pelvis. Then I strongly abducted the limb, and rotated it inwards. By this manœuvre, I succeeded in changing the position of the head of the bone from above the horizontal ramus of the os pubis into the thyroid foramen. Then I rotated outwards, and the bone slipped into the acetabulum. Thus far the operation was most satisfactory, but the result of the case was very tragical. A few minutes after the reduction had been so satisfactorily accomplished, the patient ceased to breathe; and, although every means at our disposal were employed to reanimate him, it was soon sufficiently obvious that life was extinct. Although I think the probabilities are that ether was primarily the cause of death in this case, it is quite possible that other circumstances may have had much to say in bringing about so disastrous a result; first the shock of the primary injury, then the subsequent ones produced by hæmorrhage, the amputations, and the two attempts to effect reduction. Lastly, there is the view as to the cause of death which was suggested to me by Dr. Hayden, namely, that it may have been caused by a pulmonary embolism. There was distinct evidence of phlebitic inflammation in the left femoral vein, and the large number of hæmorrhagic infarctions that were observed in the left lung was eminently suggestive of embolic pneumonia. A large thrombus was found in the femoral vein, and the sudden death may possibly have been due to pulmonary embolism. I regret much that no examination of the pulmonary artery or its branches was made, with a view of determining whether there was an embolic cause for the sudden cessation of the circulation. In truth, however, the available time for making this particular necropsy was, owing to circumstances needless to detail, extremely limited.

Coming to the lesion at the hip, I found the head of the bone in its normal situation. There was an extensive rent in the capsular ligament in the anterior and internal aspect of the joint. There was also a fracture of the horizontal ramus of the os pubis; and here a most interesting problem presents itself, namely, as to whether the fracture was produced by the wheel of the cart, or by the head of the bone striking the horizontal ramus in its passage over and above it; in other words,

Suprapubic Luxation of Femur.—A. Spiculum of Bone from Horizontal Ramus of Os Pubis. B. Head of Femur displaced above Os Pubis.

whether it was what the French surgeons term a *fracture par écrasement* or a *fracture par arrachement*. The former view was the one I at first held, having regard to the great amount of comminution—in truth, pulverisation of the bone. However, on closer consideration of the case, I cannot avoid rejecting my first theory, as the pulverisation of the fractured portion of the bone may have, to a great extent at all events, been caused by the attempts at effecting reduction of the luxation. By a singular coincidence, a second case of pubic luxation, very similar to this one, occurred last session in Dublin, in the practice of Professor Bennett. In it, also, there were pulmonary complications, which were not considered to contraindicate the administration of ether. The patient was on board a steamer, and fell from the gangway, a distance of about five feet. In this case, also, it was impossible to determine with anything like accuracy the position of the head of the bone. Professor Bennett was, as I was in my case, much perplexed to make out why it was that the head of the bone was so indistinct, while all the other phenomena of pubic luxation were present and well marked. When the patient was fully etherised, careful examination detected the position of it; and, by a manœuvre and manipulation similar to the one to which I have drawn attention, the head of the bone was elevated from within the pelvis, and reduction satisfactorily accomplished.

These cases are of much interest and importance, as showing how desirable it is, in the reduction of any of the forms of pubic luxation, to relax the ilio-femoral ligament; which can, as this specimen demon-

strates, best be done by abduction of the limb. It was, therefore, a matter of some surprise to me to find, in some of the modern surgical text-books of authority, that adduction, not abduction, is recommended. The effect of this would certainly be not to relax, but to make tense, the ilio-femoral ligament, which, as Professor Bigelow has rightly observed, plays so important a rôle in everting and abducting the limb. The rule given in the text-books to which I have referred is: "Flex the leg on the thigh, and then adduct and rotate inwards." Having regard to the position of the limb, which is always, in pubic luxation, in a condition of abduction, this position should, in order to relax the tissues, be increased, not diminished. By following the rule I have quoted above, and the soundness of which I venture to question, a failure in the attempt at reduction would probably be the result. Flexion of the leg, abduction of the thigh, extension and rotation, first inwards and then outwards, should be the course adopted; and, in the variety of luxation to which I have drawn attention, and to which the term "suprapubic" is not, I think, inappropriate, elevation of the head of the bone in the manner I have described should be had recourse to, previously to rotation.

