctionnement d’un service ophtalmologique dans les ambulances de l’avant.) Arch. d’Ophtal., March-April, 1917.

(5) de Lapersonne, F. (Paris).—Military reports. (Rapports militaires.) Arch. d’Ophtal., March-April, 1917.
Injuries to the Eye, etc., in War


(7) Leplat, Georges.—Note upon a case of ocular disturbances produced by an explosion at a distance. (Note sur un cas de troubles oculaires produits, à distance, par une explosion.) Arch. méd. belges, May, 1917.


(1) Terrien, as Chief of the Ophthalmic Centre of the Ninth Military Area, has dealt with a large number of cases of intraocular foreign bodies. While he advocates removal or attempted removal of the foreign body in the majority of cases, he is of opinion that in a certain proportion, especially when a moderate degree of sight is retained, it is inadvisable to operate. Such cases are those in which the eye has exhibited no signs of irritation, or, in other words, shows a marked tolerance of the penetrating particle. He publishes the notes of five soldiers, in each of whom the presence of a foreign body within the globe was proved by X-ray or ophthalmoscopic examination. In all these cases the wounded eye was free from pain, redness, or any other sign of reaction set up by the foreign body. In all of them the eye retained some sight, and in one, vision was practically normal. In one man the fellow eye was badly injured and nearly blind.

It is noteworthy that none of Terrien's cases remained under his observation for more than three months; hence the possibility of the onset of trouble after a long interval cannot be wholly excluded.

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(2) Dianoux enters a vigorous protest against enucleation of the eye so freely practised since the beginning of the war. A penetrating wound, treated scientifically, even if succeeded by ciliary reaction, he says, should be almost always followed by the cure and the conservation of the eye. If in spite of all the situation is menacing, optico-ciliary resection or "enervation" should be adopted. Evisceration, too, is sensibly better than enucleation. Even a simple transverse incision into the eyeball with evacuation of the contents is to be preferred to enucleation, more especially if combined with the injection of vaseline or paraffin. In brief, Dianoux holds that when dealing with an ocular wound, the eye, even if devoid of sight, should be kept or if operation be imperative, that evisceration should be performed, and that enucleation should be reserved for cases where the eye is reduced to fragments.

S. S.
(3) The rarity of sympathetic ophthalmitis as a sequel of wounds of the eye sustained during the present war has been commented upon by more than one writer.

Weekers, among upwards of 800 eye injuries, has not met with a single case. He points, as others have done, to the figures of former wars, where the disease was common. He analyses the few cases of sympathetic ophthalmitis reported during the present war by Valude (Ann. d'Ocul., 1916, p. 89) and Birch-Hirschfeld (Klin. Monatsbl. f. Augenheilk., 1916, p. 257).

Weekers sets himself to discuss the following questions:—

What are the risks to the second eye of sympathetic disease?—Statistics in regard to this point show considerable divergence. For example, in wounds of the eye with penetration of foreign bodies, Ohleman found sympathetic ophthalmitis in 0·7 per cent.; Knies had 3 per cent. in wounds of the eye; and Hobby, 11·6 per cent. Similar differences exist as regards the frequency of the complication after surgical traumatisms. After removal of cataract, Eversbusch and Pennerl had 1·3 per cent. of sympathetic ophthalmitis; Agnew 2 per cent. or 3 per cent.; and Steffan no less than 21 per cent. The difference between the figures Weekers is inclined to trace to confusion between sympathetic irritation, on the one hand, and sympathetic inflammation, on the other. If typical cases of sympathetic inflammation alone were included, Weekers believes that the apparent frequency would be considerably reduced.

For purposes of prevention should we hasten to remove a wounded eye, already lost from a functional point of view?—There is nothing pressing about the matter, and we may in every case wait for a few days. Whenever the wound is such as to allow of the hope that the eyeball will keep its shape, Weekers believes that conservative means should be adopted. The condition of the wounded eye must be our guide. Should it remain painful and irritable for a month or six weeks after the injury, it must be sacrificed. We should not wait so long, indeed, if the globe appears to be on the way to atrophy or if exudative irido-cyclitis develops in the injured eye.

Which should be preferred, enucleation or exenteration?—During the last eighteen months Weekers has not performed a single enucleation. He has resected the cornea and a narrow band of the neighbouring sclerotic, emptied the contents of the eyeball, and curetted the sclera with care. He claims that exenteration gives as much security against sympathetic disease as does enucleation, while the aesthetic results are much superior.

