tion of drops or the irritation of a general anaesthetic may have the same effect.

(3) The attack in the injured eye is liable to be followed by interstitial keratitis in the uninjured eye.

(4) It is possible that an injury to one eye may cause interstitial keratitis in the other eye.

(5) The question may be asked: "is it not possible that in every case of interstitial keratitis the attack is precipitated by some slight trauma?"

I am fully aware that the number of cases I have worked upon is small and I regard this as merely a preliminary paper. The house surgeon at the Birmingham Eye Hospital is going to continue the investigation upon the vast material at our command at the Birmingham Eye Hospital, and I shall await with great interest the result of his labours.

PAPILLOEDEMA*  
BY  
BRISBANE

Papilloedema, as contra-distinguished, for instance, from albuminuric retinitis, which is a neuro-retinitis, is caused by increased intra-cranial tension. Increased intra-cranial tension is produced either by an intra-cranial new growth, by an intra-cranial inflammatory condition, or by some poison, chemical or microbic, circulating in the blood.

It appears to me that poisons, when they set up increased intra-cranial tension, do so by irritating the choroid plexus or gland, and exciting it to secrete excessively. In my experience papilloedema has been an indication of one of the following things in the order given. Plumbism in children; intra-cranial gummatous meningitis or gumma; glioma of the brain; sub-dural or cerebral abscess due to middle ear disease or other infection.

Victor Horsley's researches indicate that a cause of sudden and even fatal increase of intra-cranial tension is a severe blow on the head, and that in such cases immediate trephining for relief of tension may save life. Might not immediate lumbar puncture do as well? I have had no experience of intra-cranial hydatid.

I have seen and treated very many cases of papilloedema in children below 8 years of age, due to plumbism. Papilloedema

* Contribution to Discussion at Australian Medical Congress, Brisbane, August, 1920.
varying from an advancement of the optic disc 2 or 3 diopters to 6, 8 and 9 diopters; in some cases accompanied by acute oedema of the retina with consequent cracks in the retina. In children this is accompanied by some ophthalmoplegia externa; most frequently by paralysis or paresis of one or of both external recti. In very severe cases of prolonged poisoning paralysis of all the ocular muscles and even of the sphincter iridis has been observed. I have found that given an opportunity of treating a case before the papilloedema has lasted for long and before sight has been destroyed, recovery of sight is obtained by treatment. That at times recovery of as much as 6/9 or 6/6 of vision has been obtained, although sight had been reduced to fingers at a couple of feet. That the treatment now found best for these cases consists of:—

First, removal from their homes so that further ingestion of the poison may not occur. Second, immediate lumbar puncture: resulting in the withdrawal under pressure of 6 or 8, or even 16 ounces of clear cerebro spinal fluid. This is repeated every third or fourth day until the tension ceases to be high. Seldom have more than three lumbar punctures to be done. Third, administration of magnesium sulphate and dilute sulphuric acid to render insoluble any lead in the intestines and to cause its evacuation. Fourth, administration of iodide of potassium after the intestinal canal has been cleared, not before. Fifth, de-ionization by the two-bath method to eliminate the lead from the body.

I have not found a decompression operation to be necessary in any of these cases. As the cause is removable, and as lumbar punctures can reduce the intra-cranial tension a trephining operation is unnecessary and would be meddlesome surgery. I am not conscious that I have encountered any case of ocular plumbism, which would have recovered vision after trephining which did not do so after the above treatment. Still, it is, of course, possible that occasionally a border line case might have its vision saved by trephining which we failed to save by lumbar puncture and the above routine, owing to presenting itself just too late.

The papilloedema in the severe cases of ocular plumbism, some recovered cases of which I was able to exhibit at the ophthalmological section, is accompanied by what I call cracks in the retina, really the so-called "star figure." This occurs at the disc edge of the macula and between that and the disc. It can be explained as Mr. Marcus Gunn explained it, viz., as a result of the acute oedema of the retina and because at the macula the retina is "pegged down" at the fovea centralis. As the cracks, if they are cracks, may extend nearly to the disc in bad cases, I think the explanation would be strengthened by recognizing that the retina is pinned down at both disc and fovea, and that it is between
Papilloedema

these two not very distinct points that the star figure runs. It is really in my experience rather a figure of slightly radiating, but at times nearly parallel lines. They are to be noticed when the oedema is at its height, but they persist, as in the cases I have exhibited, though they are longer during the acute stage. Marcus Gunn called them an arrangement of oedema. They must be more than that, because they are permanent marks. The cases shown by me this morning showed partial post-papilloedemal atrophy of the discs and remains of star figures at the disc side of each macula. In one of them the illness was nine years ago, and vision recovered to 6/9 in each eye, and is likely to remain so. The lead paint on their verandah railings was replaced by zinc white before they returned home.