TUMOUR UNDER LEFT LOBE OF CEREBELLUM.

By D. FERRIER, M.D., F.R.S.,

Assistant Physician to King's College, and to the National Hospital for the Paralysed and Epileptic.

THE patient, the particulars of whose case are here recorded, first came under my observation at King's College Hospital, in August 1877, and continued so at intervals until his admission into the National Hospital for the Paralysed and Epileptic, where he died on August 21st, 1880.

The patient was Henry H., aged 42, a printer by occupation, married, with four children alive and well. His eldest child, a girl aged 17, died over a year ago from cerebral tumour, having become imbecile, blind, and deaf before death. He said he enjoyed good health up to two years ago. He never had syphilis. Two years ago, he began to feel giddy at times. During the last twelve months, this became more marked; and he began to "heave" to one side when walking. He "heaved" to the left, he thought; at least he felt as if he was losing his support on the left side. This tendency to "heave" was observed by others, and he was thought by those who observed him to be intoxicated. This gave him great annoyance and pain, as he was never given to intemperance. He next observed some dimness of vision, particularly in the left eye. He also, for the last six months, began to complain of pain in his head. He pointed to the occipital region as the principal seat of the pain, which, he said, was intensified when he lay on the left side in bed. He had also noticed that his speech had become rather thick during the last two or three months. He had never complained particularly of nausea or sickness since he first began to feel ill. He had gradually become deaf in the left ear.

Condition on Admission.—The patient was spare, somewhat hollow-cheeked, and with an anxious troubled expression. He answered questions very intelligently. He walked with a peculiar stiff gait, holding his head well back, and keeping his legs widely apart, the left straddling outwards more particularly. In his walk, he tended to bear to the right. When asked why he carried his body in this manner, he said he felt as if he was always going down on the left, and held himself towards the right to correct this. He could not stand still with his feet approximated, but staggered backwards and to one side, generally to the right. There was no marked difference in this respect whether his eyes were open or shut. He had no pains in the limbs, and no numbness in the feet. The movements of the arms and hands were in every way normal. The left side of the face acted less strongly than the right, and the left eye could not be closed so firmly as the right. The facial muscles of the left side reacted less energetically to faradisation than on the right. The sensibility of the left side of the face was very much blunted, both as regards tactile and painful stimuli. Speech was thick and slurring, the words running into each other. The movements of the tongue were free, but the left side of the tongue was more rounded in outline than the right and marked by teeth. The faradic contractility of the left side is also less marked than the right. The tactile sensibility of the left side of the tongue was considerably impaired, and taste was entirely abolished on the anterior two-thirds of the left side. Posteriorly, in the region of the glosso-pharyngeal, taste was distinct on both sides. Hearing was entirely abolished in the left ear, both to aerial and cranial vibrations of the tuning-fork. Hearing was normal in the right ear. The movements of the eyeballs were normal in every direction. There was no nystagmus. Sight was fairly normal with both eyes, though it was said to be slightly hazy with the left eye. Ophthalmom-

scopic examination revealed indistinctness of the margins of both discs, and a fulness of the retinal veins, apparently equal on both sides.

At this time (*i. e.*, August 1877), the patient was still able to attend to his work, the chief trouble he experienced being a tendency to stumble against the machinery of the workshop. As this involved considerable danger, I advised him to give up his occupation as pressman, and obtain some different work, which he did. Attention was directed chiefly to general treatment and the relief of his headache, which was greatly ameliorated by iodide of potassium. His condition remained without marked alteration, with the exception of greater freedom from headache, for several weeks. At the end of November (1877), his general health was much improved, and he was quite free from headache and sickness. He still complained a good deal of giddiness, especially on getting up in the morning; and both standing and locomotion were very unsteady. The anæsthesia of the left side of the face had at this time almost entirely disappeared. There was still abolition of tactile and gustatory sensibility on the left half of the tongue, as before; and there was total deafness of the left ear.

On examination again, at the end of January 1878, he was very feeble, suffering from severe pain in the head, chiefly in the vertex, and occasional sickness. He was utterly unable to stand still with his feet approximated, staggering backwards, with a tendency to go down on the left side. In walking, he kept the feet wide apart, and his gait was reeling and insecure. He also complained of tremulousness of the left hand, and a feeling of needles and pins in the left hand and foot. Tactile sensibility was somewhat blunted down the whole of the left side, as well as in the left side of the face and tongue as before.