Weekers does not share Meller's view, namely, that sympathetic ophthalmitis is due to the action of a microbe, which may (under certain circumstances still unknown) develop in the blood. Given a wound of the eye, this agent proliferates in the wounded tissues,
INJURIES TO THE EYE, etc., IN WAR

its virulence augments, and it passes anew into the blood, whereby it reaches the other eye, where it sets up sympathetic inflammation. Dimmer enquires whether the extreme rarity of sympathetic ophthalmitis in war wounds is not a question of terrain. Can it not be explained by the good general health of soldiers, who are a selected body of men?

The present-day rarity of sympathetic ophthalmitis is to be explained, in Weekers’ view, by the vulgarization, so to speak, of asepsis and antisepsis, which tells all along the line—in first aid, during treatment, and in operations upon the eye.

S. S.

(4) These notes contain a description of the routine work of an ophthalmic surgeon attached to an ambulance in or near the firing line.

J. B. LAWFORD.

(5) Three reports addressed to the Under Secretary of State for Public Health, are published in the Archives under the following titles:—

I. Anti-typhoid vaccine and ocular lesions.

II. A scheme for the organization of ophthalmic clinics in the army zone.

III. A note on the simultaneous enucleation of both eyes,

I. This report is in reply to an enquiry by a Medical Commission which desired to know if anti-typhoid inoculation could, directly or indirectly, induce ocular lesions which would result in blindness.

de Lapersonne states that although a certain number of cases of ocular lesions after inoculation have been noted, only a small proportion of the observations are worthy of credence. Among the cases which have been carefully observed it is essential to distinguish between those in which the vaccine may be held responsible, and those in which another and coincident cause exists. In the latter category are to be placed cases of septic infections (staphylo-, strepto-, and pneumo-coccal) following inoculation and due to faulty methods of preparation or administration of the vaccine, or to latent infection in the patient. The writer cites an instance of such infection in a soldier in whom multiple boils, broncho-pneumonia, and metastatic purulent irido-cyclitis occurred as a sequel to anti-typhoid inoculation. Cases of this nature are extremely rare; they should, nevertheless, be made public in order to emphasize the necessity for the strictest attention to asepsis, and a thorough clinical examination of the patient before inoculation.

de Lapersonne holds that in some cases the vaccine, apart from any extraneous source of mischief, may be responsible for ocular lesions, e.g., irido-cyclitis. He suggests, as not impossible, that in an eye which has previously been diseased, the severe reaction of anti-
typhoid inoculation may excite a recurrent attack of inflammation, and that this is especially likely to occur in a tissue so richly vascular as the uveal tract.

He summarizes his opinion as follows:

1. Infections resulting from faulty technique, often serious in character, are not due to the direct action of the vaccine.
2. Anti-typhoid vaccine has given rise, directly, to a very small number of ocular lesions, notably to corneal herpes (ascribed to toxic neuritis of the trigeminal), and to irido-cyclitis in patients with constitutional taint. Glaucoma, secondary to irido-cyclitis, may develop during the reaction which follows vaccination.
3. No instances of definite lesions of the optic nerves or tracts or of oculo-motor paralysis have been recorded.
4. Primary acute glaucoma may develop during the vaccination reaction.
5. No lesion should be ascribed to inoculation which does not arise during or very shortly after the series of injections, and while the thermometer affords evidence of a severe reaction.
6. An ophthalmoscopic, in addition to a medical, examination, should be made before inoculation. It is advisable to submit to inoculation, syphilitic, tuberculous, or arthritic subjects over 40 years of age who have had lesions of the uveal tract.

II. This report deals with the arrangements, personnel, and duties and equipment of ophthalmic clinics attached to hospitals and ambulances in the different zones of the army in the field.

III. This report contains an emphatic condemnation, first, of the too hasty enucleation of wounded eyes in the ambulances or hospitals near the firing line, and, secondly, of the simultaneous removal of both eyes, which the writer holds is rarely, if ever, justifiable as an immediate procedure in warfare. In his opinion, it is very desirable that instructions should be given to surgeons at the front on the following lines:

1. The simultaneous enucleation of both eyes, hastily performed, is condemned by all ophthalmic surgeons, as useless and even dangerous. It has a deplorable effect upon the morale of the wounded at a time when they have need of all their courage.
2. It is indispensable that an oculist should be attached to all surgical ambulance and clearing stations. He should undertake the dressing of all ocular injuries, suturing of cutaneous and conjunctival wounds, while avoiding all mutilating operations, especially enucleation; the latter is seldom necessary immediately after a wound.
3. The subjects of bilateral orbito-ocular wounds should be at once evacuated to the ophthalmic centres at the base.
4. In a case in which the gravity of the patient's condition forbids immediate removal, he should be examined by two oculists;
if their decision is in favour of excision of both eyes this should be done and a report of the case sent to the medical director.

