

GIBSON (M.)

# The Axis Traction Forceps.

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## THE AXIS TRACTION FORCEPS.

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“ But if all these medicines profit not, there must be used more severe and hard remedies, with instruments, as hooks, tongs, and such other things made for the nonce. And first, the woman must be laid along upright, the middle part of her body lying higher than all the rest, accompanied with women assisting her about, to comfort her and keep her down, that when the birth is plucked out she rise not withal. Then let the midwife anoint her left hand with the oil of white lilies or other that may make it souple and smoothe, and holding out her fingers, shutting together her hand, let her put it into the matrix to feel and perceive after what fashion the dead birth lyeth in the mother’s womb, so that she may the better put in hooks and such other instruments to pluck it out withal.” This selection is from the quaint old book of Thomas Rainald, called “ The Woman’s Book, or the birth of Mankind,” published in England in 1565, being the first English book on midwifery of which we have any knowledge.

The practice of midwifery commenced in the earliest days of the human race, arising, as other branches of medical and surgical matters, from the needs of the people. Progress was, however, very slow. Hippocrates had an instrument, or more than one, for the purpose of assisting in difficult cases of labor, merely to extract the child without any reference to saving its life, and Galen describes something of the same kind. Rhazes, the Arabian, makes some reference to the use of the fillet in the 10th century, and Avicenna, one hundred years later, mentioned the forceps by name, but his forceps had blades containing teeth to take hold of the foetal head.

The first forceps made anything like those we have now, was that of the Chamberlains, made in 1650, or about that time. This was a crude form of the short forceps with straight blades, having only the cephalic curve. From this has come, in a direct line, the whole vast multitude of obstetric forceps, some few of which have become famous, but the most only



known to a small circle of the friends of the inventor, a few even never having passed the stage of drawing on paper. "Pajot once observed that he does not reproach a man for having invented a forceps, for that might happen to any one." The forceps of Chamberlain was practically the one form used for about one hundred years. They were different, but alike in having but one curve, and being short and straight. It could be used only when the head had descended to the pelvic cavity. About 1752 Levret, probably first, and Smellie soon after, added the pelvic curve. The present lock, such as the Simpson forceps has, was probably made before the time of Smellie, though Simpson calls it Smellie's lock. Tyler Smith says the lock was Chapman's. About this time the forceps were made longer, so that, with the added curve, it could be used under all suitable conditions of labor. The French forceps were from the first made longer and heavier, and much stronger than the English, and was a really formidable looking instrument. One of them described in Ramsbotham's book was  $19\frac{1}{2}$  inches long and weighed 2 pounds and 5 ounces.

For more than another hundred years this was all the essential change made in the forceps. There were changes many and various, and improvements, but they were essentially the same forceps, having the two curves, pelvic and cephalic. Out of this the Simpson forceps were evolved, which he said had the Ramsbotham blades, which were essentially Smellie's, the Smellie lock, the Naegle handles, and his own longer shanks. And the Davis forceps, with blades carefully calculated to nicely fit the sides of the fetal head. And our own Hodge, who taught so eloquently the "Mechanism of Labor." How "the irregular convexities of the head fitted themselves to the irregular concavities of the pelvis, so that the more difficult the labor the nearer will be the approximation of the different circles and planes of the cranium to the planes of the canal through which it has to pass." And many others, that are mostly combinations, in different forms, of different parts of some others. But to-day a competent man would not be very badly off, in a usual forceps case, if he had with him a good

Smellie forceps. He would be much better equipped than Dr. W. C. Blackman was, who practices in Davidson county, Tenn., who says, in the *Medical Record*, that, being far from home and having no instruments with him, he delivered two cases with a shoemaker's forceps, and both mothers and children lived and did well. The worst thing about the Smellie forceps was that they were covered with leather, and certainly could not be made aseptic. But this was a time when it was a usual custom to cover the blades with some kind of soft leather or gutta percha. Ramsbotham discusses this practice and says: "It was the old fashion to cover each blade entirely with leather, that it might be less formidable to sight; that in locking it little noise would be made; that it might be softer to the woman's person and not so likely to do injury." This practice was, in his opinion, objectionable on many grounds. It takes up room, and is not so easily applied, and, more than all, "it has been supposed that infection, the virus of syphilis or gonorrhœa for example, has been carried from a diseased to a healthy person." He suggests that "if such a sad accident could be possible, the coating should be abandoned or changed every time it is used."

He says, further, the only coating I would admit is one of gum elastic or silver wash. He quotes from Wallace Johnson (new system of Midwifery, 1769), who says: "If the instrument is covered with wash leather, humors which are infectious may be absorbed and conveyed from one patient to another." He recommends that morocco leather be substituted. He adds: "Indeed, danger may arise from this also, if care be not taken to wash them very clean with soap and water after every time that they are used. Nay, rather than neglect this I could wish them not to be covered at all." Ramsbotham says, in a foot note, that Simpson's forceps are coated with gum elastic, which is not liable to the same objections as a coating of leather. All this may seem strange to us, who live in this aseptic age, but it was many a long year after that when sponge tents were used to dilate the cervix and pieces of sponge to tampon the vagina.

