The notes of the few days following the operation show very little alteration in her condition, the most noticeable point being that her pulse quickened, varying between 105 and 130, and that she was restless, and called out at times. On March 10th—that is, five days after the operation, twitching of the left arm and leg was noticed, and the temperature rose to 102°; but there was no paralysis, the half unconscious condition remained, sometimes a little better at other times worse. The next note of importance was made on March 13th, when the patient had a slight rigor, and as the abscess had ceased discharging another exploration of the cerebellum was made, but no pus was found. On March 17th there were two distinct rigors, but no tenderness could be elicited over the internal jugular vein, nor was there any thickening to be detected in its course. Infective thrombosis, whilst suspected, was so uncertain, and the patient so feeble, that exploration of the sigmoid sinus and internal jugular vein was not resorted to. Other conditions, which included Cheyne-Stokes respiration, remained much as before; the pulse was always 120 or more, and the temperature fluctuated between 99° and 101°.

On March 23rd there was distinct paralysis of the right arm; motions were passed involuntarily, the unconsciousness became deeper, the curious breathing continued. The wound was now nearly healed, and exploration of the cerebellum failed again to find any further collection of pus. Death occurred on March 26th, without further developments of any kind.

The necropsy made by Dr. Stanley showed that an abscess existed at the surface of the cerebellum close to the tentorium, to which the right cerebellar lobe was adherent. This was well above the position of the abscess which had been opened. The right lateral sinus was thrombosed, but the thrombus was not breaking down at all, it was merely an adherent organising clot. The thrombus did not extend into the internal jugular vein. There was no secondary infection of the lungs or other viscera.

CASE III.—OTITIS MEDIA; CEREBRAL ABSCESS; RECOVERY.

Miss C., aged about 30, had for some years been subject to a purulent discharge from the right ear. On December 1st, 1895, she complained of headache, was sick once, and her temperature ran up to 103.6°. For the next week headache, often very severe, continued, with irregular elevation of temperature, ranging between 100° and 103.6°, the pulse being quickened up to something below 100°. On December 8th the patient again vomited once; the temperature was 101°, pulse 96. From this day until December 16th the temperature gradually dropped to 98°, at which point it remained for two days; the pulse-rate also fell to between 50 and 60, headache continued, and the patient became dull and apathetic.

I first saw Miss C. in consultation with Dr. Churchill, of Chesham, on December 16th. She lay in bed supine and indifferent; roused with difficulty, she relapsed directly into insensibility. The left arm was doubled under the patient as she lay in bed, as though it were paralysed, but there was no other paralysis evident either in limb, face, eyes, or tongue. The condition of the optic discs could not be determined owing to the patient's insensibility. The temperature was 98°, pulse 52. A little fetid pus lay in the right ear, but there was no swelling, redness, or cedema over the mastoid, nor thickening over the internal jugular vein.

The symptoms pointed in my opinion clearly to cerebral abscess, depending upon the old ear trouble. I determined first to explore the right mastoid antrum, and failing to find perforation of its roof into the cranial cavity, to examine the temporo-sphenoidal lobe, and if necessary the cerebellum on the same side. The antrum was exposed at a depth of three-quarters of an inch from the surface; it was a small dense walled cavity containing only about a couple of drops of pus; its roof was not perforated. A small circle of bone was next removed an inch and a-half above and three-quarters of an inch behind the middle of the right external auditory meatus. The dura mater was not pulsating, and it bulged into the wound; on incising it the brain matter squeezed out. A trocar and cannula thrust straight in let out about an ounce of fetid pus with sloughs of brain tissue. An india-rubber drainage tube $\frac{3}{4}$ inches long was placed in the cavity, and its outer end brought through the middle of the scalp flap. The flap was then secured all round with sutures, the mastoid cavity was packed, and the patient put back to bed. The next day she had recovered consciousness; she could use her left hand, and there was no bad indication. During recovery she was under the care of Dr. Churchill. He removed the drainage tube on the fourteenth day after operation, and reported an uninterrupted convalescence. The patient remains well, and engages in mental and physical work just as formerly.

