ART. XIII.—*Case of Tumour of the Cerebellum.*^a By DAVID DRUMMOND, M.D.; Physician to the Infirmary and Hospital for Children, Newcastle-on-Tyne; Joint Lecturer on Clinical Medicine, Durham University College of Medicine, Newcastle-on-Tyne.

At a period—more than any in the past—when brain disease is occupying the attention of physicians, physiologists, and experimental pathologists, almost more than any other subject within the range of medical science, the following case, which was made the subject of a clinical lecture, may not be without interest. Unfortunately the lesion was not localised, two tumours being present, as well as a large quantity of fluid in the ventricles. However, the record of such cases tends to strengthen the prominence given to certain symptoms in the diagnosis of brain tumours, and it is only by heaping up evidence upon the points already ascertained, and, if possible, eliciting new features, that the diagnosis of brain disease can be made with that degree of certainty which enables a pneumonia or mitral regurgitation to be recognised.

CASE.—W. R., aged six, was admitted into the Children's Hospital, under my care, Sept. 3rd, 1879. He was blind, unable to walk, and complained of severe headaches, and occasional attacks of vomiting. About the month of May, 1878, his parents first observed that the boy's sight was failing; his father's attention was drawn to the fact by the child frequently falling over pails, &c., on the floor. Any earlier statements than this regarding his condition are uncertain and contradictory, for he was an extremely "delicate" child, and the statement, as made by some of the friends, that attacks of headache, accompanied by vomiting, were noticed before the visual impairment, though highly probable, cannot be relied upon; such attacks made no impression upon the minds of the parents—ailing with him being the rule rather than the exception. He continued, however, to attend school, taking an intelligent interest in his lessons, when in the month of July, 1878, he was knocked down by his school-fellows, the left temple being cut. This blow, which was evidently severe, was followed by loss of consciousness for several hours. A fortnight subsequently sight was lost completely. He was then taken to the Eye Infirmary, where he was seen by my friend, Mr. Williamson, who spoke to the condition as follows, when the specimen was shown to the Northumberland and Durham Medical Society. I quote from the Transactions of the Society:—"He was completely blind. On ophthal-

^a Being an abstract of a Clinical Lecture delivered in the Newcastle-on-Tyne Infirmary.

moscopic examination the optic discs were found to be atrophied to an extent that is rarely seen. They were small, and almost as white as paper; the edges were irregular and contracted, instead of being round and full. The arteries were mere threads, but the veins stood out large, dark, and tortuous, in remarkable contrast to the whiteness of the disc and the smallness of the arteries. There was a deep bend or knuckle on each of the veins as it passed over the edge of the disc. From these appearances, the fundus generally being healthy, it was concluded that the atrophy was the sequel to an attack of optic neuritis. The swelling of the optic disc, at the time the neuritis is going on, raises and stretches the veins; and when the neuritis subsides, the knuckles remain on the veins," &c. Mr. Williamson at that time concluded there was an intracranial growth, but, owing to the absence of special symptoms, was unable to localise it.

Subsequently, on the 16th Oct., 1878, the child was admitted into the Newcastle Infirmary, under the care of my friend, Dr. Bramwell, who describes his condition as follows (*Edin. Med. Journal*, Aug., 1879):—"He is fairly well nourished; sight almost *nil*; the optic discs are in an advanced stage of atrophy. The headache is paroxysmal and intense, the pain being referred both to the forehead and occiput. The gait is very unsteady and waddling; even when standing the feet are kept as wide apart as possible. The temperature and pulse are natural. All the other organs are healthy. He remained for some weeks under observation, and was then removed by his friends. No new symptom developed during his stay in hospital." Dr. Bramwell, who gives a very short notice of the case, remarks:—"The uncertain waddling gait seemed to point to its (the tumour) being situated in the cerebellum."

He gradually became unable to walk, or even to sit up, being entirely confined to bed six months before I saw him. Tremor of the arms (especially the right) and legs (slight) was observed about this time. On admission the large head, as compared with the emaciated body and extremities, was very noticeable, and suggested distension of the lateral ventricles by fluid. The left eye looked downwards and outwards, whilst the right had undergone no deviation. Both eyes oscillated in a slow and rhythmic manner, most marked when his attention was attracted—for example, when spoken to, the movements being always a deviation to the left, and then rather suddenly back to the usual position. The tongue was protruded in a tremulous manner; speech excessively slow and syllabic, resembling closely the typical hesitating mode of speech in cases of multiple cerebro-spinal sclerosis. A purely volitional tremor, especially of the right arm, was a very noticeable feature in the case; the legs, when he attempted to move them, were also affected by tremor to a slight extent. This tremor, like the syllabic speech, reminded one strongly of a case of cerebro-spinal sclerosis, appearing with every inner-

