

oxygen did in certain conditions improve the oxidation in the blood. Although the amount of oxygen in the atmosphere is enough to maintain the aeration of the blood when the circulation in the whole of the lung is available for the process, and although in such circumstances an increase in the depth of inspiration is not followed by an increase in the amount of oxygen absorbed, yet when a large portion of the lung was cut off from duty it seemed evident from experiment that the blood could utilize a larger amount of oxygen than the atmosphere contained normally.

Dr Church, in thanking the Society for their favourable criticism of his paper, thought that further clinical study would show that greater aeration of the blood takes place with the more free inhalation of oxygen where the natural conditions of respiration are interfered with. Physiologists admitted that with increased atmospheric pressure more air was taken into the lungs. A larger volume of air could not be taken up, but an equal volume with increased density could. Hence it could be logically maintained that more oxygen might be introduced into the system in time of need. In a case of asphyxia every physiological effort would be made to utilize all oxygen within reach of the blood. The subject was a difficult one in physiological chemistry, but it was to be hoped that *laboratory* would harmonize with *clinical* observations.

II. A NOTE ON THE USE OF THE AXIS-TRACTION FORCEPS IN THE HIGH AND LOW OPERATION.

By MICHAEL DEWAR, M.D., C.M.

A CONSIDERATION of the details and results of the following cases of the high operation in contracted pelvis with the axis-traction forceps, and a comparison of the results in my pre-axis-traction days with these, have induced me to lay before the Society a few notes on their use. These cases are the first in which I have had the opportunity of delivering with those instruments above the brim since I commenced to use them. Formerly I had been in the habit of using the ordinary Simpson long forceps in such cases, and when I failed to draw the head through the brim with them, I was obliged to resort to version, seeing that in these cases I could get no skilled assistance, being, when in Forfarshire, often from fifteen to twenty miles from home. This latter operation, of course, had to be as a rule performed under not very favourable circumstances, and the results, in my hands at least, were not very encouraging as regards the foetus. Of twelve cases of version in my first thousand cases, I had six still-births, exactly 50 per cent.; while of my long forceps cases, which ended as such, there were 6 per cent. of foetal deaths. I am of opinion now that, judging from my new experience, one should be able to deliver with the axis-traction forceps a greater proportion of living children in

rickety pelvis, and thus avoid version with its greater mortality as regards the child, and the greater risk to the mother of puerperal troubles.

CASE I.—Mrs B., aged 38, a short, deformed, bow-legged secundipara with a flat pelvis, sent for me at 10.30 P.M. on 1st November last. She had been in labour for some hours. On making a p.v. examination, the os was found well dilated, the membranes intact, the head presenting; could just reach the head, but could not make out the position. The pains were strong and frequent; after some time the membranes ruptured spontaneously, when the head was found lying above the brim, there being no advance with the pains. By pushing the fingers well up, and steadying the uterus with the left hand, I could define the sagittal suture running upwards and forwards to the posterior fontanelle, indicating a R.O.A. position. As no progress was being made, I administered chloroform and attempted to apply the axis-traction forceps, but failed completely to get them locked, due to my want of skill in manipulating the rods. After several attempts without success, I withdrew the forceps and removed the rods, thus converting them into simple long forceps. On reintroducing them, they locked at once, but on making traction with all my strength, I could make no advance. I then allowed the forceps to remain in position and sent for my friend Dr Proudfoot to take charge of the chloroform, and induce deeper anaesthesia. I was then able to draw the head down into the pelvic cavity, and with a little care complete delivery without any further mishap, though when the head was passing through the vulva the perineum was in great danger for a time. By keeping back the head, however, so as to allow the perineum time to stretch, it was saved. There was a caput succedaneum on the left parietal region. The child, a male, was still-born. The mother recovered in the usual time, without a bad symptom.

CASE II.—Mrs K., aged 44, a spare, sallow, rickety primipara, sent for me on 7th November last at 10 A.M. She had had labour pains since the night before. On making the usual examination I found a slight mucous discharge, the os about the size of a crown piece, and the membranes entire. The head, which was the presenting part, could only be reached with difficulty. After waiting for a short time without much progress, I ruptured the membranes, and after pushing the fingers well up behind the pubic arch, made out the position to be L.O.A. in a contracted conjugate. I administered a little chloroform, and with my finger dilated the os sufficiently, and putting her more deeply under the anaesthetic, applied the axis-traction forceps, which locked at once, the rods coming together nicely. With not a little traction the head was dragged through the brim. Rotation into the antero-posterior diameter of the pelvis took place, after which I had simply to

follow the movements of the application handles till the head was completely born. The perineum was preserved intact. The child, a female, commenced to cry lustily, and the mother made an excellent recovery without a moment's anxiety.