Cases of gummatous intra-cranial deposit I have encountered in adults and in children. I have observed up to eight diopters of swelling in the discs of such cases. In some of them I have done lumbar punctures, but I put them at once on mercurial inunction and keep them in bed and administer iodide of potassium for a few weeks in 20 gr. doses, 3 times daily by the mouth for adults. In these cases also the papilloedema which helps us to diagnose them is due to a removable cause. If we begin treatment and prosecute it thoroughly before permanent damage of sight has occurred, we obtain successful results as regard sight, and if we persevere with treatment long enough the ultimate health of the patient is also secured. Arseno-benzol may be employed as well later on. The following case illustrates what I have said:—

Woman, 40, married. Seen first 8½ years ago. All the symptoms of a cerebral tumour in frontal region, viz., headaches, vomiting, mental inco-ordination, motor inco-ordination, papilloedema, defective vision. Six diopters of swelling in each disc. Vision reduced to 6/60 and part of 6/36. Faulty binocular co-ordination. Eight healthy children, three miscarriages at five or six weeks. Eyes and head troubling for five months. No albumin.

Inunction in a private hospital. Improvement in sight rapid: 6/18 and 6/12 partly in a week. In a month 6/9. In seven months, when she returned to show herself, no swelling in either disc, very slight partial post neuritic atrophy, vision 6/6 and 6/5 partly. Has gained 2 stone in weight. After four years when came in to show herself still keeping well. Had continued inunction for about 3½ years. Vision 6/5 partly. Looks particularly well and is perfectly clear in the head. 'Lives two days’ journey from Brisbane. In answer to a letter on August 15th, 1920, says, "I am very well, my health is real good, occasionally a heavy feeling on the top of the head, and occasional neuritis in
It is now $\frac{84}{2}$ years since I saw her first, she had inunction for $\frac{34}{2}$ years. Gums had never been tender. Improvement in sight was so rapid that I did not even do a lumbar puncture, though perhaps I should have done so.

It may be of value to mention also a case of my colleague, Dr. Mathewson, which I was asked to see at the hospital for sick children. The child had severe head symptoms, and was very blind. I found intense double papilloedema. Told the resident surgeon that I did not think it was lead, and that she had better commence mercurial inunction that day: that possibly it was an intra-cranial gummatous condition. "Oh, doctor," she said, "its given a negative Wassermann." "Never you mind," I said, "inunct it and at once." The child got quite well and regained good sight, as Dr. Mathewson, who is present, can tell you.

In cases of glioma no doubt trephining may save sight and prolong life, but unless the growth can be removed the relief can only be temporary. Where the tumour is possibly a removable one and can be localized, operation as Victor Horsley proved is of course, indicated.

When papilloedema is due to intra-cranial abscess evacuation of the abscess is indicated.

In Egypt I had an interesting lesson in the matter of not being too sure of the side of the brain on which a glioma is situated. The patient had double papilloedema. The left eye had the appearance of having been longer in a state of papilloedema than the right. There was slight but recognizable proptosis of the left eye. Dr. Stawell saw it with me, and we asked Dr. Trethowan to trephine over the left lateral frontal region. Post-mortem a large glioma was found occupying the right (not left) frontal lobe. It is difficult to understand why there was slight proptosis of the left eye and none of the right eye.

**PARTIAL POST-NEURITIC ATROPHY AFTER OCULAR PLUMBISM**

(1) Elsie Allen, aged 6 years and 11 months, seen February 1, 1918.

Developed, possibly subsequent to an influenzal attack, some neuralgic pains between the shoulders, and at the same time a paralytic squint which has existed for three weeks.

Dr. Patterson, of Ipswich, who sent the child, said she had never had a squint before. There had been no colic nor constipation. I found a very marked convergent strabismus, owing to marked paresis of the left external rectus. Hands moist, nails
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bitten. I ascertained that powdery lead paint was available on the verandah rails. I found intense papilloedema in each eye, with surface of disc advanced to be seen with + 8 diopters, i.e., 6 to 8 diopters of swelling. The exudation was solid, and there was no outline to either disc. There were a lot of nearly parallel cracks in the retina between the disc and the macula. Vision: right eye fingers at 4 yards, left eye fingers at 2 feet. Lumbar puncture gave 8 ounces of clear fluid under greatly increased pressure. De-ionization resulted in deposit of lead on the negative plate.