vation of the muscles, and completely absent during rest. On careful observation the ocular movements seemed to be of the same character, for although at times the eyes were jerked, without any apparent voluntary movement, yet when they were turned in the direction of a noise the tremor became very exaggerated—the occasional trembling during apparent absolute rest being analogous to the tremor of the head in multiple sclerosis. Taste, smell, and hearing were normal. He could tell what was on the dish for dinner by the odour, before it was brought to his bedside, and those about him in the ward were recognised with marvellous facility by their voices. The child was remarkably intelligent; any apparent slowness of cerebration was the result of the slow, hesitating manner of articulating. Complex movements were performed by the arms and hands, any impairment in coordination being due to the tremor. He could elicit from a liliputian concertina a noise which might be mistaken for a tune. The lower extremities were much weaker than the upper, whilst they could be moved about in a slow and tremulous manner, yet they were unable to sustain his weight; thus, being unable to stand, it was impossible to test his capacity for maintaining the equilibrium. As before stated, he was absolutely blind, the ophthalmoscope revealing the most markedly atrophied discs I ever saw, the arteries thread-like, and the veins, as described by Mr. Williamson, exceedingly large and tortuous. Tactile sensibility all over the body was very slightly impaired, the impairment being with difficulty detected, and perhaps most marked in the lower extremities. The headache was not incessant, but returned in periodic attacks, which were generally weekly, lasting for nearly twenty-four hours, during which time he vomited frequently. All through the case the two symptoms of headache and vomiting were intimately associated. When the headache was severe, the boy lay on his side—generally left—with his head drawn back, the occiput almost resting on the fourth and fifth cervical spines. In this position he would lie in a semi-unconscious condition whilst the headache lasted, only roused by the attacks of vomiting, or when food was pressed upon him, which he generally refused, his appetite at other times being fairly good. The pain was invariably situated in the occipital region; whether slight or intense, the locality never altered. Tapping the bone (occipital) with the finger always gave rise to a complaint of pain.

The head increased considerably in size during the time he was under observation—for example, on the 25th of September it measured 53 centimetres, and on the 17th of October, 55½ centimetres—an increase of 2½ centimetres in three weeks. The coronal suture could easily be felt.

On the 1st of November the boy had a convulsion. During a period of severe headache, which was characterised by more intense pain and

nearer approach to unconsciousness than usual, it was noticed that the spinal column was completely arched (opisthotonos). This condition of rigidity lasted for fifteen or twenty minutes, and then for three or four minutes clonic spasms of the right arm and leg ensued. At the same time the right eye was markedly turned inwards, the pupil being almost hidden.

Gradually emaciating, and complaining more frequently of headache, but without developing any new symptom, the lad died on the 4th of December, three months after admission into hospital, and about a year and eight months from the time when the symptoms were first observed. His memory or other mental faculties had never been in the slightest degree impaired. Four or five days before death he discussed most intelligently, with his mother, the joys of the approaching Christmas, recalling past experiences of the same. Latterly he had completely lost control over the sphincters—rectal and vesical.

Post mortem.—The calvarium was very thin, being almost membranous. The sagittal and coronal sutures were gaping, admitting of slight movement between the bones on compression. The skull-cap was adherent to the cerebellum, by strong adhesions, which had to be torn through before the bones could be raised. The surfaces of the lateral hemispheres, which were full and extremely soft, shook with a tremulous motion when exposed. The lateral ventricles were enormously dilated, and contained a large quantity of clear fluid.

The bone surface to which the cerebellum was adherent was not at all corroded, the adhesion taking place through thickened membranes, which were more strongly attached to a mass in the cerebellum than to the bone. The cerebellum was much increased in size, the increase being due to the presence of two tumours, the larger an irregular-shaped conical mass, the base of which occupied a great part of the right posterior superior and posterior inferior lobes, the apex extending across the veriform process to the left hemisphere. Although better seen on the upper surface, the tumour extended through almost the entire depth of the organ. It measured $8\frac{1}{2}$ centimetres from side to side, $5\frac{1}{2}$ of which were in the right hemisphere, and 3 in the left. The base of the cone measured $3\frac{1}{2}$ centimetres in depth in a vertical direction, and 4 centimetres in an antero-posterior one.

There was also a small tumour occupying the so-called central lobe of Reil, just behind the corpora quadrigemina. This tumour was of an almond shape, and, as seen in the drawing, was exactly bisected by a section in the middle line, the long axis of the tumour being antero-posteriorly directed. It measured 3 centimetres in length, by nearly 2 in breadth.