Chapman, who wrote the first description of the forceps,

calls it "a noble instrument," and Smellie was the most noted champion of it; but when Bard came to write his book, the first treatise on midwifery in the United States, while he quoted many other writers, he made no mention of Smellie's teaching only to say that he considered him a dangerous man and his teachings unsafe. I have read somewhere of a physician who said he liked to see a doctor show a rusty forceps, for that proved that he did not often use them. Blundell says, quoted by Dewees, "I do not like to see an elegant pair of forceps. Let the instrument look like what it is, a formidable weapon, *Arte non vi* may be usefully engraved on one blade and *cave perineo* on the other."

The next change in the forceps is the present, the axis traction era, and the essential thing added to the forceps by this is, in some form or other, the perineal curve, so that traction can be made in the line of the pelvic axis. This is accomplished either by having the handles bent so as to clear the perineum when traction is made in the pelvic axis, or by traction rods attached somewhere to the forceps, for the same purpose. Herman had traction rods in 1840; Hubert had traction rods in 1860; Morales made a perineal curve in 1868, and the same year Aveling brought out his sigmoid-shaped forceps. But nothing much came of any of these until Tarnier presented his instrument in 1877. Since that time the subject has been much discussed, and several physicians have essayed to devise axis traction forceps. Of some of these I have only been able to find the name in the instrument maker's catalogue. That is all I know about Howard's Tarnier in Ford's catalogue, Braun's triform, Corning's and Burges' forceps in Tiemann's catalogue. Galabin of London, Knox of Chicago, and Dewees of Kansas made longer handles and a perineal curve like Aveling's sigmoid forceps.

Wells and Maher of New York, Briggs of California, Dewees of Kansas, Steavenson of Scotland, all have traction rods drawing from the lock. Prendergast of Philadelphia and Reynolds of Boston have loose traction rods drawing from the fenestrae. The Breus and the McFerran have a hinge in the blade; the Breus having traction rods drawing from the hinge

about midway of the blades. Langstaff of New York has a Simpson forceps with a flat metal plate, five or six inches in diameter, and chain fast to it. He places the plate under the sacrum of the patient and throws the chain over the forceps at the lock after it is applied, and it does for him just what the Smith and Pajot movements do with the ordinary forceps. It exerts a downward force between the head of the child and the hands of the operator, and so draws the head away from the pubic bone. The McGillicuddy of New York, Fisher of Salt Lake City, and Grattan of England, have handles like the old Hubert forceps. The McGillicuddy has a Simpson forceps with traction handles that fit to the end of the handles of the forceps; the Fisher, a bar that fits over the lock; and in the Grattan the handles of the forceps are jointed near the lock, so that they bend down. The Jewett, Milne-Murray, Lusk, Cullingworth, Simpson and Poulet have the traction principle like the Tarnier's.

Looking over what has been done in this field, and reading the different papers and discussions that I have had access to, this conclusion is reached: That the axis traction principle is correct; that it is an event in the development of the forceps like the cranial curve of Chamberlain and the pelvic curve of Levret and Smellie; but that the earlier ones were heavy and complicated and unmanageable, and the later ones are in the line of advance and improvement.

I have arranged in classes the different forms mentioned.

1. The sigmoid of Aveling.
2. Traction rods drawing from the lock.
3. Traction rods drawing from the fenestræ.
4. The hinged blades.
5. The plate and chain of Langstaff.
6. The traction bars of Hubert.
7. The Tarnier class.

I would eliminate at once the 1st, 4th and 5th, as not coming up to the requirements of the work. However, Doctors Barnes, Robert and Fancourt, in their book, consider the Aveling to be as satisfactory as the Tarnier.

The 2d, 3d and 6th are practically alike in their action. They are simple, easily applied, and cheap—all good qualities. The

loose traction rods can be applied to any forceps. Maher, however, has applied his to the Simpson, and has changed the handles and made them much more elaborate. Of those having traction bars like the McGillicuddy, when the bars are removed there is left an ordinary forceps; so in using any of these only one forceps would be necessary. Dr. Maher's traction rod is worked out on mathematical principles, and he makes strong claims for its efficiency, but not more than Dr. McGillicuddy does for his.

