be chronologically accurate. There is a distinct and perhaps interesting possibility in cholesterin: it is an active substance in various ways. It is a constituent of gallstones, even up to 90 per cent. or more (*Extra Pharmacopoeia*, Vol. 1, p. 112, Eighth Ed.) Cholesterin is an unsaturated secondary alcohol having the molecular formula $C_{27}H_{46}O$. It occurs in the organism both in the "free" *i.e.*, alcoholic, condition, and as esters of the fatty acids. We are not prepared to state whether or not this active substance exists in any special form in fish gall, but the investigation may appropriately be left to the chemists, one might say to the biochemists.

One more remark and this disquisition is finished. What other fish than a salmon could this have been which with " vaulting ambition which o'erleaps itself " falls on the rocks at the side of the leap and is captured by the hands of a young man camped on a rugged portion of the bank of the Tigris? A very human story this. Only the essentials of one part of it have been here referred to.

IODINE IN THE TREATMENT OF TRACHOMA

BY

J. NEUMANN

FROM THE OPHTHALMIC CLINIC OF THE UNIVERSITY OF WARSAW.
DIRECTOR: W. MELANOWSKI

THE cure of trachoma is a task which frequently affords serious difficulties. In cases of advanced trachoma, especially when complicated by pannus, ulcers and infiltrates of the cornea, our ordinary methods of treatment often fail. In such cases copper sulphate does not always relieve, it may aggravate the condition; and the long continued use of silver nitrate, though most useful as long as muco-purulent secretion is excessive, usually leads to argyrosis. It is in such cases that I have found the application of iodine successful. I was led to try this drug in a desperate case of trachoma (Case I) and was so much impressed with the favourable result that I have given it a repeated trial in bad cases since, always with good results. This paper concerns 15 cases of trachoma treated with iodine.

Case I

A male clerk, aged 20 years, consulted me in June, 1926. His left eye had been " sore " since May, 1924; he had undergone treatment at the hands of several physicians and peritomy had

been twice performed on the left eye. Examination showed that the right eye was normal. In the left eye the conjunctiva of the tarsus and fornix was thickened and much scarred; the bulbar conjunctiva was hyperaemic, marked ciliary injection was present and the cornea was entirely covered with pannus, that in the upper part being fleshy. New vessels invaded the cornea on all sides, infiltrates of the size of a pin's head as well as ulcers, measuring 1 by 2 mm. were present in the cornea. The anterior chamber was deep; the pupil reacted badly to light, much photophobia was present and the vision was reduced to counting fingers at a range of 20 cm.

He was treated with atropine and massage with an ointment containing atropine, scopolamine and cocaine. When seen next day the pupil was dilated but the condition was not otherwise improved. This treatment was continued for four days without improvement and on June 14 I smeared the fornix with iodine. On June 16 the photophobia was rather less and the patient could open his eye with difficulty. Massage of the lids was repeated. On June 18 I smeared the upper fornix and the upper part of the tarsal conjunctiva with iodine, and by the 21st there was considerable improvement; the eye was paler, the ulcers were healing and the infiltration was less marked. Two days later the application of iodine was repeated and this caused pain lasting three hours, but by the 25th he could open his eye and felt well, the infiltrates were gone and the ulcers healing satisfactorily. On June 28 he had some pain in the eye with recrudescence of infiltration; the application of iodine was repeated. Photophobia persisted till July 2 but by July 5 the eye was white, the infiltrates gone. The iodine was repeated from July 5 to 12 and by the 15th the man was back at work. He could open the eye freely, the fornix and tarsal conjunctiva were smooth and heavily scarred and the pannus complete. The right eye was normal with full visual acuity and the vision in the affected eye had improved to being able to count fingers at 2.5 metres.

