TABLE II.—Showing Results of Experiments on the Tongue.

	Psychi- cal.	Taste.	Faradic Pain.	Aes- thesio- meter.	Thermal Discrimi- nation.
1. Atropine 2 per cent. in absolute alcohol	0 (throat dry)	0	0	—	—
2. Aconitine 0.5 per cent. in absolute alcohol	tingling 3-5 hours	0	doubtful, q.v.	—	0
3. Menthol, saturated solution in spirit	q.v.	abolish'd	0	0	0
4. Morphine tartrate, 5 per cent. aqueous	0	0	0	0	0
5. Cocaine hydrochloride, 10 per cent. in absolute alcohol	numb	abolish'd	some anaesthesia (8.2-7.2)	some anaesthesia	reduced.
6. Aq. chloroformi, B.P.	sweet	—	0	0	—

0 = No effect.

SUMMARY.

Apart from the theoretical conclusions mentioned in speaking of the effects of menthol, we believe that we have been able to obtain definite evidence that none of the drugs at present in use for painting on or rubbing into the skin have any power to relieve pain. The use of belladonna, opium, aconite, menthol, and cocaine for bruises, thrombosis, inflammation, or neuralgia should therefore be discontinued and replaced by more efficacious means, such as rest, massage, and counter-irritation.

The accompanying tables give details of the results of each experiment, repeatedly confirmed by each of two observers. For explanation of terms see the section on above methods.

INFANTILE GLAUCOMA OR BUPHTHALMIA.

BY

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THERE is nothing more painful to a medical man than to be called upon to treat a disease which is considered to be incurable, and which he knows from experience will steadily progress, with dire results to the patient. Such a condition is buphtalmia, the ox-eye of childhood. It is of sufficiently frequent occurrence to ensure the interest of the profession in any means which may alleviate its disastrous course. I have been tempted, on this account, to record a case which has been under my care for nearly two years, and which presents an unusually satisfactory result.

The clinical picture of the disease is sufficiently well known, but a recapitulation of its symptoms may not be out of place. The onset dates from birth, or even before; both eyes are, as a rule, affected, the first signs generally noticed being the reluctance of the child to face the light, and the presence of a certain amount of lachrymation. Soon the eyes become enlarged and prominent, the corneae are increased in size, and the vision obviously impaired. The disease progresses slowly but surely, and ultimately the child's condition is truly pitiful. The eyeballs bulge hideously, the sight is completely destroyed, and frequently one or both eyes have to be excised owing to corneal ulceration and its attendant pain. The symptoms are entirely due to a persistently high intraocular tension, and there is no doubt that the complaint is an infantile form of glaucoma similar in nearly all respects to that occurring in the adult. It differs in its pathology and in the fact that, the coats of the child's eye being distensible, they give way readily under the increased tension, and consequently the effects of that pressure on the retina and optic nerve do not appear so quickly as in the adult eye with its inelastic sclera.

The eye commences to give way at the junction of the cornea and sclera, the so-called intercalary region, which

is one of the weak parts of the envelope. The consequence is that the cornea is flattened and stretched, and also thinned, especially at its periphery. Opacities frequently occur in it as a result of malnutrition. The sclera generally becomes distended, but, according to many observers, shows no thinning. The eyeball is elongated and oval in shape, and is consequently prominent. The anterior chamber is deeper than normal, and the iris may become atrophic and tremulous, owing to lack of proper support by the lens. The latter is, as a rule, smaller than normal (Fuchs), and is displaced backwards, owing to the stretching of the suspensory ligament. The lens remains transparent for a considerable period, but ultimately opacities make their appearance in its substance as a result of failing nutrition. The pupil is larger than normal, and does not readily react to light. The media are clear, and the retina and choroid show no visible signs of degeneration until the later stages. The acuity of vision gradually deteriorates, the field of vision being contracted in a manner similar to the contraction in adult glaucoma. The optic disc eventually presents marked cupping, and the optic nerve undergoes gradual atrophy, until complete blindness results.

Although the eye is so considerably elongated, it is rare to find it highly myopic; this is due to the flattening of the cornea and the backward displacement of the lens. Astigmatism, however, is frequently present.