Now, we have left only those of the Tarnier type, and these carry out the axis traction idea more fully than any of the others. Maher argues that there is no need to have four shanks passing into and through the vagina, which occurs in the Tarnier instrument, but there is certainly a difference between drawing on rods attached at or near the centre of the head in the axis of the pelvis, and drawing on bars at the ends of the handles or attached to the lock, and the use of the handles as an indicator of the position of the head is certainly of much account. Maher calls his the ideal forceps, and it will undoubtedly do good work. And Prof. Keiller, describing the Milne-Murray instrument, calls it the ideal tractor; but what is an ideal tractor? Suppose we have a normal pelvic canal, and a normal head ready to engage at the brim, and normal maternal forces to drive it along. The head will enter the canal, and be propelled along the way, changed in its course by its own form and that of the canal. It will be extended and flexed, advance and draw back, rotate on and on, changing its direction at every point of the way, because the canal changes, until at last it rolls out of the vulva, and nothing has occurred that is not strictly natural and physiological. But suppose it is arrested at the brim or anywhere else, because either the forces are deficient, or the head is slightly too large, or the passage slightly too small, what shall we do? Why, just supplement the deficient forces, or add to them enough to overcome the difficulty, and not to change any other condition; not to change the direction, nor the rate of its movements. If we could take hold of it with our hands we would soon feel, almost by intuition, how to exert the necessary force. Again,

if we could put about it a network of some material, like the silken net of a balloon, with a strong cord at its center, and then could draw in the axis of the pelvis, which, at the brim, is in a line falling from the umbilicus to the point of the coccyx, and changes at every point till, at the vulva, it is at right angles to this line, we could easily supplement the natural forces, and accomplish delivery. But these things we cannot do. If we can, however, place on the head the blades of a forceps and attach to them traction rods, so placed that in use of them the head would not be changed in its relation to the pelvis, except its own natural advance; would be neither flexed nor extended, would be entirely free to rotate naturally, and only be drawn along in its correct line of advance until it was delivered, that would be ideal axis traction, and the forceps that would do that the most easily, with none at all or the least injury to the maternal or foetal tissues, and having the fewest complications, and that could the most easily be made aseptic—that would be the best forceps. And the Tarnier principle does that more fully than any other. But taking, as it does, the character of French forceps from the days of Baudolocque, the Tarnier forceps is heavy and complicated and unmanageable, and some of its modifications are preferable.

The best of these are the Simpson, which is the classical forceps of Sir James Y. Simpson, with traction rods added by Prof. Alexander R. Simpson, the Milne-Murray modification of the Simpson, and the Jewett modification of the Murray. Prof. Lusk's modification of the Tarnier is equally good. He recommends his in all high operations, in cases of occipito posterior, and in breech cases.

Prof. Jewett's practice is to draw down the head with the axis traction forceps, and finish with the others. He has delivered with the Simpson, and also with the Murray, and in those cases has been unfortunate enough to have a ruptured perineum. He, however, does not charge this to the forceps, for he says that certain perinei will rupture under any treatment, and with this I think we will all agree. He says, further, "In my experience, without episiotomy, lacerations at the vaginal orifice occur in 15 to 20 per cent. of first labors in

spite of all other precautions with or without forceps. The Drs. Barnes consider the A. R. Simpson and the Lusk the most notable modifications of the Tarnier. They say: "We have used Simpson's, which the professor lengthened at our suggestion, and find it to work well. But we are unable to find any definite improvement upon Tarnier's last model. Prof. Lusk says the A. R. Simpson forceps are valuable when the head is in the pelvic cavity, but when it is at or above the brim he uses the Tarnier model with a perineal curve. Prof. Leishman says that while Tarnier was working at his idea of axis traction, from 1877 to 1879, he made no less than thirty different modifications of the instrument.

Herman, in his book, "Difficult Labor," London, 1894, after describing this forceps, and speaking of its uses and advantages, says that "its defects are, first, its complexity, the number of joints and crevices in which dirt may lurk, and hence greater difficulty in keeping them clean; second, the continued compression of the head while it is applied. If forceps were often required when the head was above the brim, the advantages would outweigh the defects. But in nineteen cases out of twenty in which forceps are required, the head is in the pelvic cavity, and the ordinary forceps will do just as well as the axis traction. In most cases in which assistance is needed while the head is above the brim, turning is better than any forceps." The most enthusiastic followers of Tarnier's idea are the Edinburgh School, and I shall refer here to a paper\* written by Prof. Keiller, of Galveston, Texas, an Edinburgh graduate. Speaking of Tarnier, he says: "Like all innovations of sufficient importance to attract general attention, his ideas met with much opposition and some ridicule; but, nevertheless, the principle of axis traction forceps on the true Tarnier lines is now acknowledged by the most advanced teachers to be the true principle, and this the only scientific instrument applicable to high and even low forceps operations, so much so that no Edinburgh specialist carries any forceps in his bag but some form of the Simpson-Tarnier type, and few recent Edinburgh graduates think of buying any other form of instrument."

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\*American Journal of Obstetrics, April, 1893.