Vision improved steadily after one month to: right eye 6/12, left eye 6/18. The squint had disappeared and the papilloedema. After three months one or two letters of 6/9. Now, after nearly two years 6/5 partly with each. The partial post-neuritic atrophy is very marked and the cracks in the retina at the disc edge of the macula also marked in each eye. The child was in excellent health. The railings were all painted with zinc paint after her illness.

(2) Edna Wilson, aged 8 years, on November 17, 1914, was brought to me.

History: In bed for a month, vomited at first and headaches off and on all the time. Sight bad for six days, and a squint for that time also. Counts fingers at 3 yards only. Marked internal strabismus owing to paresis of each external rectus.

R. disc advanced 6 diopters. Left disc advanced 5 diopters. Nails bitten. Access to powdery lead paint on verandah rails. Fan-like figures between each disc and macula. Confinement to bed, and therefore removal from ingesting more lead, saved eyes from being still worse. Only 3 ounces of cerebro-spinal fluid withdrawn by lumbar puncture; under less tension than is usual in lead cases. Squint disappeared within a week and sight improved. In six weeks there was no swelling of the discs. In three months vision was 6/9 partly. Now it is 6/6. R. a little the better. L. 6/9, and one of 6/6. She has been very well since. Note partial post-neuritic atrophy and irregular remains of star figure in left; only a little of this in right.

These cases all show basiphylllic degeneration of the red cells at the time of illness. This is found to be a help in diagnosis.

(3) M.B. seen with Dr. Brockway in 1911, when 4½ years old. Had been ill with severe headaches and retching, and pains in legs and arms for several weeks. Suddenly began to squint and to have very defective sight. I found paralysis of one external rectus. Intense papilloedema with several diopters of swelling in each disc and “star figure” between disc and macula in each eye. Treated by lumbar puncture, dilute sulphuric acid, mag.
sulph., and later by iodide of potassium. Recovered and regained 6/9 of vision.

Vision now 6/9 and 6/6 partly.

Note the distinct partial post-neuritic atrophy of discs. Also note the remains of the "star figure" at the disc edge of the macula in each.

She has been in excellent health since and does well at school.

The powdery lead paint on the verandah railings and garden rails was replaced by zinc white.

THE OXFORD OPHTHALMOLOGICAL CONGRESS, 1922

The Thirteenth Annual Meeting of the Oxford Ophthalmological Congress was held at Oxford on July 6, 7, and 8 last.

As in past years the proceedings took place in the Department of Human Anatomy of the University Museum, kindly lent for the purpose by Professor Arthur Thomson, Professor of Human Anatomy, whilst Keble College was again available as headquarters through the courtesy of its Warden, the Reverend B. J. Kidd, D.D.

The meeting opened at 10.15 a.m. on Thursday, July 6, and in the unavoidable absence of the Master, Mr. Sydney Stephenson, the Deputy-Master, Mr. P. H. Adams, of Oxford, occupied the Chair. In declaring the Congress open, Mr. Adams voiced the feelings of all present in expressing deep regret at the absence of the Master.

The discussion on "The Significance of Retinal Haemorrhages" followed, and was opened by Dr. C. O. Hawthorne (London) from the point of view of the physician, and by Mr. P. H. Adams from that of the ophthalmologist.

The two papers were followed with much interest, and the subject was discussed by the following:—Mr. Ernest Clarke (London), Dr. T. Harrison Butler (Leamington Spa), Dr. Lundsgaard (Copenhagen), Mr. R. Foster Moore (London), Dr. A. G. Gibson (Oxford), Mr. N. C. Ridley (Leicester), Mr. J. Jameson Evans (Birmingham), Mr. D. Leighton Davies (Cardiff), Miss Marion Gilchrist (Glasgow), Dr. Stobie (Oxford), Mr. Matheson Mackay (Hull), Dr. Thomson Henderson (Nottingham), Mr. John Hern (Darlington), Mr. B. Cridland (Wolverhampton), Mr. Traquair (Edinburgh), and Mr. J. Gray Clegg (Manchester).

At the conclusion of the discussion the Annual General Meeting was held, when a resolution of deep regret at the absence of the Master was unanimously passed, to whom a telegram to this effect was sent.