In commenting upon these cases I will first refer to the marked retraction of the neck in Case 1. I attribute this symptom to the extradural suppuration rather than to the cerebellar abscess, as it subsided to a great extent when the pus outside the dura was evacuated. I have only once before seen such extreme retraction, and that was in a case¹ of suppuration in the lateral ventricles extending into the fourth ventricle. In Case 1 I did not feel justified, after opening the extradural abscess, in at once proceeding further, for at this time there were no focal symptoms, and there was the danger of carrying infection inside the dura if it did not already exist there. When, however, horizontal nystagmus developed with paralysis of the sixth nerve on the left side the case was different, as it seemed to me that pressure on the sixth nerve, and no other, could best be explained by pressure forwards from the cerebellum catching this nerve where it has its surface origin between the medulla and the pons. One of the most remarkable features of this first case was the retrogression of the very large hernia of the brain.

Turning now to Case II we find the indications not at all clear. It was uncertain whether the case was one of circumscribed meningitis or of abscess in the brain tissue, and, if the latter, whether it was in the temporo-sphenoidal lobe or

the cerebellum. The slight nystagmus, a condition which existed in Case 1 to a much more marked degree, implicated to some extent the cerebellum. The Cheyne-Stokes type of respiration, suggestive of compression of the medulla or the nerves derived from it, also pointed somewhat in the same direction, but the evidence was not at all emphatic, especially in the absence of paralysis of the sixth nerve and of retraction of the neck. The second abscess, revealed at the necropsy, I have no doubt existed at the time of the operation, for the relief given by the evacuation of the one abscess was only slight. For this reason, on two subsequent occasions, exploration of the cerebellum was made in the belief that a further collection existed. I do not regret the non-interference with the sinus, the thrombus in which had, I think, little to do with the fatality. It was firm and apparently organising, and there was no evidence of secondary infection from it.

I may refer briefly to Case III as a typical example of abscess of the brain, in which, not only was the presence of an abscess clear, but its locality also; and it is in such cases as these that very good results may be expected.

Turning now to the procedure by which intracranial suppuration from middle-ear disease is to be attacked, I may say at once that I accept the rule laid down first I believe by Macewen that the mastoid antrum should first be opened in all cases, and its walls explored for perforations, through which suppuration may have extended to the inside of the cranium. Pus not being found here, there will often be some localising indication which will call for trephining over the temporo-sphenoidal lobe or the cerebellum, as the case may be. If, however, after opening the mastoid antrum and not finding pus outside it, there are no focal symptoms to guide as to the next step, it becomes a matter of considerable importance to reduce the exploratory process to a minimum. If after exposure of the antrum a scalp flap is raised and the trephine applied over the temporo-sphenoidal lobe, and pus is not found, and the same process has to be repeated over the cerebellum, it is evident that a considerable traumatism and a lengthy operation will be inflicted on the patient. To avoid this I shall in the future adopt the suggestion of Mr. Percy Dean. From the mastoid incision behind the ear the upper end is curved into a scalp flap covering a portion of the temporo-sphenoidal lobe, the lateral sinus, and the cerebellum. The trephine is applied $1\frac{1}{2}$ inch behind the external auditory meatus and $\frac{1}{2}$ inch above the centre of that canal. By enlarging this opening slightly upwards the parts above the tentorium can be explored; by enlarging it downwards the cerebellum is accessible, and at the same time the lateral sinus is exposed and its condition can be determined.

REFERENCE.

¹ *Birmingham Medical Review*, vol. xxxiv, p. 302.

AN OPERATION FOR EXTROVERSION OF THE BLADDER.

By R. W. MURRAY, F.R.C.S.,

Honorary Surgeon, Liverpool Infirmary for Children.

EXTROVERSION of the bladder is a rare malformation, though it probably occurs more frequently than is generally supposed. The older surgeons were of opinion that no operation could benefit the unfortunate victims of this deformity, and it is well known that persons suffering from it have lived to advanced years; so that any operative interference is proposed with the view of relieving suffering rather than with the object of adding to the duration of life. That very material benefit can be obtained by means of a plastic operation there can be no doubt. The method of operating most generally known, and probably still most frequently practised, is that of the late Mr. John Wood.

The principle of this and of all similar operations is to so arrange the flaps that skin shall be next to the bladder surface. The objections to this operation are:

1. That it is prolonged and necessarily severe.
2. That partial failure is the rule, thus necessitating several subsequent operations.
3. That, although affording a covering for the bladder, the

subsequent growth of hair from the skin flaps next the bladder causes an accumulation of phosphates, the annoyance from which is frequently as great as was the original trouble.