J. B. LAWFORD.

(6) Burger points out that this syndrome can be encountered but rarely in military surgery since the injury able to produce it usually proves fatal from haemorrhage. It should, however, be borne in mind when dealing with injuries in the neck. He describes a case which came under his observation. The injury in this case was caused by a fragment of glass. The wound extended on the left side from the angle of the jaw to the mastoid and had detached the sterno-mastoid muscle from its superior insertion. The bifurcation of the carotid was exposed in the lower part of the wound, and it was necessary to tie branches of the thyro-linguo-facial vein, of the thyroid, lingual, facial and occipital arteries, and also of the external jugular. The hypoglossal nerve was exposed and its descending branch partly divided. Neither the pneumogastric nor the sympathetic nerve was seen. On the following morning the Claude Bernard-Horner syndrome was well established: slight ptosis, enophthalmos, miosis with preservation of pupillary reflexes. The intra-ocular pressure was equal in the two eyes. Lacrimal secretion was excessive. Visual acuity was unaffected, but there was diplopia on looking up and to the right; no apparent strabismus. Three weeks later a full examination of the nervous system was made. The left eye then showed slight ptosis, enophthalmos, and miosis with preservation of reflexes. Lacrimal hypersecretion and diplopia had disappeared. There were no vasomotor or sweat disturbances. Accommodation and convergence were normal. Instillations of adrenalin followed by cocain produced no effect on the pupil even after several hours. On the following day cocain was first used and adrenalin later. This had the effect of slowly dilating the pupil, but only to a moderate extent. In addition to the ocular symptoms there was paralysis of the left vocal cord, sterno-mastoid and trapezius and some of the facial muscles.

In the body of the paper Burger gives a brief account of the current views of the anatomy and physiology of the sympathetic in the neck. He explains the transient diplopia from which his patient suffered as due to the altered mechanical conditions under which the extrinsic ocular muscles had to work, owing to the enophthalmos caused by paralysis of smooth muscle fibre in the orbit. A diagram is given to explain this hypothesis.

He sums up as follows:—"The cervical sympathetic tract as it leaves the spine is composed of two series of neurones. The first, part of the medullary centre (cilio-spinal centre of Budge), reaches the superior cervical ganglion by the three or even seven first pairs of dorsal nerves, by their rami communicantes and the cervico-thoracic sympathetic cord. The second series leaves the superior cervical ganglion to reach the eye."
The syndrome of paralysis of that sympathetic tract is composed of:—1. Motor phenomena, ptosis, enophthalmos, miosis with preservation of reflexes. 2. Vaso-motor and sweat phenomena. Finally, hypotony of the globe and occasionally facial hemiatrophy. This syndrome is nearly always dissociated. We believe that this can only be produced as a result of a partial lesion of the fibres. At the level of the cord where all the fibres are united a dissociation can only take place as a result of a slight lesion, and possibly of the particular susceptibility of certain elements.

"The action of cocaine and adrenalin is of great importance in characterising the iris disturbances that are seen in sympathetic lesions, and possibly also in the determination of which of the two neurones is affected. Experiments on animals seem to prove that adrenalin shows whether the lesion is above or below the ganglion."

E. E. H.

(7) Leplat’s patient was injured by an explosion from which the man was separated by a distance of 1 m. to 1.5 m. The lesions affected the eye which at the moment was directed towards the mortar. They took the form of blood in the anterior chamber, a zone of ciliary injection, reduced sight, and a pupil that dilated unequally when the eye was under the influence of atropin. All these had disappeared in sixteen days. The author has since observed the symptom-complex in three cases of contusion of the eye by a football.

S. S.

(8) In this communication to the Société d’Ophtalmologie de Paris, Terrien deals expansively with the various surgical measures advised or adopted in endeavours to obtain a sufficiently prominent and movable stump on which an artificial eye may be worn. He discusses the subject under four headings: (a) Natural stumps; under which term are included shrunken eyeballs, and remnants of the eyeball left after amputation of the anterior segment or exenteration. In his judgment, the insertion of glass globes, sponge, paraffin, etc., in the empty scleral envelope should be abandoned as only temporarily useful. Sooner or later the foreign material is expelled. Moreover, these methods are not wholly devoid of the risk of sympathetic ophthalmitis. (b) Anophthalmic stumps, including all procedures associated with, or undertaken subsequently to, enucleation. Such are the implantation in Tenon’s capsule of inorganic substances, of portions of living tissue, e.g., rabbits’ eyes, skin, cartilage, and as accessory means the adaptations to the artificial eye of indiarubber globes. (c) Artificial stumps, the adaptation of small moulds of the conjunctival cavity made of ebonite with an indiarubber envelope, or of paraffin, or of the soft rubber employed by dentists for taking impressions of teeth. (d) Contraction or destruction of the conjunctival culs-de-sac.
The author holds the opinion strongly that in war injuries the wounded eyes should seldom be removed by surgeons at the front. The patients should be sent to the base hospitals where there is time and opportunity to select that method of operating which promises to conceal resulting deformity to the greatest degree possible.