Both tumours, on section, were exactly similar in appearance, being firm, and of a yellow colour. The larger contained several small cavities.

SOROFULOUS TUMOUR OF CEREBELLUM (RIGHT SIDE).
SURFACE.—INCISION MADE THROUGH THE MIDDLE LINE.

W. ROBINSON, ET 6.
Dec. 6th, '79.

They were evidently scrofulous in character. The rest of the brain was apparently healthy, though rather soft. The spinal cord appeared to be healthy.

The thoracic and abdominal organs were perfectly normal. Beyond slight congestion of the right lung, there was no pulmonary disease.

The accompanying drawing shows well the fresh appearances of the cerebellum. A section was made through the middle line in an antero-posterior direction.

The case I have thus briefly recorded is almost a typical example, from a clinical point of view, firstly, of an intra-cranial growth in general—*i.e.*, gross disease of the brain—and, secondly, of a cerebellar tumour in particular; the evidences of gross brain disease being three, the so-called cardinal points, and upon which too much stress cannot be laid—*viz.*, *headache*, *vomiting*, and *double optic atrophy*, *the result of neuritis*; for had the case been seen at an earlier stage, double optic neuritis would undoubtedly have been recognised—not that optic neuritis is an invariable result of intra-cranial tumour. This point Dr. Hughlings-Jackson has recently touched upon (*Brit. Med. Jour.*, Feb. 7, 1880, p. 197). In two cases which have, within the past few weeks, come under my notice, it was absent—one, a case of my own, a young woman, obviously suffering from cerebellar tumour, in whom the only ophthalmic change is syphilitic choroiditis of the left eye, the right fundus being normal. The other case I saw through the kindness of my colleague, Dr. Oliver, under whose care the patient was; it was that of a man who was admitted for multiple tumours of a lympho-sarcomatous character. Suspecting brain disease, his eyes were examined, but both discs were normal. A few weeks subsequently he died, and the *post mortem* revealed, besides the other tumours, several growths in the brain, two of which were about the size of walnuts.

Though cases of cerebral tumour are occasionally seen without distinctive ophthalmic changes, yet it is the rule undoubtedly to have double optic neuritis. Of five cases of intra-cranial tumour at present under my care, it is a marked symptom in four.

The localising features which pointed to the cerebellum as the probable seat of the disease in my patient, the subject of the present communication, were, first, a *reeling* gait—a fact noticed by Dr. Bramwell, and described to me by the parents of the child; second, the situation of the pain in the back of the head; third, drawing back of the head, which occurred occasionally in

exaggerated paroxysms. On one occasion the condition of opisthotonos was noticed.

In discussing the clinical features of the case in the light of the *post mortem* appearances, it is difficult to eliminate the causative influences of the hydrocephalus. The presence of a large quantity of fluid in the lateral ventricles, of course, detracts from the accuracy and importance of observations relative to symptoms depending upon the situation of the disease. It will be conceded that the motor paralysis was the result of the fluid, the absence of sensory paralysis from the same cause simply bearing out what has long been known to be the case, especially in the spinal cord—viz., where motor and sensory tracts are alike subjected to pressure, the latter can resist, in a remarkable manner, the baneful influence, whilst the function of the former is early impaired. It is rather strange that the special senses of hearing and smell should have been unimpaired, for, from the position of the larger tumour, the acoustic nuclei and the striæ medullares, as well as the sensory nuclei of the trigeminus, must have been subjected to considerable pressure, whilst the parts of the cerebrum to which the olfactory nerves are traced—which nerves easily fall victims to the presence of intra-cranial growths, either directly or indirectly—could scarcely escape.

It is difficult to account satisfactorily for the tremor, the presence of fluid failing, I think, to do so. The tremor described above is not like that usually noticed in cases of chronic hydrocephalus, which appears to lack somewhat the distinctive volitional character, in the sense that it is markedly increased upon energetic voluntary movement. Perhaps it may be ascribed to some influence of the tumour upon the corpora quadrigemina and the pons—the smaller tumour encroached almost upon the testes—for it is usual to associate the tremor of multiple cerebro-spinal sclerosis with the presence of “sclerosed plates” in the pons, medulla, and cerebellum. Scrofulous tumours are more frequently found in the cerebellum than in any other part of the brain; it is, however, rather unusual to find, in such cases, all the other organs of the body free from tubercle. A microscopical section of the optic nerves showed the axis cylinders to be markedly atrophied. There were numerous bands through the section, which stained well with carmine, and which were taken to be processes of young connective tissue. The axis cylinders—cut across—did not take the carmine staining at all well.