Case II

A labourer (female), aged 30 years, consulted me in June, 1926, with well-marked trachoma of both eyes; this had existed for several years and a diagnosis of trachoma (stages 2 and 3) had been made in the previous year, with pannus, more marked in the left eye. On examination the conjunctiva of the right eye showed papillary hypertrophy and scarring, there were some recent granules in the fornix, but the cornea was clear and vision normal. The left eye was kept closed, lacrimation and hyperaemia were marked, the state of the conjunctiva was similar to, but worse than,

that of the right side, the upper part of the cornea was covered with pannus and a central ulcer 2 by 3 mm. in size was present; the base and edges of the ulcer were much infiltrated. Vision was reduced to finger counting at 3 metres. For three weeks I treated her with atropine and massage with very little improvement. On June 24 I applied iodine to the fornix and upper tarsal conjunctiva, the right eye being treated with copper sulphate. Next day the eye was quieter and the ulcer better; the iodine was repeated. On July 1 the eye was much better and the iodine was repeated and by July 5 the conjunctiva was smooth, the photophobia had disappeared and the ulcer was healing. Iodine was repeated. The patient went back to work on July 15, with smooth, scarred conjunctivae, pannus in the left eye and a facet at the site of the ulcer. Vision had improved to 5/36.

Case III

A labourer (female), aged 28 years, consulted me on June 7, 1926, complaining of sore eyes. She had had trachoma for three years with aggravation of symptoms for eight weeks. She could not open her eyes and had to be led about. On examination, marked blepharospasm was present; the conjunctival surface was uneven with papillary hypertrophy and fresh granules. The eyes were much congested, the whole cornea being covered with pannus, while numerous infiltrates and ulcers were present. She was treated with atropine and massage for two weeks without much improvement. On June 24 I smeared the upper fornix and tarsal conjunctiva of the right eye with iodine. Massage of the left eye was continued. By June 29 the right eye was much less photophobic; on this date I applied the iodine to the left eye and massage to the right. By July 15 a considerable improvement had taken place; the woman could open her eyes and could find her way about without assistance. The eyes were white, the conjunctiva of the tarsi smooth except at the outer and inner angles of the upper lid, the corneal infiltrates and ulcers were cured and the pannus thinner than on her first visit. Vision with the right eye was finger-counting at a range of 1 metre.

Case IV

A male clerk, aged 59 years, with a history of sore eyes of several years duration consulted me on June 16, 1926. I found papillary hypertrophy of the upper fornices of each eye; the tarsal conjunctiva being scarred but smooth. Vision, 5/10. I massaged the conjunctivae on the two days succeeding his visit, and on June 19 I treated the right eye with iodine. During the next week he was

given massage and the iodine treatment on alternate days and by June 28 the fornices were much smoother. During the next three weeks the conjunctivae were massaged three to four times a week with marked improvement.

Case V

A male porter, aged 18 years, came to the Ophthalmic Clinic of the University of Warsaw on July 20, 1926, complaining of defective sight in the right eye for the past month. On examination, photophobia was present with papillary hypertrophy and scarring of the right conjunctiva; the cornea was covered with pannus, the eye was very congested and infiltrations were present. Vision was reduced to counting fingers at a distance of 10 cm. in the right eye. Vision in the left eye was 1/20, myopic astigmatism being present. The iodine treatment was started at once. Improvement was immediate and by July 24 the right eye was white, the infiltrations having cleared up; iodine was continued in the right eye; the left, also trachomatous, was treated with copper sulphate. By July 30 the vision in the right eye had improved to finger counting at 2 metres. The man then ceased attending. He returned with a relapse on September 11. During the next ten days he was treated with iodine and massage at the end of which time the eye was white, the conjunctiva smooth but hyperaemic, the corneal infiltrates had cleared and vision had improved to finger counting at 3 metres. During the following three months he was treated with massage and tannic acid; there was no further infiltration of the cornea.

There being a strong family resemblance among all cases of long standing trachoma it is permissible to consider cases 6 to 12 together. Each was a case of long standing, the youngest patient being aged 38 years and the oldest 57 years.

All attended the clinic of the University of Warsaw. All presented evident signs of trachoma and in most cases the corneae were covered with pannus and either infiltrated or ulcerated. Treatment with iodine was used in each case with considerable improvement. Cases 12, 13 and 14 occurred in young patients and the last of my cases reported here was a long standing case of trachoma in a woman aged 52 years; all did well.