The author's conclusions are set forth as follows:—1. The stumps which give the best results are "natural stumps" (atrophic, painless globes, posterior segments of globes, scleral envelopes left after exenteration). Attempts should be made to obtain such stumps by conservative treatment, or by the various procedures for removal of the anterior segment of the eyeball, or by exenteration of the globe. By none of these methods can the risk of sympathetic ophthalmitis be wholly excluded, and they cannot therefore be adopted systematically. 2. Enucleation, when necessary, should always be performed with care, and should be completed by the graft of a portion of costal cartilage, about 1.5 cm. in length, taken from the patient, into the capsule of Tenon. The tendon of each rectus muscle is sutured to the cartilage. The motility thus obtained is perfect, the sinking of the glass eye is obviated and the prothetic result is excellent. It is equal to that obtained by "natural stumps" and is less dangerous, all risk of sympathetic ophthalmitis being avoided. This appears to be the method of selection. 3. In default of a graft, and after simple enucleation, prothesis can be greatly improved by the employment of artificial stumps consisting of a hard ebonite shell in an envelope of soft indiarubber, which moulds itself to the bottom of the conjunctival sac, or by the use temporarily of moulds of soft wax introduced behind the artificial eye. This is an excellent method of remedying the unsightly sinking of the glass eye, and at the same time giving it a certain degree of mobility. It causes no discomfort to the individual, and it is only surprising that such means of remedying a deformity were not introduced long ago. 4. If the culs-de-sac are contracted or irregular and will not hold an artificial eye, progressive dilatation by globes of increasing size is a simple and effective procedure. It is generally preferable to, and more successful than, any operative measures designed to restore a contracted conjunctival cavity.

J. B. Lawford.

III.—SENILE MARGINAL ATROPHY OF THE CORNEA (FUCHS)

After recalling his first description in 1901 of the anatomical changes in this corneal condition, and making a passing reference to earlier workers on the subject, Fuchs says that the greater number of cases of marginal atrophy clinically described since may be divided into two groups: young individuals in whom the changes are connected with mild inflammatory manifestations; old individuals in whom the furrow develops quite indolently, and is linked with the arcus senilis. It remains undecided whether the two groups belong to one and the same category or represent two different diseases.

He returns to the subject because he has had occasion to examine anatomically an eye which, in his opinion, shows the commencement of the disease.

The following are his former findings:—

1. Bowman's membrane ceases at some distance from the central border of the furrow.
2. The central wall of the furrow is steep, the peripheral gradually sloping.
3. The bottom of the furrow is made up of corneal layers still maintained. Superimposed on them lies loose connective tissue rich in blood-vessels and cells, which replaces the loss of substance caused by the disappearance of the anterior corneal lamellae only partially, so that a moat-like depression of the surface remains.
4. One part of the corneal lamellae disappears at the central border of the furrow, while another part frays up into fibres and blends with the connective tissue on the floor of the furrow, to become connected at the peripheral border mainly with the limbal connective tissue and only in the deepest layers with the superficial layers of the sclera.
5. Signs of inflammatory infiltration are absent.

Since the foregoing observations, there have been four anatomically examined cases published by others which confirm and complement them as follows.—According to Seefelder (1907 and 1910), the lamellae which disappear completely at the central border of the furrow, break up beforehand partially into homogeneous, strongly refractile bits, and within the lamellae—not only on the floor of the furrow, but also in the part of the cornea adjoining its central border—lie fine drops of fat. Rupprecht (1907) found Descemet's membrane absent to a considerable extent in his case. Coats's case (1911) showed, owing to new formation of layers, considerable thickening, and in parts fissures, of Descemet's membrane. Fuchs thinks that the changes in Descemet's membrane are not concerned in the formation of the furrow itself, but refer to the ectasia of the thinned floor of the furrow occurring at later stages of the disease, on account of which the membrane gets stretched, and either tears and disappears, or counters the stretching by thickening.
Senile Marginal Atrophy of the Cornea

The beginning of senile marginal atrophy, described here by Fuchs, was a fortuitous finding in an eye removed from the body of a man of 70 years, which was divided vertically and examined because of a slight downward ectopia of the pupil. Hence, the gutter-shaped depression, which was not marked enough to force itself upon one's attention, was not looked for, and the sections were not stained for fat. The cornea had an arcus senilis at both upper and lower periphery.