The pathology of the condition is of great interest. Leber proved experimentally that defective filtration of the intraocular fluid was the cause of the trouble, showing that in a buphtalmic eye the rate of excretion was considerably below normal. Treacher Collins held the view that the base of the iris was imperfectly separated from the periphery of the cornea, owing to arrested development, so causing blockage to the exit of fluid from the filtration angle into the canal of Schlemm. Later, he pointed out that in the embryo the ligamentum pectinatum iridis is in two layers as in animals; the one layer, being in apposition to the sclera, forms the inner wall of Schlemm's canal; the other layer, the inner, is loose and sponge-like. The latter persists until the sixth month of fetal life, after which it should normally disappear. The abnormal persistence of this prenatal condition of the inner layer is in his opinion the cause of buphtalmia. In support of this theory strands of tissue have been found stretching between the base of the iris and the cornea. The canal of Schlemm is frequently partially or completely obliterated. In the opinion of other authorities the disease is due to intrauterine inflammatory changes at the filtration angle.

Four years ago Freda C., aged 6 months, was brought to see me, suffering from undoubted buphtalmia. The mother had noticed that both eyes had gradually become abnormally large, and that the child cried when made to face the light. Both eyes were constantly "running water." The corneae were large, the globes slightly prominent, and the intraocular tension decidedly high. It was impossible to examine the fundi owing to the intense photophobia.

At that time I considered it to be impossible to cure the condition, and for want of anything better pilocarpine drops were ordered. I had in several previous cases performed iridectomy without the slightest improvement, and had abandoned the method as illogical and dangerous.

Soon after consulting me the parents of the child went to live in a distant part of the country, and I did not see her again for two and a half years, when they returned to the Midlands and brought her to see me once more.

A short time previous to this visit, by the kindness of Mr. Priestley Smith, I had examined a buphtalmic patient of his, upon whom a distinguished Continental ophthalmologist had previously operated. His method of treatment was by a series of punctures of the intercalary region of the sclera, resulting in a considerable improvement in the patient's condition.

When in March, 1908, my patient was brought to see me again, I decided to try a modification of this method. At that time the child was 3 years old, and had marked buphtalmos. The corneae were considerably enlarged, and showed extensive nebulous opacities. The tension was high, photophobia was present, and the sight seriously impaired.

In April I performed anterior sclerotomy on the right eye. A Graefe knife was used, with which a puncture was made about 1.5 mm. from the corneal margin on one side, through the sclera. The knife was carried across the anterior chamber, and the point emerged through the sclera on the other side at a similar distance from the corneal margin. Then by a few sawing movements the intercalary region was incised on both sides of the cornea, leaving, however, a bridge of sclera intact at the upper part. Unfortunately these incisions healed very rapidly and firmly, and the tension soon became as high as ever.

This operation having proved unsuccessful I decided to alter the procedure, and in the following June the left eye was operated upon. As in the other eye, an anterior sclerotomy was performed, but the incision was extended so as to cut entirely through the upper part of the intercalary region. The knife as it emerged through the sclera above the cornea was not allowed to cut through the conjunctiva, but this membrane was undermined for a few millimetres, producing a bridge of tissue which held the flap-like portion of the cornea in position.

Fig. 1.—Diagram showing extent of incision. A, B, C, Incision through sclera; B, point at which cystoid cicatrix developed; D, D, bridge of conjunctival tissue.

at the upper point of the incision, and a minute fistulous opening in the sclera at this point could be detected. The tension soon became normal, and the symptoms gradually abated.

In September, 1908, a similar operation was performed on the right eye, with an equally satisfactory result, and in December of that year the intraocular tension of both eyes was normal, the photophobia had completely disappeared, and the child could see very much better. She could readily perceive a pin lying on the floor some yards away, and had accurate colour perception. The fields of vision were not markedly contracted.

Fig. 2.—Photograph of Freda C. at the present time.

In January, 1909, tension was still normal in both eyes; there was no injection, and the small cystoid cicatrices caused no irritation or discomfort. The corneal nebulae had nearly disappeared, and the eyes were much less prominent. The fields of vision, as far as they could be investigated, showed no contraction. The optic discs were a little pale, but were not cupped, and the vision was rapidly improving.

Since that time I have seen her periodically, and the improvement has been maintained. In November, 1909, the tension was normal on both sides, and the sight was very good. A small astigmatic error was discovered, corrected by a -2 D. cylinder 15° from the horizontal in each eye, and with these correcting glasses she could read easily Jaeger 5 at about 6 in. Objects about the room could be distinguished with clearness and precision.

The child presents now an almost normal appearance, the eyes merely resembling the slightly prominent globes of a myope. She is bright, happy, and intelligent, and no longer complains of any eye symptoms.

This result, considering the usually hopeless nature of the disease, warrants me, I think, in recording the case, and will, I trust, lead to the relief of many future cases by a similar operative procedure.