During the past four and a half years I have treated 58 cases of trachoma with iodine; all these cases have been complicated with pannus and corneal ulcers or infiltrates. It is not necessary to describe all these cases, but I have been struck with the improvement which has followed the use of this treatment. In all cases

infiltrates in the cornea cleared with surprising rapidity and ulcers healed; the infiltrates often cleared in 24 hours. Iodine has also a favourable influence in reducing the papillary hypertrophy of the conjunctiva and purulent secretion is markedly lessened. I have also used iodine in uncomplicated cases of trachoma with gross papillary hypertrophy, in 100 cases during the past four years always with a good result.

In cases of trachoma I usually smear the conjunctiva with iodine once a week, or once a fortnight, applying in the meantime copper sulphate stick or massage of the conjunctiva by the method of Likiernik; *i.e.*, massage with a glass rod with globular end measuring 8 to 10 mm. in diameter. The safety of iodine application is proved by the fact that I have had no cases of artificial injury of the cornea during the treatment.

The technique of smearing the conjunctiva with iodine is simple. I wind a wisp of cotton-wool round the end of a glass rod and dip it in 10 per cent. tincture of iodine; I take on the end of another glass rod plenty of xeroform or some other unirritating ointment. After having carefully everted the eyelids and protected the cornea, I smear the iodine over the tarsal conjunctiva and that of the fornix until the cotton-wool holding the iodine is dry; if necessary I also smear the lower fornix. I then remove excess of iodine with dry cotton-wool, smear the whole area treated with the previously prepared ointment and replace the lids.

Occasionally patients complain of the after-effects; in some cases burning feeling is experienced and at times, pain, which may be severe. Should this occur cocaine may be instilled. In some cases patients complained of pain lasting several hours; other cases spoke only of a burning sensation, and in one case the patient went back to work immediately after the treatment and worked for the rest of the day. The immediate result of smearing the conjunctiva with iodine is to produce an inflammatory reaction; this usually reaches its climax on the next day. The secretion from the eye is now plentiful enough; the conjunctiva is whitish-grey. Two days later the necrotic conjunctival epithelium has been cast off and is quickly regenerated. The treatment may be repeated when the inflammatory reaction is over, usually by the fourth day, but no hard and fast rules for this can be laid down, each case must be treated on its individual merits. To summarize: My indications for the use of iodine are:—1. Trachomatous complications on the cornea. 2. Papillary hypertrophy, without corneal complications. 3. Purulent secretion from the conjunctiva in cases of trachoma which is not controlled by the use of silver nitrate. 4. Purulent secretion when argyrosis is already present. In corneal complications the iodine acts by destroying the papillary hypertrophy. Secretion is locked up in the spaces between the papillae and

conditions are then excellent for the development of micro-organisms. The destruction of the hypertrophied papillae removes the mechanical and toxic causes of corneal irritation. Iodine is an excellent means of disinfecting the skin prior to surgical operations; and bacteriological investigations have shown that iodine kills the micro-organisms on the skin and although those in the hair follicles and ducts of the sweat glands are not killed outright, they are imprisoned by the operation of the iodine which causes a slight spasm effect whereby the skin becomes as if tanned and the orifices of the follicles and ducts are thereby closed. The same effects doubtless take place in the conjunctiva; thus iodine destroys the hypertrophy of the papillae, kills the surface organisms and imprisons those which are in the depth of the membrane. I do not claim that iodine is a specific for trachoma, but if we are concerned with the rapid removal of ulceration and corneal infiltration together with hypertrophy of the lid papillae, then iodine has shown itself to be a good medicament. I have found the massage of the surface of the lid by the method of Likiernik to be useful in cases of complicated trachoma, while in uncomplicated cases I have used the copper stick and also chaulmoogra oil with good results. The combination of massage with the iodine treatment usually gives very good results.