The eye was hardened in Muller-formol, embedded in celloidin, and the sections were stained with haematoxylin-eosin and with van Gieson.

Microscopically, the whole surface of the cornea was found bereft of epithelium (post-mortem change), thus leaving us in the dark as to its disposition and condition in and about the furrow, which was situated at the upper border of the cornea (see Figure). The furrow was bounded centrally by the edge of Bowman's membrane and peripherally by the edge of the limbus.

In reality, Bowman's membrane did not terminate at the central margin of the furrow, but split into about four lamellae. Similarly, the corneal lamellae at the margin of the furrow, at first more markedly streaked, split up further on into thinner layers. Complete disappearance of the lamellae at the periphery of the cornea was not seen. The thin lamellae arising from the corneal lamellae were in no way distinguishable from those arising from Bowman's membrane, among which they lay.

Other lamellae, which in cross-section appeared like fibres, and stretched about 0.3 mm. further out beyond the furrow of the cornea, and here and there enclosed a nucleus, covered those proceeding from Bowman's membrane. This layer was about half as thick as Bowman's membrane.

All the lamellae described took a wavy course in the region of the furrow. Because of the spaces left between lamellae, Fuchs surmises
that this change was due to hardening, and that in life they lay fairly flat on one another. Most of them passed over to the connective tissue of the limbus, only the deepest blending with the superficial layers of the sclera. The transition was quite gradual, and without sharp demarcation.

The loosened part was thus interposed between sclera and cornea, but, as became evident when the unaltered corneal lamellae lying immediately below were taken into consideration, belonged to the cornea itself. It measured in breadth as well as in depth, 0.14 mm., and hence constituted about a sixth of the thickness of the cornea. In this region the corneal lamellae were stained less red than in the region of normal cornea.

The increase of nuclei constituted a further change which made itself evident in the immediate neighbourhood where the nuclei of the fixed cells of the cornea were larger and more succulent than in the rest of the cornea. In the fibrillated area the nuclei were even more numerous. Fuchs feels sure that these are by no means the nuclei of leucocytes, but only specially large and more rounded nuclei after the type of those of the fixed cells of the cornea, which have obviously multiplied in the diseased part. Cells which correspond to inflammatory infiltration, connective tissue cells, and vessels were absent.

At the lower corneal margin the only change seen was the splitting of Bowman’s membrane into a number of lamellae, just for a short length prior to uniting again to form the terminal part. The lamellae of the substantia propria were unaltered. As at the upper corneal margin, here also one found a stratum composed of fine lamellae superimposed on Bowman’s membrane.

Although it cannot be positively proved, yet because of the correspondence in kind of the changes in this case with those noted clinically and anatomically in others, Fuchs feels justified in looking upon it as an instance of commencing marginal atrophy of the cornea, and draws the following inferences as to how the disease arises:

The change begins with the splitting of Bowman’s membrane at, or near, the periphery. Then the immediately subjacent corneal lamellae undergo a similar change and in this manner the disease progresses deeper and deeper, attacking each succeeding layer at the same spot, thus producing the steep, sharp central border. The fibrillation is to be explained by assuming that the cement binding the corneal fibres loosens, not in such a way as to break up the lamellae into individual fibres, but so as to divide them into finer lamellae. A further change consists in the destruction of the corneal substance. It has been seen that in advanced cases the corneal lamellae are more or less absent in the region of the furrow. In the present case there is no such absence, and because of the
diminished volume of the cornea, rather than an increased volume as is to be expected where there is a mere splitting into more layers, and because desiccation is here out of the question. With the splitting the corneal fibres must undergo atrophy, and, for aught one knows, it is probable that individual thin lamellae gradually disappear on that account.

The dissolution of the cement between fibrils of the individual fibrils themselves and in advanced cases of whole lamellae, must be regarded as the result of metabolic changes. As inflammatory manifestations are altogether wanting, the disease must be looked upon as a degenerative process like the resorption of bone in old age. That in old age the periphery of the cornea is the arena of altered chemical processes is proved by the fat globules constituting the arcus senilis, which Seefelder has found even in senile marginal atrophy.

A further change noted in this case, viz., the multiplication of the nuclei of the fixed cells, Fuchs puts down to the altered chemical constitution of the tissue-fluid which renders it solvent to the cement and which exerts an irritation on the tissue, not of an inflammatory nature, so as to excite leucocytic infiltration, but of such a metabolic kind as to lead to increase of the fixed cells.

He thinks that the stratum overlying Bowman’s membrane, noted so far only in this case, is to be looked upon as a projection on the cornea of the conjunctiva, a condition often found in senile eyes.