He was admitted into King's College Hospital in March 1879, complaining this time chiefly of the pain in his head, which was most marked on the left side. There was no marked difference otherwise in his condition, as compared with previous notes. He did not hear, however, so well with the right ear as formerly, continuing absolutely deaf in the left. Dimness of vision, in the left eye particularly, was complained of—intensified if he turned his head quickly to the left. Well-marked optic neuritis existed. He returned home after a month's stay in the hospital, considerably improved as regards his general health and headache, for which he was treated mainly by iodide of potassium, in large doses, with marked benefit. About August 1879, he became completely deaf also in the right ear—so that, from this time onwards, his sense of hearing was completely abolished. He still continued able to move about the room alone, very unsteadily, and with the support of the furniture; but, at the end of this year (1879), he became absolutely unable to do so, and could only stagger a little when firmly held up. In May 1880, his sight began to fail rapidly, and he became totally blind about a fortnight before admission into the National Hospital for the Paralysed and Epileptic, on June 21st, 1880.

June 21st, 1880.—The patient being totally blind and deaf, and in a condition of great mental hebetude, it was very difficult to communicate with him, or ascertain anything as regards his subjective state, except by inference.

With assistance, he could walk a little, with short steps, oscillating greatly, but utterly unable to maintain his balance unsupported. The movements of his hands and arms were free, though feeble, and also those of his lower limbs when he was lying in bed. The patellar tendon-reflex was abolished, and no cutaneous reflex could be obtained from the right foot, and only just from the left foot on repeated stimulation. The condition as to sensation was difficult to determine. Occasionally, he would wince when his face was pricked; but his arms and legs might be pricked deeply without causing them to be withdrawn. Though the patient lay in a state of great apathy, and required to be tended like a child, he could generally call for what he wanted, but occasionally he passed his excreta in bed. He frequently would pass his hands over the hands and clothes of those who tried to communicate with him, as if endeavouring to make out who they were by the sense of touch, which he thus appeared to possess. The corneæ were somewhat opaque, from ophthalmia of comparatively recent date. The right pupil was larger than the left, but both were inactive to light. Indications of double optic neuritis were visible, but the opacity of the corneæ somewhat interfered with the examination. Severe purulent ophthalmia came on shortly after admission, and proved very intractable.

On August 1st, he seemed to wake up a little from his apathetic condition, which had gradually been getting more pronounced; asked for some tea, and spoke somewhat more plainly than usual. He took hold of the attendant's hand, and asked who it was. He had, a day or two before, recognised his wife by her ring. After this, he had occasional apoplectic seizures, lasting from twenty-four to thirty hours, in which he became quite unconscious, with stertorous respiration, full and soft pulse, and skin covered with perspiration, especially about the forehead. In one of these attacks, he died, on the evening of August 21st.

Post Mortem Examination (Head only).—The skull-cap was normal, and free from adhesion to the dura mater. On removal of the dura mater, several nodules, varying in size from a pea to a hazel-nut, were found attached to its under surface, and slightly indenting the cortex. Two of these, the smallest (not larger than peas), growing close together, were situated over the left antero-frontal region. A third was attached close to the falx, and indented the middle of the superior frontal convolution on the right hemisphere, close to the median fissure. A fourth, the largest—equal to a hazel-nut—was attached close to the falx, in the occipital region, and caused no visible indentation of the cortex. The convolutions were more or less flattened throughout. Posteriorly, the hemispheres diverged from each other, leaving a triangular space, with the apex at the posterior extremity of the corpus callosum. In this space, the cerebellum was visible, almost on a level with the occipital lobes, the left lateral lobe being somewhat higher than the right. The lobes were closely approximated, leaving only a central furrow in a line with the longitudinal fissure between the cerebral hemispheres. On removal of the brain, a tumour was found attached to the dura mater, and filling up the left posterior fossa of the skull. This required to be removed before the brain could be taken out. It only adhered at one point to the dura mater, and was merely lodged, without adhesion, underneath the left lobe of the cerebellum. A smaller tumour—to be described below—situated in the right posterior fossa, came away *in situ* with the brain. The under surface of the brain, when the parts were replaced *in situ*, exhibited a tumour, of the size and shape of a hen's egg, concealing the under surface of the left lobe of the cerebellum, and causing a divergence of the pons Varolii and medulla in a curve towards the right. The middle of the tumour, which lay with its long axis antero-posteriorly, lay on the left middle peduncle of the cerebellum; and the left lateral lobe was displaced upwards (so as to be visible between the hemispheres), and somewhat backwards, the tumour lying in contact with the under surface of the left occipital lobe.

