is seen by the misdirected eye. In investigating the lower field in the same way, if both eyes converge on the same point there will be no diplopia, thus implying healthy depressors; if, however, there is weakness of the superior oblique or inferior rectus, the affected eye will remain higher than its fellow, and there will be upward strabismus and an over-low projection of its image, thus confirming *Rule 2*: In diplopia in the lower part of the field the lower image is the one seen by the misdirected eye.—It will also be apparent from the diagram that paralysis of an oblique muscle will give rise to inward strabismus and therefore homonymous diplopia. *Rule 3*: Paralysis of an oblique muscle gives rise to homonymous diplopia.—The diagram also shows that paralysis of a superior or inferior rectus will give rise to external strabismus and crossed diplopia. *Rule 4*: Paralysis of a rectus muscle will give rise to outward strabismus and crossed diplopia.

Application of the rules.—A pencil should be held high up in the upper visual field. If the patient sees but one image, neither eye lags; there are no strabismus and no affection of the elevators (superior rectus or inferior oblique). In the case of diplopia direct the patient to shut the eye he habitually closes to prevent giddiness. If the upper image disappears he has closed the affected eye. He should now reopen it and note should be taken whether the diplopia is homonymous or crossed. If the former, by *Rule 3* the inferior oblique is affected; if crossed, the superior rectus by *Rule 4*. The lower field is investigated in the same way. Absence of diplopia would imply healthy depressors, while *Rule 2* would enable the surgeon to recognise which was the affected eye. The next question would be as to whether the diplopia is homonymous or crossed. If the former, by *Rule 3* the superior oblique is paralysed; if the latter, by *Rule 4* the inferior rectus. In one or two cases where the diplopia was occasional it was quite easy to discover the affected muscle by taking the patient into a dark room and using a red glass in front of one eye, while in others a diagnosis was made of the faulty muscle in heterophoria by the use of a red glass and convex lenses, which made the patient highly myopic. By means of this schema I was recently able to diagnose paralysis of the inferior oblique in one eye and superior oblique in the other with precision and in an amount of time that would be incredible to those who have not practised this method of examination.

Finsbury-circus, E.C.

THE TREATMENT OF CHRONIC HYDROCEPHALUS BY BASAL DRAINAGE.

BY ALFRED PARKIN, M.S., M.D. LOND., F.R.C.S. ENG.,
SENIOR ASSISTANT SURGEON TO THE VICTORIA HOSPITAL, HULL.

I NOT long ago¹ described a new method of operating for the relief of excessive intra-cranial pressure by the withdrawal of cerebro-spinal fluid from the basal subarachnoid space. The following case was treated by me in the way described, and, as will be seen, with the happiest result.

A child eleven months of age came under my care in April of this year as an out-patient at the Victoria Hospital, Hull. It had a large head, in comparison with which the body looked small, the greatest circumference of the head being 17½ in. The temporal fossæ were obliterated, the anterior fontanelle was large, and the membrane covering it was tense. There was marked separation of the two halves of the frontal bone, and to a less degree of the parietal bones. The eyes were prominent, and the sclerotics were visible above the pupils. The child was fairly intelligent for its age and up to that time had had no fits of any kind, but was always restless and irritable. Sight and hearing were good. The mother gave a history of tubercle on both sides of the family, and said that the enlargement of the head was first noticed when the child was five months old, since which time it had gradually progressed. There was no history of syphilis. The child was treated with mercury and chalk, and later with iodide of potassium and iodide of iron. On July 18th the circumference of the head had increased to 18½ in. The general condition of the child was not so good; it took little or no notice of anything and was frequently sick. On the 21st the child was admitted into the hospital;

it rapidly became worse, so that on the 26th it lay perfectly quiet in bed, never moving its limbs and not uttering the least cry, even when taken up roughly and shaken violently from side to side. The eyes were open and staring; the head was retracted. Food was taken badly, and it vomited twice or three times in the twenty-four hours. The pulse was 84. The anterior fontanelle was very hard and no pulsation was felt through it.

A little chloroform was given, and the under surface of the cerebellum was exposed about one inch below the superior curved line of the occiput and half an inch to the right of the middle line. The bone was easily gouged away, exposing the tense dura mater. After incision of the latter a few drops of fluid came away, but the passage of a probe into the subarachnoid space and gentle raising of the cerebellum allowed the exit of a quantity of clear cerebro-spinal fluid. A horsehair drain was inserted into the subarachnoid space and was brought out at the inner end of the wound, which was sewn up with a continuous suture. On the next day (the 27th) the condition of the child was most satisfactory. The eyes were opened intelligently, and no part of the sclerotics was visible above the pupils. The anterior fontanelle was soft and pulsated. The child smiled from time to time, moved its limbs about, and recognised its mother at once. The pulse had risen to 128, and the temperature, which previously to the operation had been 97° F. for three days, was normal and remained so afterwards. The condition of the child was so different from that of the preceding day that it seemed difficult to believe that it was the same child. The improvement continued, the wound healed by primary union, and the drainage, though never very abundant, was sufficient to keep the intra-cranial tension low, as evidenced by the softness of the anterior fontanelle. The horsehair drain was removed eighteen days after the operation, no fluid having come away for the three days before its removal. The child was sent home on Aug. 22nd, and when last seen (Oct. 13th) it was in excellent health. The head was then the same size—viz., 18½ in.; there was no proptosis, the anterior fontanelle was soft and pulsating, and the mother said that the child was much more intelligent than it had ever been and that it was rapidly gaining in weight.

Remarks.—It is now three months since the child was operated on, and so far there has been no indication of any recurrence. I can only ascribe the rapid recovery from what was almost complete coma to the relief of the intra-cranial pressure in the way described. Repeated aspirations and drainage of the lateral ventricles have been frequently tried with but indifferent results. The mode of operating suggested and more fully described by me² is extremely easy, and gives ready drainage at a place which in a child is easily kept aseptic. Drainage through the vertebral canal is indirect, takes more time, and interferes considerably with the subsequent stability of the spinal column. It is important that such cases should be relieved before complete coma is present. Any further delay in this case would have been undoubtedly fatal, and the remarkably rapid recovery of the patient and the rise in temperature and pulse-rate all indicate the amount of good done by the relief of the intra-cranial pressure. A temporary relief of pressure by aspiration seems to be productive only of temporary improvement, but a constant drainage for some time is much more likely to produce a permanent result, as it gives time for a re-establishment of lymphatic absorption, which process is undoubtedly interfered with in such cases. There are analogous conditions in cases of serous cysts and hydroceles, where tapping often fails, while constant drainage for some time frequently effects a cure. Whether similar treatment is equally efficacious in acute hydrocephalus I am at present unable to say. So far I have only tried it in one case³ in which the coma was complete. It can only be said that it promises better than either vertebral or cortical drainage.

Hull.

² THE LANCET, July 1st, 1893.

³ THE LANCET, July 1st, 1893.

A CONVALESCENT HOME FOR WORKING MEN.—Mr. Passmore Edwards has offered to the clubs of London a home for convalescent purposes at Pegwell Bay, only stipulating that it shall be supported, when opened, by others. At a meeting of the clubs lately it was intimated that there would be no difficulty in supporting it by subscriptions from the members of clubs in London or by direct donations.

¹ THE LANCET, July 1st, 1893.