Putting together the changes noted in this case and the more advanced ones, the following conclusions are arrived at as regards the manner of progress of the disease:

1. The change extends more and more into the depth, but does not spread breadthwise.

2. The thinner lamellae resulting from the splitting up of the corneal lamellae assume the appearance of connective tissue or are substituted by connective tissue, which, together with the vessels, grows into the diseased area from the limbus and even penetrates between corneal lamellae at the central border of the furrow. Along with the connective tissue and the vessels, cells other than those arising from the corneal fixed cells appear and a slight inflammatory infiltration may even occur, as noted by some observers.

3. Next the complete dissolution of the individual corneal lamellae at the central edge of the furrow occurs.

4. Finally, ectasia of the floor of the furrow and stretching of Descemet’s membrane with its consequences, such as tearing, complete dissolution, or, conversely, thickening through new formation of layers.

D. V. GIRI.
IV.—EXPERIMENTAL TRYPANOSOMIASIS OF THE EYE


de Schweinitz and Woods have undertaken an investigation of the ocular lesions which occur in the dog as the result of infection by the *trypanosomiasis equiperdum*. A dog was injected intraperitoneally with the blood of a white rabbit infected with these trypanosomes, and about ten days later, at a time when the trypanosomes had appeared in the circulating blood of the first dog, other dogs were infected by injecting intravenously 1 c.c. per kilo. of the seed dog's blood. Trypanosomes were usually found in the circulating blood of these animals in from one to two weeks, and they then developed anaemia and lost weight. They became listless and drowsy, and slept constantly. Localized swellings made their appearance in the joints, scrotum, and elsewhere, and trypanosomes were found in the fluid from those swellings, which were due to oedema. The infection became more and more virulent as successive dogs were inoculated. The time elapsing before eye symptoms made their appearance was variable—two to eighteen days after the trypanosomes had been found in the blood. In general, they were observed between the fifth and the twelfth days after the appearance of the trypanosomes in the blood. Two distinct types were noted: (1) simple clouding of the cornea; and (2) clouding of the cornea, accompanied by circumcorneal injection, photophobia, iritis, and hemorrhage and exudations into the anterior chamber. As the virulence of the trypanosome was enhanced by successive inoculations, the iritis became more constant and severe in character. In several dogs there was an appearance like *iris bombe*, followed by clouding of the cornea. In the aqueous of all affected eyes trypanosomes were found. The vitreous, as examined in an enucleated eye, contained actively motile trypanosomes. The authors surmise that the haemorrhages into the anterior chamber may be caused by a thrombosis or rupture of the arteries of the iris by the trypanosomes. It is to be noted that examination of the blood showed no differences between dogs with eye lesions and those without such lesions.

As regards the microscopical pathology, lesions were found in the cornea, iris, and retina of the dogs whose eyes were affected. The cornea had twice or thrice its normal thickness, and the changes were limited to the substantia propria, which was loose and distended, while polynuclear and mononuclear cells were found in these foci. There were capillaries of new formation extending from the sclera
into the cornea. When sections were stained with alum-iron-haematoxylin, as recommended by W. Yorke, trypanosomes could be recognized between the lamellae of the cornea and the characteristic nuclear arrangement demonstrated. Trypanosomes could also be seen when the Romanowsky (Wright) stain was used. Giemsa’s and Levaditi’s stains yielded somewhat unsatisfactory results. The stroma of the iris showed areas of distension, which contained granular material, fibrin, small round cells, and polymuclear cells, but no trypanosomes. There was a thin layer of exudation over the iris as well as around the ciliary processes. In the latter a few trypanosomes could be seen. In the retina small focal lesions were present, manifested by slight thickening, looseness of structure, indistinctness of the ganglion cells, fullness of the capillaries, and general mononuclear infiltration of the deeper layers. Over the surface of these foci was homogeneous material, including degenerate trypanosomes.

Arsenobenzol, the American equivalent of salvarsan, was injected in four dogs, and the eye lesions rapidly cleared up. But in one instance a single injection of the remedy did not prevent recurrence. “One injection of arsenobenzol,” as the authors remark, “was evidently not sufficient to effect a permanent cure.”

The experimental lesions in animals—keratitis, iritis, and retinitis—caused by the trypanosome, bear a striking similarity to those set up in man by the spirochaeta pallida. In those lesions, as in syphilis, there is an actual invasion of the tissues by the parasite. The lesions are manifestly due to (1) a general toxin carried either in the blood or the lymph; (2) a toxin elaborated in the eye by the trypanosomes; or (3) an invasion of the tissues of the eye by the trypanosomes. That the lesions are due to a general toxin can be definitely eliminated, “for the ocular lesions do not occur in an animal, no matter how heavily infected, independent of an actual invasion of the ocular humours by the parasites.” The authors believe that the other factors (2 and 3) play a part in the development of the eye lesions.