On lifting the tumour, the left side of the pons was seen to be hollowed and compressed towards the right side, and the left middle cerebellar peduncle appeared flattened and drawn out, following the left lobe upwards and backwards. The region pressed on included the roots of the fifth nerve anteriorly. The sixth, slightly displaced, was free from compression, and visible at the inner margin of the tumour. The seventh, eighth, and ninth lay in the centre of the hollow made by the tumour, and were displaced upwards, but there was no solution of continuity of the nerves. The roots of the hypoglossal nerve were flattened against the olivary body and lateral tracts. Situated at the angle formed by the pons, medulla, and flocculus, and concealing the origins of the seventh and eighth nerves, was a smaller tumour, of the size of a cob-nut, which, however, had not caused any evident indentation of the parts on which it lay. The roots of the nerves were distinct. The fifth, sixth, and ninth nerves were entirely out of the region of pressure on this side. All the tumours had the characters and histological structure of the small spindle-celled sarcomata.

REMARKS.—It will be seen from the *post mortem* record that, in addition to the cerebellar tumours, the case is complicated to some extent by the occurrence of nodules also on the surface of the cerebral hemispheres. But though these, without doubt, played some part in the general symptomatology, yet their small size, and situation over cortical regions, lesions of which are usually latent, or not associated with special symptoms, render them unimportant as compared with the large tumour pressing on the left lobe of the cerebellum and adjoining structures. And as the tumours were all of the same nature, and their rate of growth presumably equal, we may reasonably suppose that the tumour of the left lobe had already attained a considerable size before the others had made their appearance.

The symptoms observable three years before the fatal termination were such as to lead me to diagnose an intracranial tumour affecting especially the left lobe of the cerebellum—a diagnosis justified by the result. The symptoms indicative of intracranial tumour, in general, apart from those indicating its position, were the persistent headache, sickness, and optic neuritis. Convulsions were conspicuously absent, however, throughout the whole course of the disease, whether clonic or tonic. There was no rigid retraction of the head or tonic spasm of the extremities, such as have been carefully described by Hughlings Jackson and Stephen Mackenzie in connection with tumours of the middle lobe of the cerebellum. This is a fact of some significance as to the pathogeny of such tonic spasm; and favours the view that it does not depend on the cerebellar lesion, as such, but on irritation of neighbouring or subjacent structures. Hughlings Jackson, however, has always considered this as a possible explanation of the phenomena in question. The situation of the tumour was determined both by symptoms proper to cerebellar

lesions, and by accessory symptoms not connected with the cerebellum as such, but dependent on the intracranial situation.

Among these latter, I attached considerable importance to the region to which the headache was more particularly referred, both spontaneously, and, of greater significance, on pressure and percussion of the head. Cerebellar tumours are most frequently, but not always, associated with occipital headache. I attribute this to the fact that, owing to the arrangement of the tentorium cerebelli, the tension of the membranes on which the pain depends is concentrated mainly in the posterior fossa, and therefore referred to the occiput. The pain, however, in some cases is diffused, and non-localisable; or it may be referred to the frontal region. But I have found often, in cases of intracranial disease where the symptoms have led me to suspect lesions—more especially meningeo-cortical—that percussion over suspected regions often elicits pain which may not have been complained of spontaneously, and intensifies and concentrates pain, if it have been slight or more or less diffused. In this case, percussion of the head intensified the pain, more especially over the left occipital region; and this, taken with other facts, I regarded as of significance. As the disease progressed, the pain was not so limited, and was often most severe at the vertex—a fact which may find its explanation in the growth of the other smaller tumours described. Very important indications of the seat of the disease were also furnished by the evidences of compression of some of the cranial nerves on the left side. These were, first, the fifth nerve, the sensory functions of which were greatly impaired, as evidenced by the blunting of sensibility on the left side of the face and head; and more especially by the almost complete loss of tactile and gustatory sensibility of the left half of the tongue. Taste was abolished only in the anterior two-thirds of the tongue, the region supplied by the gustatory branch of the fifth; while the region of the glosso-pharyngeal still retained its functions. This, at least, was the condition in the earlier stages of the disease, of which alone I would speak positively. The motor division of the fifth was not perceptibly affected, so far at least as was to be judged by the ordinary movements of the jaws. The seventh cranial nerve was also affected, both in its portio dura and portio mollis. Comparatively speaking, the function of the portio mollis, or auditory nerve, was entirely abolished, and had been for some time before other symptoms had occurred; while the functions of the facial were only slightly affected. The facial movements, including those of the orbicularis oculi, were more feeble on the left side, and the faradic contractility was somewhat diminished. There were no evident symptoms of compression of the eighth cranial nerve. The hypoglossal was, however, distinctly implicated, though the tongue could be moved from side to side; yet the left half of the tongue was more flaccid than the right, and there was slight impairment of the faradic contractility. The delicate movements required for articulation were very evidently affected, and the speech was thick, like that of intoxication, to which the other symptoms bore some resemblance, to the great annoyance of the patient.