CASE III.—Mrs Q., aged 35, a scrofulous, thick set, squat multipara. She had previously two female births without any instrumental aid, and two male births,—the first still-born, delivered by forceps, the second seven years ago, delivered after great difficulty alive by long forceps. I was sent for at 10 A.M. on 28th December last, and learned that she had been in labour since 3 A.M. On making a p.v. examination I found a slight muco-sanguineous discharge, the water having escaped, and the os about the size of a crown. The head was situated above the brim, and the sagittal suture could be traced upwards and backwards to the posterior fontanelle. The anterior fontanelle could not be reached, and therefore evidently a R.O.P. position above the brim. In a short time the os was sufficiently dilated to allow the introduction of the axis-traction forceps under chloroform, after the bladder had been emptied by catheter. The bowels had been relieved by castor oil the previous evening. The instruments were carefully introduced,—the lower blade over the posterior portion of the right parietal bone, and the upper over the left side of the head in the region of the ear (as shown by the pressure marks after birth). Traction was made moderately at first, gradually increasing till I was pulling with all my might, when suddenly the blades slipped off the head without moving the head in the slightest. I reapplied the forceps in much the same way, with a similar result. For the third time I applied them, taking care to get them over the occipito-frontal poles as nearly as possible. I had considerable difficulty in placing the upper blade over what I considered the proper place, the blade always being inclined to slip backwards to the side of the head. At last I succeeded, and when the instruments were locked, and the occipito-frontal diameter reduced, the head was with only a very moderate amount of traction drawn through the brim. After this I had very little to do except to reapply the forceps in the biparietal diameter, watch and follow the movements of the application handles, as in the second case. The head rotated into R.O.A., and was delivered in the usual way. When restitution took place, the face turned downwards to left thigh, and the left shoulder appeared under the pubic arch. The child, a male, was still-born (the mother had not felt movement for more than two days). The lower blade was over the occiput close to its junction with the right parietal, while the upper was over the left eye. The mother made a good recovery.

CASE IV.—Mrs M., a small, very much undersized multipara, sent for me at 5 P.M. on 25th February 1892. Her previous obstetric history is as follows: the first child, a boy, was born at

the seventh month, delivered at the brim by long forceps, alive ; the second, a girl, after failure with the long forceps, was delivered by version with great difficulty, alive ; the third, a miscarriage at the fourth month.

On making my visit on this, the fourth pregnancy, I found that she had been in labour since early morning. The water had escaped, the os was about the size of half-a-crown, and the head presenting, but high at brim. On calling again at 8 o'clock the pains were found to be more frequent but feeble, and the os almost fully dilated. The head, which had made no advance, was occupying the R.O.A. position. Very shortly afterwards I administered chloroform and applied the axis-traction forceps ; and remembering my difficulties on the previous occasions, I placed the first blade over the right occiput, and the second blade over the left forehead above the left orbit. With moderate traction the head was drawn through the brim with comparative ease. Rotation did not take place till the head was well on to the perineum, but the latter being very distensile, I did not in this case remove the instruments till after the occiput had slipped under the pubic arch. The delivery was then completed in the usual way. The child was very lively, and the mother made an excellent recovery.

The first thought that will occur to every one is, that my success with the axis-traction forceps is quite as bad as the results of the operation of version after failure with the long forceps. But this is not so. In the first case, I hold that had it not been for my bungling with the traction rods and the long time taken to deliver the child, that child would in all probability have been born alive. The second case ended favourably. The third case could not have terminated in any other way, as the child had been dead for some days. The fourth case also ended favourably.

According to my experience, the chief difficulty to one using the axis-traction forceps for the first time in the high operation is the apparently hopeless task of getting the rods to come together properly, but when one has surmounted that difficulty it is all plain sailing. There is no difficulty whatever with the rods when applying the instruments to the head in the pelvic cavity or at the outlet. With these instruments properly applied and used, one should be able to deliver cases which without them would have to be delivered by version or by perforation. This leads me to a short consideration of the accident which befell me in the third case (the first time in my experience), when the forceps slipped off the head twice, and where on my applying the blade carefully over the occipito-frontal diameter of the head I was able to extract the head with comparative ease. The only way in which I can account for the slipping is, that the blades having been placed too far back in the biparietal diameter, the head was squeezed together in that axis, and, as a consequence, lengthening of the occipito-frontal

diameter took place. The occiput and forehead of the child necessarily rested on the brim of the pelvis, rendering its extraction next to impossible in a contracted pelvis, and when the very powerful traction was made on the bar, the blades were simply pulled off the head backwards. The head could not possibly pass through between the points of the blades. By applying the blades in the occipito-frontal diameter, or as near to it as possible, that diameter was very much reduced, the head becoming more rounded, and extraction was made very much easier.