S. S.

V.—THE AETIOLOGY OF CATARACT


(1) According to the theory of Peters, the toxin of tetany acts injuriously on the eye, and may cause cataract, lamellar in childhood, nuclear in adults. Hesse and Phelps by careful examination found signs of tetany in 80 to 90 per cent. of cases of lamellar cataract, and consequently deny to rickets the important rôle it was believed to play in the aetiology of this affection.

Fischer and Triebenstein, at the instigation of Peters, took up the investigation of 68 cases of senile and presenile cataract, employing the electrical and other methods of the neurologists, to discover the evidences of tetany and of latent tetany. These evidences were found in 88.2 per cent. Other defects of ectodermal structures were often present, such as premature greyness of the hair and dryness of the skin. Twelve old people without lens opacities were investigated as controls. Ten of these were negative, one doubtful, and one positive, with regard to the signs of tetany. The authors conclude that there is an aetiological relationship between tetany and senile cataract similar to that established for the cataract of younger subjects.

A. J. BALLANTYNE.

(2) Löhlein describes a case of myotonia congenita atrophica with bilateral cataract, the subject being a female, 29 years of age. All other causes of early cataract seemed to be excluded by the investigation. In the same case there was a yellowish-red atrophy of the discs, with indistinctness of outline, and there were scotomata in the field of vision. These conditions have not been described previously in association with myotonia atrophica.

A. J. BALLANTYNE.

VI.—PATHOLOGICAL ANATOMY

(Second Notice)


(1) Watanabe gives an account of the following case.—The patient was a man, 18 years of age, with bilateral keratitis. Tubercle tests were negative. Wassermann was positive, but there were no other signs of syphilis. One of the eyes was removed, at the patient’s request, on account of the severe persistent inflammation. Microscopic investigation showed slight edema of the anterior layers of the cornea, and irregularities of the epithelium and Bowman’s membrane, moderate cellular infiltration of the middle layers, intense cellular infiltration and degenerative changes in the deeper layers. The degenerative changes took the form of a patch of non-staining fibro-cellular tissue, causing the cornea to be thickened in the direction of the anterior chamber. These changes were all most intense towards the central area of the cornea. A layer of new-formed connective tissue lay on the back of Descemet’s membrane, thickest at the periphery of the cornea. The cellular infiltration of the cornea extended peripherally into the deep layers of the sclera, and into the iris and ciliary body as far as the anterior part of the choroid.

A. J. Ballantyne.

(2) The patient who came under the notice of Arisawa was a man of 39 years of age, who suffered from a large abdominal tumour, possibly carcinoma of the pancreas. Four months after admission to hospital he experienced dimness of the right eye, and a large tumour was observed occupying the interior of the eye. Having refused enucleation, exophthalmos, glaucoma, pain, and inflammation came on in the course of a few months. The eye was removed, but death occurred twelve days later. There was no post-mortem examination. On examining the eyeball the tumour was found to be a large, partly cystic, mass, attached to the nerve head and retina. Microscopically it was typical carcinoma, partly of alveolar or tubular structure. The central parts were necrotic. There was no involvement of retinal pigment layer or of the choroid, but the uvea and the orbital tissues were secondarily inflamed. In the absence of a post-mortem examination it is impossible to be certain that the eye growth was secondary to that in the abdomen; but whether primary or secondary, it appears to be the first published case of true carcinoma confined to the retina. In the hitherto published cases of metastatic carcinoma of the eye, the choroid has been the seat of the metastasis, and the retina and optic nerve have been involved by extension.

A. J. Ballantyne.

(3) Höhne describes the case of a man, 56 years of age, who, a year
before observation, had received an injury to the right eye by a branch. There was a small gelatinous growth resting upon the limbus at the outer and lower sides. It was of light red colour, and a diagnosis of carcinoma of the cornea was made. It was dissected away and the base cauterized. Microscopically it showed several layers of epithelial cells on its surface. There were signs of active proliferation, and here and there the basement membrane was broken and cells were growing down into the substance of the growth. The diagnosis between early carcinoma and a growth of inflammatory origin is left in doubt, but after a lapse of two years there has been no recurrence.

A. J. BALLANTYNE.

VII.—THE OCULAR SIGNS OF DEATH


(1) A. Terson suggests the following test to distinguish between real and apparent death.—Apply a little dionin to the lower conjunctival cul-de-sac, and if the eye gets red and puffy, life is not extinct.