These symptoms all receive a satisfactory explanation by the *post mortem* examination. The tumour was so situated as to compress the left fifth, seventh, and ninth nerves. The eighth may have been affected, but the symptoms were not such as to declare themselves in affections of the cardiac or respiratory rhythm, or impairment of the functions of the glossopharyngeal. And if you will consider the position of these nerves, you will see that they may be carried upwards by a tumour pressing from below with less compression than would be exerted on the other nerves which come against the more resistant pons and medulla. It is just a question whether we might not ascribe some of the defects in articulation to compression of the medulla in the region of the olivary body. Those who look upon the olivary body as the centres of articulatory co-ordination, would at least have some grounds for regarding this case as in harmony with their hypothesis. Others again, as Jaccoud and Luys, might regard the affection of speech as a special cerebellar symptom; for which, however, I know of no satisfactory evidence. Another symptom which manifested itself at a later stage of the case, viz., the occurrence of total deafness also in the right ear, was one which I had some difficulty in satisfactorily explaining to myself. The case being presumably a tumour of the left lobe of the cerebellum, the difficulty was to account for a degree of pressure sufficient to annihilate the functions of both auditory nerves, without also having more evidences of compression of the pons and medulla oblongata than were perceptible in this case. This difficulty was completely solved *post mortem* by the occurrence of nodule, of the size of a nut, immediately underneath the roots of the seventh and eighth nerves on the right side. We see in the compression here, as on the left side, an illustration of the fact that the more specialised a function, the more it suffers from lesion of its nerves and nerve-centres. The highly specialised sense of hearing is abolished before the functions of the facial nerve are perceptibly impaired. This, of course, may also be explained by the more

ready compression of the portio mollis than the portio dura of the seventh.

But again, the affection of the sensory functions of the fifth nerve was most marked in the more specialised sense of taste on the left half of the tongue. And the more delicate movements of the tongue in articulation were greatly impaired, in comparison with the larger movements of this organ in articulation.

In an advanced stage of the disease, there arose also indications of implication of the sensory strands for the left side of the body, evidenced by paræsthesia and blunted sensibility, not merely in the face, as before, but in the arm and leg. This cannot be looked upon as directly related to the cerebellum, but must be ascribed to interference with the sensory strands of the pons or medulla. Though the tumour lay more particularly on the left side of the pons, we cannot *à priori* determine where the pressure was more especially concentrated, or found on this any conclusions as to the position of the sensory strands. The pressure might either be direct, or by counterpressure from the opposite side of the skull; and therefore we may let the facts stand without building any particular theory on them.

Two symptoms specially characteristic of cerebellar disease were well marked in this case, viz., vertigo and unstable equilibration, both as regards station and locomotion. More correctly, perhaps, I ought to say vertigo *with* unstable equilibrium, instead of speaking of them as separate symptoms; for vertigo by itself may occur from many other causes than cerebellar disease. In combination, however, they may be regarded as of pathognomic significance. But neither in this case nor in other cases of cerebellar disease which I have seen, have I been able to determine any constant relationship between the feeling of vertigo and the disorders of equilibration. In this case, the vertigo was most pronounced in the morning. It also was more apt to occur on rapid turning to the left. But, at other times, it was not marked by the patient, though the defect of equilibration was always very pronounced. The patient could neither stand with his feet approximated, or even with a comparatively wide base, nor could he walk without reeling. There was not more than the usual difference observed in perfectly normal individuals in this respect with the eyes open or shut.