A few days after the date of this third delivery I had the opportunity of reading the able paper on the axis-traction forceps by Dr Milne Murray, in which, at page 23, he describes the delivery of a child in the transverse axis by this same method. The comparative ease with which my fourth case was delivered still further illustrates the advantage to be gained by the use of these instruments. It would be well, therefore, to bear in mind that in cases at and above the brim, when the necessary amount of flexion has not taken place, one may by grasping the head in the occipito-frontal diameter, and thus shortening that diameter, be able to extract a living child easily with the axis-traction forceps, which under other circumstances might have to be delivered by version, with greater risk to its viability, or by perforation.

As regards delivery of the head in the pelvis and at the outlet, there cannot be the shadow of a doubt as to the immense advantage of the axis-traction forceps over the ordinary forceps, in administering at least to the comfort of the medical man. The ease and pleasure with which he can sit down at the bedside after the instruments are introduced and locked, and with one hand on the cross-bar follow the movements of the application handles, are in marked contrast to the awkward position one has to assume with the ordinary forceps. I do not think, however, that, in the matter of saving the perineum, the axis-traction forceps have any great advantage over the ordinary forceps, for I have delivered a fairly large number of all kinds of cases, and for various reasons with medium and short forceps, without rupturing the perineum beyond the fourchette, which goes in all first cases.

There is just one other point to which I might allude. Dr Murray in his paper, in referring to the gliding movement of the occiput over or under the pubic arch during the process of extension at the outlet, mentions that this movement is overlooked or ignored by many teachers, and therefore the process of extension is improperly taught. To me this seems incredible. I certainly went into practice under the belief that the occiput as a fixed point turned round the pubic arch as on a pivot. It was not very long, however, before I observed that this was wrong. The gliding movement may be seen by everyone who cares to look. Nature, if she can help it at all, will never allow the occipito-mental diameter to become engaged at the vulva. Repeatedly for the last sixteen

years in cases of stiff perineum I have held back the frontal pole so as to allow the occipital to get well forward under the pubic arch. There is no doubt that if the movement of extension were better understood, and a little judicious care taken at the birth, there would be fewer ruptured perinea.

The chief points, therefore, I would wish to emphasize are,—

1. The comparative ease with which one should be able with the axis-traction forceps to terminate favourably cases in which the head is above or impacted at the brim in flat pelvis, and thus avoid the more serious operation of version, or even perforation. I would venture to affirm, that by a careful and intelligent use of these instruments any ordinary sized head may be dragged through a conjugate whose diameter is as low as three inches, without injury to the pelvis or to the child.

2. In the low operation, the ease and precision with which you can follow the movements of the head as indicated by the movements of the application handles, the avoidance of the awkward positions necessitated by the use of the ordinary forceps, thereby contributing to the comfort and the dignity of the obstetrician, and though my results with the old instruments *in saving the perineum* are quite as good as they ever can be with the axis-traction forceps, yet there can be no doubt as to the incomparable superiority of the latter over any other forceps which have been put into the obstetrician's hands.

The Vice-President said the Society was greatly obliged to Dr Dewar for his very able and interesting paper. He was sure they all agreed with him in urging the immense superiority of the axis-traction forceps over the ordinary long forceps. Personally he also heartily concurred with Dr Dewar's remarks on the great comfort in using the axis-traction forceps compared with the Simpson forceps. There might be a little trouble at first in getting the handle of the tractors fixed, but that over, the ease in farther manipulation was wonderful.

Dr Berry Hart thought Dr Dewar's paper one of great interest. It was most valuable to know the practitioner's opinion of new appliances, whether they were available and useful under the conditions of private practice. He was glad Dr Dewar's opinion was so entirely favourable to the use of the axis-traction forceps. The unfavourable view Dr Dewar took of version was hardly warranted if it was tried after forceps. The question of version or forceps was a difficult one, but so far as the rachitic pelvis was concerned, he held version to be preferable. The use of axis-traction had, however, re-opened the question, and he had no doubt it would be settled in time, without the acrimony of the old debates.