I have found but few instances in the literature of the use of iodine in trachoma. The first to introduce this method was Nieznamoff. He used iodine dissolved in white vaseline oil. He used a 0.5 to 1 per cent. solution in complicated cases; and he treated dry cases of trachoma without corneal complications with stronger solutions; *i.e.*, 2 to 5 per cent. The weak solutions produced only a slight burning sensation, but those above 1.5 per cent. caused great irritation, which, however, quickly diminished. This irritation was largely the result of the ether added to the solution in order to keep it in a concentration above 1.5 per cent. Neither weak nor strong solutions had any deleterious effect upon the cornea. In 1897, Nieznamoff published a second paper, recommending a 2 to 3 per cent. solution of iodine. Simi, in 1896, applied iodine in white vaseline as a collyrium. One case bore it well and a good result was obtained, but in two cases severe pain resulted and this surgeon therefore abandoned this method of treatment. Eversbusch, in 1896, recommended the application of iodine in cases of trachomatous pannus. He smeared it with a thin brush upon the ocular conjunctiva at a distance of 2 to 3 mm. from the limbus over the sites of the large vessels running to the pannus. Aristoff, in 1898, and Mochulsky, in the same year obtained fair results in severe cases of trachoma by using iodine in 1 to 3 per cent. solution in white vaseline oil. Polansky, on the other hand, had bad results, the condition in his

hands being even aggravated. Schiele, in 1901, used iodic acid, glicin and iodoglicin and considered iodic acid to be a useful method of treatment. Simi, in the same year, reported good results with iodic acid. Morgano, in 1902, used iodvasogen and obtained good results, the pannus being cleared up. Maretti, in 1924, after having expressed the granules, smeared the bleeding spots with 10 per cent. iodine and also touched corneal ulcers with a like strength, obtaining good results. Theodor Ballaban, in the same year, scraped off the pannus with a sharp spoon and smeared the denuded area with iodine. He repeated the application of iodine every 2 to 5 days and obtained rapid clearing of the pannus.

BIBLIOGRAPHY

- Aristoff.—*Voyenno. Meditzinskij JI.*, Vol. LXXVI, March, 1898, Russian.
 Ballaban, T.—*Klinika oczna*, p. 126, 1924, Polish.
 Everbusch.—*Klin. Monats. f. Augenheilk.*, p. 1, 1896.
 Likiernik.—*Czasopismo lekarskie*, No. 1, 1904, Polish.
 Ibid.—*Wochenschr. f. Therapie u. Hygiene des Auges.*, No. 3, October, 1917.
 Ibid.—*Gazeta Lekarska*, No. 48, 1917, Polish.
 Mochulsky.—*Voyenno. Meditzinskij JI.*, Vol. LXXVI, March, 1898, Russian.
 Moretti.—*Giornale di Ocul.*, Vol. V, p. 15, 1924.
 Morgano.—*Annali di Ottal. e Lavori della Clinica Oculistica di Naples*, Vol. XXXI, p. 77, 1902.
 Nieznamoff.—*Vrach*, Vol. XVI, 1895, Russian.
 Ibid.—*Ibid.*, Vol. XVIII, 1895, Russian.
 Ibid.—*Centralbl. f. pract. Augenheilk.*, August, 1897.
 Polansky.—*Voyenno. Meditzinskij JI.*, March, 1898, Russian.
 Ibid.—*Ibid.*, Vol. LXXVII, 1901, Russian.
 Schiele.—*Centralbl. f. pract. Augenheilk.*, April, 1901.
 Simi.—*Boll. d'Ocul.*, Vol. XVIII, 1896.
 Ibid.—*Ibid.*, No. 16, 1901.

OXFORD OPHTHALMOLOGICAL CONGRESS

XXIst ANNUAL MEETING

THE XXIst Annual Congress was held at Oxford on July 9, 10, and 11. The Deputy Master inaugurating the first meeting alluded to the unavoidable absence of the Master through illness and suggested that the Congress should send a telegram expressing its regrets at the absence of Mr. Cridland. Mr. PATON in opening the symposium on the diagnosis of intracranial new growths reminded the members that the subject was a weighty one, and that it occupied no less than nine volumes of Willbrand and Saenger. In his opinion, papilloedema was the most valuable sign but it was essential that the observer should be well trained,