In 1885 Professor Trendelenburg, of Bonn, published the account of an operation he had performed. In this operation the principle is entirely different from that of Mr. Wood. Immediate union of the lateral margins of the bladder is obtained after division of the sacro-iliac synchondroses. I have never performed this operation, for it seems to me that the benefits following it hardly justify its severity.

The following operation, which I first performed in June, 1893, has the advantage of being comparatively simple; it affords a good covering for the bladder, and as there is a raw surface and not skin next the bladder mucous membrane there can be no subsequent trouble from the growth of hair and phosphatic deposit. Two lateral flaps are raised as represented in Fig. 1. These flaps should be of considerable thickness, which the tissues here fortunately permit, and broader than the bladder surface. The extent to which they must be raised will of course depend upon the size of the extroverted bladder surface. I have always found they can easily be made to more than meet in the middle line. This is a matter of great importance, for, considering that the raw surface of the flaps is next the bladder and will be irritated by the urine, it is essential in order to obtain union that two broad surfaces should be in apposition. This apposition I ensure by means of three or four button sutures uniting the everted flaps about one inch from their margins (see Fig. 2). The margins of the flaps are united by silkworm gut. A bridge is thus formed completely covering the bladder. It is well not to attempt at first to close the small opening remaining in the middle line above, for this opening renders the effect of irrigation more perfect, contracts very considerably later on, and is then more readily closed. During the week following the operation I arrange for the continuous irrigation of the parts, warm boracic lotion dripping constantly on to the wound.

The following is a short clinical report of two cases:

CASE I.—V. B., aged 1 year 7 months, was admitted to the Liverpool Infirmary for Children on April 10th, 1895. The child was in good health, and his malformation is well illustrated in the accompanying photograph (Fig. 1). The area of the extroverted bladder measured $2\frac{1}{2}$ inches trans-

Fig. 1.—Before operation. Incisions for raising lateral flaps.

versely and 2 inches vertically. The symphysis pubis was deficient, the bones being about 1 inch apart. The scrotum was imperfectly developed, and the testes were just outside the inguinal canal. The penis was in a condition of complete epispadias. On April 13th the bladder surface was covered by means of lateral flaps in the manner already described. In raising these flaps several vessels required twisting, and throughout the operation, which lasted about three-quarters of an hour, the wound was constantly irrigated with warm boracic lotion. A piece of lamp wick was passed from above downwards under the united flaps, and retained there, in order to facilitate drainage, and to assist in the subsequent irrigation. The child was afterwards so arranged in bed that warm boracic lotion should constantly drip on to the wound. He subsequently did very well, and suffered in no way from the constant irrigation, which was continued for four days. The button sutures were removed at the end of a week.

He was readmitted on January 16th, 1896. The result of the previous operation was very satisfactory, the bladder surface being completely covered, and there was no trouble, as is so frequently the case with reversed skin flaps, from phosphatic concretion. It was curious to observe that on exploring the new bladder with the finger the original raw surface of the flaps was now covered with what to the touch at all events exactly resembled mucous membrane; what the real histo-

logical substitution has been it would be interesting to know. He was admitted in order to have the opening leading to the bladder from above

Fig. 2.—Transverse antero-posterior section of flaps, showing broad apposition and button suture in position.

closed. This part was left unclosed at the first operation in order to secure thorough irrigation of the bladder and raw surfaces of the flaps. The opening had contracted to a mere sinus, through which a little urine escaped when the child was lying down (Fig. 3).

Fig. 3.—After operation.

On January 25th the margins of this sinus were freshened and stitched together, but it did not close completely until February 28th.

CASE II.—M. J., female, aged 3, was admitted into the infirmary on May 17th, 1893. This was the first case of extroverted bladder in which I performed the above-described operation. I much regret I did not secure a photograph of the child before operation, but her condition was almost exactly the same as that of the boy V. B. I adopted precisely the same procedure in both cases, but in this case the second operation for the closure of the sinus leading to the bladder from above was more troublesome, and required an application of the actual cautery before it finally closed. The final result after operation is shown in Fig. 4.

Fig. 4.—After operation

This operation I have performed three times, and the results have been so satisfactory that I trust other surgeons may be induced to give it a trial. All that is attempted is to give the bladder an efficient covering, and one that will not give subsequent trouble by the accumulation of phosphatic deposits. I hope in a future communication to deal with the treatment of the epispadias which accompanies this deformity.

M. FALGUIERES has received the commission to design the Pasteur statue to be erected in Paris by international subscription. The sum subscribed now amounts to 297,000 francs (£11,880).