Dr J. C. Webster had shown at an earlier meeting in the session the head of a child which had been delivered by means of axis-traction forceps in a flat pelvis. The head had been grasped antero-

posteriorly, and, owing probably to the great over-riding of the frontals by the parietals, as well as to the bulging of the vertex, rupture of the longitudinal sinus had been caused, leading to death of the child. It had always been supposed that intra-cranial haemorrhage was an almost necessary accompaniment of the use of forceps in flat pelvis, and it had occurred to Dr Webster to try a series of experiments on fresh still-born children in order to determine what intra-cranial lesions were produced. Four children were obtained, two of which had died from pressure on the cord during delivery ; the cause of death in the other two cases, obtained from the Maternity, could not be made out. Three of these were drawn by means of axis-traction forceps through rickety pelvises of various degrees of antero-posterior brim-contraction ; the internal jugular veins were then injected with coloured blood-serum. In the other case the injection was made previous to the use of the forceps. In all cases the coloured fluid was found on dissection to have escaped from the intra-cranial vessels, either into the dura, the falx or tentorium, or through the dura into the sub-arachnoid space on the upper part of the brain or about its base. Dr Webster at first thought that these experiments showed the great danger to the child from the use of forceps in flat pelvises, even taking into consideration the different conditions in the case of the operation during life and in the experiment on the dead child. Recently, however, in a valuable paper by Spencer ("On Visceral Haemorrhages in Still-Born Children, etc.", *Lond. Obstet. Trans.*, vol. xxiii. p. 203), a detailed account of a series of 130 autopsies on fresh, mostly still-born, foetuses had been given, and these examinations showed that intra-cranial haemorrhages as well as other haemorrhages occurred "in cases delivered naturally, or by version, or by forceps, through normal and abnormal pelvises; in primiparæ and multiparæ; with large and small children; in easy and difficult, rapid and prolonged labours." In view of these facts, Dr Webster considered that his experimental results were worthless since the rupture of the intra-cranial vessels might have taken place in connexion with the birth of the foetuses, and not as a result of the post-mortem experiments. He believed that only extended clinical experience could determine the relative value of turning and forceps as a means of treatment in cases of flat pelvises. It is interesting to note that Spencer's cases show that cerebral haemorrhage is most frequent with forceps delivery and least in normal vertex delivery, and that it is greater in breech cases than after version. He does not, however, specify the variety of forceps used. Unless he had reference to the axis-traction forceps, his results will not in the least help to settle the question recently raised by Milne Murray, as to the best mode of delivering the child through a brim contracted in the antero-posterior diameter, since the action of the axis-traction forceps is very different from that of the ordinary long forceps.

Dr Dewar thanked the Fellows for their kind reception of his paper. As regards the question of "Version *v.* Forceps," he did not wish to imply that his results led him to believe that forceps were in all cases superior to version, for version in the majority of his cases was only performed after failure with the long forceps. In a country practice, with a constantly shifting population, one does not always know what kind of a case one has to tackle till the actual delivery takes place. But he feels confident that the use of axis-traction forceps will reduce version to a minimum. As regards the comfort of the medical man, he has a very vivid recollection of the many awkward positions he had to assume, especially when attending a case in a box-bed.

III. THE SECTIONAL ANATOMY OF AN ANENCEPHALIC FœTUS.

By J. W. BALLANTYNE, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Gynaecology, Medical College for Women, Edinburgh; Secretary to the Edinburgh Obstetrical Society.

THE external appearances of the anencephalic foetus are such as to suggest a disturbance of the relations of the internal organs to each other and to the vertebral column, and it was with a view to the demonstration of what these changed relations were that I examined one specimen of anencephaly by the frozen sectional method. The foetus chosen for the purpose of this investigation was one sent to Prof. A. R. Simpson by Dr Miller of Sunderland, and I have to thank Dr Simpson for permission to examine it.

The *Clinical History* of the case may be given in Dr Miller's own words:—"In April 1888, the mother gave birth to an anencephalic foetus. There was large excess of the liquor amnii, and the labour was very tedious. The mother on this occasion attributed the deformity to a fright received whilst carrying the child. She states that she has a great horror of frogs, and that whilst walking in the country a friend took up a dead frog and threw it at her. On her telling this to the nurse, she confirmed her in her opinion by saying that the child had the appearance of a frog. Six weeks after the birth of this child she menstruated slightly; she then became pregnant again, and expected the child about the beginning of March 1889. However, on January 27th, I was called to see her, and found her in labour, the os uteri being about the size of a half-crown piece. I waited till the os was largely dilated, and then ruptured the membranes, after which there was a tremendous gush of waters. Two or three pains now served to expel the child, which proved to be anencephalic like the former one." Her husband, whose second wife she was, had had by his first wife a child that died of hydrocephalus, and another that succumbed to spinal disease.

The interesting facts about the clinical history were—(1), that the