On the matter of cerebellar reel, I think we are in need of much more careful observation than it commonly receives. It is not enough to ascertain merely that the patient oscillates or staggers in his gait, for the direction in which the equilibrium tends more especially to be overthrown is a matter of some importance in a regional diagnostic point of view. No doubt it would seem sometimes that no order is discoverable, but my own observations lead me to believe it may be more frequently made out if more carefully looked for. In the present case, the phenomena were such as to induce me, apart from other evidence, to suspect affection of the left lobe of the cerebellum more particularly. The man stood and walked with his feet wide apart, the left leg straddling outwards relatively more than the right, accounted for by the feeling he constantly experienced, that he was going down on the left. In the same way is to be explained his tendency in walking to bear to the right, which we may regard as an over-compensation against this going down on the left. So also, in attempting to stand with the feet approximated, he generally staggered back and to the right; though later, he did sometimes actually go down on the left.

As well from facts of experiment, which I need not here discuss, as from anatomical and pathological research, it would appear that the cerebellar lobes are in relation especially with their own side of the body, and regulate the motor adjustments necessary for equilibration, more particularly on their own side. The case before us seems to me thoroughly in harmony with this view. No doubt cases have occurred in which the destruction of one lobe of the cerebellum has caused no marked or evident symptoms; but we are not entitled to conclude from this that the lateral lobes have not the functions we have assigned to them. Since it has been proved by experiment that one cerebral sensory centre may perform the work usually carried on by two, so we may argue that one cerebellar lobe may suffice for the work usually involving the co-operation of both. And it may be that, in this case, the general compression of the cerebellum rendered the also enfeebled right lobe unable to compensate sufficiently for the more serious damage sustained by the left. I am of opinion that the view advocated by Nothnagel and others, that the middle lobe only is concerned in equilibration, is not justified by the facts either of pathology or physiology.

Not to prolong my remarks on this case unduly, I would, in conclusion, urge the advisability, in the diagnosis of cerebellar disease, of testing the powers of equilibration in a more searching manner than is usually done. It is not enough merely to ask the patient to stand or walk. This may be quite sufficient when the disorders are already well marked; but a patient may walk fairly well, and yet have considerable impairment of equilibration. A patient with cerebellar dis-

case has no ataxy proper. He may co-ordinate his limbs in locomotion without any evidence of ataxy, provided he be kept steady, and does so in his continued efforts to preserve his equilibrium. Walking certainly requires equilibration; but equilibration—co-ordination in space—implies a great deal more than mere locomotion. I am in the habit of putting patients in whom I suspect cerebellar disease through a series of exercises calculated to test their equilibration, such as making them turn sharply, balance themselves now on one leg, now on the other, etc.; and my experience leads me to believe that deficiencies may thus be detected which otherwise might escape observation, and be put down in clinical records as non-existent.

THE IMMEDIATE CURE OF INGUINAL HERNIA BY A NEW INSTRUMENT.

By W. DUNNETT SPANTON, M.R.C.S.ENG.,

Surgeon to the North Staffordshire Infirmary.

WHEN we consider for a moment the enormous number of cases of hernia met with in practice—those applying to the truss societies of London alone numbering over nine thousand a year—it seems strange that so little comparatively has been accomplished in attempting to cure such cases permanently. Most surgeons seem to rest contented with some palliative measure, which, sooner or later, is tolerably certain to be found wanting at the critical moment, when strangulation is about to take place. The ancients were in their generation somewhat wiser; for, fifteen hundred years ago, the operation for radical cure was comparatively common; and long before that (about B.C. 400), Hippocrates described the operation, which, for aught we know, may have been practised even before his time.

The different methods which have been practised for the immediate or radical cure of hernia may be roughly classed under four heads, viz.: 1. Contraction of skin and sac by excision, cautery, or ligature; 2. Closure of the sac by adhesive inflammation; 3. Plugging the inguinal canal; 4. Bringing the walls of the canal together.