(2) This paper, presented by Terson to the Ophthalmological Society of Paris, at its third War Session, consists mainly of a résumé of what is known concerning ocular conditions which are, or may be, accepted as reliable evidence of death. Attention is drawn to the uncertainty which attaches to some of these signs and reactions, from the fact that they may be present in conditions closely simulating death, e.g., in patients attacked by cholera; and from the additional fact that certain signs, such as the reaction of the pupil to atropin and eserin, are known to persist for a period, varying from a few minutes to four hours or more, after death has been determined by other unequivocal evidence. This latter warning is the more necessary in that there is widespread belief encouraged by ill-informed writers, that fixity of the pupil, and loss of its action to mydriatics and miotics, are immediate evidence of death. The author remarks à propos of such statements, that "the pupil is mobile in many of the dead and immobile in many of the living."

Among the most trustworthy signs of death in the eye, as in other parts of the body, are those demonstrating a complete cessation of the bloodstream. Such include the application to the conjunctiva of a pair of fixation forceps, a cautery point (the glowing end of a wooden match suffices in the absence of other means), irritants, such
Tuberculosis of the Retinal Vessels

as dionin, copper sulphate, etc., or the subconjunctival injection of a solution of fluorescein. In the dead eye this remains as a patch of colour, but Terson has found that a very slow diffusion of the fluorescein does occur in some instances after death.

He is of opinion that the absence of a conjunctival reaction, two hours after presumed death, to mechanical or chemical irritants, may be considered as certain evidence of death.

J. B. Lawford.

VIII.—Tuberculosis of the Retinal Vessels


(2) Spencer, Frank R. (Boulder, Colo.).—Tuberculosis of the retinal vessels, with recurring haemorrhages and proliferating retinitis. Ann. of Ophthal., April, 1917.

(1) Jackson, within the last two years, has seen five cases presenting the ophthalmoscopic appearances of retinal tuberculosis; three of these, in which the diagnosis was fully supported by the results of tuberculin injection, were under regular observation for many months. The case now reported has been closely observed for over a year and a half. The ophthalmoscopic appearances are described at length, and are illustrated by two plates. The article concludes with the following words:—“The clinical picture that it seems important to fix in relation to retinal tuberculosis includes these features: vitreous opacities, recurring vitreous and retinal haemorrhages, enlargement of the retinal veins, the local lesions described as associated with large retinal vessels, white spots in the macula in some cases, optic neuritis, and retinitis proliferans as a terminal condition; the earlier lesions giving reactions to tuberculin injections, and their involution favoured by tuberculin therapy.”

R. H. Elliot.

(2) The first sign that the retinal vessels are invaded by tubercle (of which condition Spencer has met with three examples) is often disclosed by haemorrhage, and in young adults there may be no other evidence of tuberculosis. The patients, however, may give a general, a local, or even a focal reaction to tuberculin, human or bovine. The author is of opinion that we should consider haemorrhage into the vitreous just as characteristic of tuberculosis as haemorrhage from the lungs in the pulmonary form of the disease. Later in the course of the affection the retinal vessels show slight perivascular thickening or extensive fibrous changes about them. In other cases, fibrous bands form (“retinitis proliferans”). Much may be done by a suitable diet, an outdoor life, and by small
doses of tuberculin. It is important also to inject the tuberculin at long intervals.

S. S.

CORRESPONDENCE

FUNCTIONAL SPASM OF ACCOMMODATION

To the Editor of The British Journal of Ophthalmology

Sir,—In your issue of October Mr. Leslie Paton reports some interesting cases of functional spasm of accommodation.

In a paper on nystagmus, published in the British Medical Journal for November 1, 1913, I reported a case of spasm of accommodation associated with nystagmus. The patient was a young woman, a photographer’s re-toucher, whose eyes had been troublesome for a year, and who complained of diplopia. Subjective testing and retinoscopy showed that she had 4D. of myopia. Under atropin her static refraction was low hypermetropia, say, 1D. After she had been under observation for about two months she had an attack of diphtheria, which imposed on her nearly two months’ of forced quiescence. On examining her thereafter, I found that all her eye troubles had disappeared. This case and Mr. Paton’s cases, in my opinion, belong to the same category.

Yours, etc.,

J. A. Wilson.

The Lord Derby War Hospital,
Warrington.

Dear Sir,—Having seen the account of some cases of spasm of accommodation, published by Mr. Paton in the British Journal of Ophthalmology for October, I am sending you a few notes of a case which was in this Hospital under the care of Capt. J. Herbert Parsons.

Admitted Aug. 26, 1917 (a Newfoundlander). Medical card from France headed “Eyes gassed.” Not seen by me on admission.

Note on case sheet: “Slight conjunctivitis in both eyes; photophobia, V. under atropine, 6/60, myopia in L. eye.”


R.V. \( \frac{\frac{5}{36}}{\frac{-4.5}{-4.5}} \)

Sept. 18. When reading type letters disappear; appear again —? functional.