NOTES ON A CASE OF CYCLOPHORIA.

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CYCLOPHORIA is the condition which is associated with an abnormal rotation of the eyes. It is therefore a subject which belongs essentially to the sphere of the ophthalmic surgeon, but my reason for drawing attention to it is that it can, when untreated, lead to a state of matters which becomes really serious for the patients and most unsatisfactory for those whose duty it is to treat them. The reason for this is twofold—the absence of signs or symptoms to direct the attention of the examiner or the patient to the true seat of the cause; and also the considerable degree of ignorance which seems to exist, even in the majority of textbooks, concerning even the very existence

of such a condition. Further it is important to recognize that it can be brought about by error in the ordering of glasses, and its existence should therefore be borne in mind by those who are in the habit of prescribing glasses.

The following is the statement which a patient I saw last August—a cashier aged 48—wrote concerning himself (names omitted):

In 1894 I consulted Dr. — about my eyes; for a time the glasses were satisfactory, but by the year 1900 I had been to see three eye specialists, and the glasses they prescribed gave little ease or satisfaction for long. Between 1900 and 1907 I consulted an optician two or three times whose modification gave some satisfaction. Trouble then ensued again, and the optician could give me no relief. In the spring of 1907 I first experienced sensation of collapse or unconsciousness after walking two or three hundred yards in the noisy streets of Manchester, after working at figures and correspondence, and after railway travelling. In 1907 I again consulted an ophthalmic surgeon, who said: "That there was no trace of disease; that the unpleasant symptoms resulted from overwork; that the glasses last made by the optician were right; that if I persistently overworked my eyes some form of epilepsy would certainly result." I then consulted my local doctor, who advised me to give up my occupation. I next consulted a heart specialist, who told me that my heart was not responsible for the trouble; that my general condition was very good; that he was certain that my trouble came from my eyes, and urged an effort to find correct glasses. In 1908 I consulted another optician, who tried various lenses, but my condition varied, and tended to become worse. In the same year I consulted a nerve specialist, who said I was simply run down through overwork; that the eye condition was secondary, and that I must take a cruise in the Mediterranean, and if I did he would guarantee a cure. I did this at great expense, but only to find a return of all my symptoms within a few weeks of my return. I then consulted a hydropathic physician, who said that I was suffering from optic neuritis with gouty complications. Tried hydropathic and electric treatment for one month with little benefit. Finally, I consulted another doctor, who sent me to see you.

I experienced at times a dull, aching, intermittent pain about the eyeballs and eyebrows, always finishing in the right eye, leaving a sensation of numbness, always aggravated by near work, followed sometimes by a feeling as if I were going to collapse and become unconscious. It is unaccompanied by noises in the head, though noises aggravate it. Am sometimes left slightly deaf for a time. I never see double, and external objects do not revolve.

Questioned further, he said that after any lengthened period of application to near work he had noticed on getting up from his desk that the ground seemed to slope up towards him. His general medical history was good. His father was alive and his mother lived till 70. He had no brothers or sisters. He was a widower with two healthy children. He was almost a total abstainer as regard tobacco and alcohol. Except for his nerve troubles he enjoyed very good health.

Here, then, was a person who was evidently suffering from a condition which had been more or less present for fifteen years. If we carefully consider the history we see that the intensity of the symptoms has increased much more rapidly since he reached the presbyopic age; this points to a definite relationship to his near work. Again, we notice that his symptoms were always aggravated by near work and that relief followed cessation from such work.

These points taken together with the slowness of onset and the temporary relief only obtained by the various glasses tried, justify the conclusion that the cause must be of a trifling but persistent nature. Persistent because of its effects, and trifling because of its escaped detection.

I found that he was wearing one pair of glasses for near and far work. In front of the right eye he had a simple convex glass, but in the left was a strong convex cylinder placed at an angle of 25° degrees from the vertical. I assumed at once that his trouble arose from the position of this cylinder. If one of these cylinders be held about a foot or two in front of the eyes, and looked through it at, say, the bars of a window, and it then be rotated slowly it will be noticed that the bars seen through the glass become rotated out of alignment with those seen outside the glass. As this is what occurs when the cylinder is rotated, it is easy to see what happens when the eyes rotate and the cylinder is fixed. It is well known that the eyes turn in when a near object is looked at, such as a book, as in the act of reading, but at the same time they rotate on a fore and aft axis in such a manner that their vertical meridians become tilted out at their upper ends. This movement is exactly like that which occurs when the steering wheel of a ship is turned.