1. Among the old surgeons, the first method was the only one employed. Celsus says that, in his day, the surgeon opened the sac with a sharp instrument, took hold of it, and, after putting back the intestine, cut the sac, then tied the spermatic cord and removed the testicle. He then took away part of the scrotum, and reunited the lips of the wound, so as to form a firm cicatrix.

Paulus Aegineta followed Celsus, but ligatured the sac before cutting it, and sometimes applied the actual cautery also; and, in cases of bubonocoele, he advocated cautery alone, applied to the skin sufficiently to penetrate the parts beneath—"being guided as to its extent", he says, "by a skilful conjecture".

Oil of vitriol used as a caustic, by being repeatedly applied over the inguinal ring until it penetrated all the soft tissues, was in vogue in the early part of last century, and was as barbarous as it was ineffectual.

Another plan, invented by Berault, was styled the *punctum aureum*. The rupture was reduced, the sac laid open, taken hold of with pincers, and a gold wire passed through it, which was then twisted and cut off. Other kinds of wire were subsequently employed by other surgeons. At the best, this operation could only convert a complete into an incomplete hernia; but it appears seldom to have effected even so much. About this period, a much more barbarous modification of this operation was in vogue among the Turks, which is fully described in Arnaud's work.

2. Of the second series, the best example is that of the seton. Various substances have been employed with the object of setting up inflammatory action in the interior of the sac, so as to cause the sides to adhere, and so prevent protrusion of the bowel. Silk threads, sponge, injection of irritant fluids of various kinds, were at different times employed for the purpose by various surgeons. The method, by whatever variety of practice carried out, appears to have been even less efficacious than the barbarous practice of the ancients, and almost, if not quite, as dangerous.

3. In the third class, Wurtzer's operation affords the best illustration; that of Gerdy being very similar. In the latter, the skin of the scrotum with the fundus of the sac is invaginated by the finger of the operator into the inguinal canal, and a curved needle armed with thread is passed through the skin of the groin on each side of the finger, and the skin retained in its place by means of the suture until it becomes adherent. Sometimes caustic ammonia was used, in order more certainly to obtain union between the two invaginated skin-surfaces. Wurtzer used, instead of the finger, a wooden plug, retained *in situ* by means of needles passed through the skin at its extremity, and fixed externally to a corresponding piece of wood, so placed as to produce sufficient compression of the intervening tissues as to secure their adhesion to each other.

The records of successes after these measures are, I believe, comparatively few; and I have myself seen some instances in which the rupture has been made seriously worse by Wurtzer's operation.

4. The fourth plan differs materially from the foregoing, in providing the remedy which Sir W. Lawrence pointed out as being required to contract the tendinous opening (*Treatise on Ruptures*, by W. Lawrence, 1816, p. 94). The idea of bringing together the pillars of the inguinal ring in such a way as to restore the normal valve-like shape, is based on true anatomical principles, and to Mr. John Wood must be ascribed the great credit of having reduced these to valuable practical results. Wood's operation, however, consists not merely in approximating the pillars of the ring, but in the subcutaneous invagination of the tissues which are intended to fill up the abnormally expanded opening. Stress is laid by Mr. Wood on the fact that, "to ensure success, complete union must be established along the whole length of the canal" (*On Rupture*, by John Wood, p. 88). This statement first led me to consider how far it might be feasible to secure such a result with greater simplicity and certainty. It will be observed that, in using the wire sutures of Mr. Wood, as ordinarily applied, a hold is secured on the pillars of the ring at two points only, while the invaginated tissues are

Fig. A.—Copied by permission from Mr. Wood's work *On Rupture*, p. 113.

forcibly drawn up in such a way as, in some measure, to defeat the object the surgeon has in view, of approximating the sides of the canal as much as possible. By means of the operation I propose, you will see that these drawbacks are overcome. The points of

Fig. B.

security are multiplied, and the invaginated plug, being rather cylindrical than conical, is retained in position in such a way as to permit the walls of the canal to come as close together as possible. The in-

Fig. 1.

struments* required are very simple—a thin strong knife, like a tenotomy knife, for separating the skin from the subjacent tissues; and the screw instrument (Fig. 1), shaped like a corkscrew, with a flat-point and

* These instruments made for me by Evans and Woodall, Stamford Street, Blackfriars.