ON THE PRINCIPLE OF TRACTION-RODS, WITH A SIMPLE SUGGESTION APPLICABLE TO ANY FORCEPS.

By WILLIAM STEPHENSON, M.D.,

Professor of Midwifery in the University of Aberdeen.

THE addition of traction-rods to midwifery-forceps marks an epoch in the process of their evolution. The credit of the conception is due to Tarnier; and, though his special form may be superseded, yet the profession will ever be indebted to him for the idea. They may as yet be imperfect in form, but it is not likely that the principle will be given up. Certainly no other modification has attracted so much attention, and been adopted in special cases by men of different schools in all parts of the world. Whatever objections may be brought against his forceps, the opinion that they possess some advantage over the ordinary instruments is too general amongst those who have tried them to be ignored. In what does this advantage consist, or what is the principle involved in traction-rods? becomes an important question.

For myself, I must admit that the objections I entertain to Tarnier's forceps have prejudiced me against them. I still hold that they are too cumbersome and complicated to meet the wants of the general practitioner; that their method of use implied in the term *axis-traction* is delusive and wrong when applied generally; and that we lose much of the power and information of the skilled tactus when we relinquish the hold of the handles proper, and draw only by the rods. Experience in their use has, nevertheless, taught me that they embody an important principle, which brings the forceps nearer to the ideal of what they should be.

In comparing the action of traction-rods with that of the ordinary curved forceps, Tarnier and his followers do not state the subject accurately. They have assumed that the power is exerted always by simple traction, and that in both cases the force can be represented by a straight line. This is true for traction-rods only; it does not correctly represent the mode of using the ordinary forceps. With them it may be possible, in very easy cases, to deliver the head by simple traction; but, whenever the resistance is considerable, there is, consciously or not, on the part of the operator, always a leverage or straining effect by the hand, whereby the action is rendered compound, one force drawing in the line of the handles, and others acting as a couple, whereby the force is directed in the line of the axis of the blades. The resultant, therefore, cannot be represented by a straight line, but by a line and a couple; and the recognition of this fact is essential to the understanding of the principles of traction-rods. The difference between Tarnier's and ordinary forceps is not between direct and oblique traction; but between simple traction and a leverage or straining action, where the fulcrum can never be a rigidly fixed point. Dr. Albert Smith (*Transactions of the American Gynecological Society*, vol. 6, 1881) advocates the leverage method, pure and simple, without traction; generally, however, the two are combined, and in difficult labour it is impossible with the ordinary curved forceps to deliver the head without some degree of leverage or straining.

In discussing the subject, it would be well were all agreed as to the essential requirements in an ideal pair of forceps. These to my mind are the following.

1. They should provide a secure hold, which gives full command over the head. It is not sufficient that the hold does not slip, but the command also over the head must be good. For this purpose, we must be able to apply the blades to the head, in whatever position it may be, so that the force passes through the centre, and acts equally on all parts. Such a hold, having been obtained, should not be disturbed. The pelvic curve in the forceps is necessary to accomplish this when the head is at the brim.

2. Prehension should mainly be dependent upon the cephalic curve, with a minimum amount of compression. To maintain the perfect action of the blades in this respect, it is necessary that the line of traction should coincide with the axis of prehension of the blades. In proportion as traction is made out of the axis of prehension, the forceps are liable to slip, and increased compression is necessary to counteract this, and retain the hold. In order to permit a variation in the line of traction, it is advisable that the fenestra should be of sufficient width.

3. The forceps should be such that the extractive force can be exerted in any desired direction by simple traction only, and free from all strain upon the hand of the operator or on the fetal head. With an instrument such as the forceps must necessarily be, force can be always applied more directly and accurately and more savingly by

simple traction, than by a combination of traction and leverage exerted by straining with one hand, or operating by two hands through a rigid rod. Simple traction, skilfully adjusted, is the safest and most saving mode of action.

4. The forceps should afford facility of varying the line of traction, when necessary, without disturbing the hold and command over the head. This condition cannot be accomplished by simple traction with forceps which, when applied, form a rigid rod. With such an instrument, a change in the direction of the force can be accomplished only by a change in the position of the blades, or by the leverage action of the hand. To effect the change by simple traction only, the instrument must be composed of two parts, one movable upon the other.

The question between the ordinary forceps and traction-rods turns on the means of adjusting the line of traction; but, whilst Tarnier and his followers have limited themselves to the axis of the pelvis, and mainly directed their attention to the head at the brim, the means devised have a much more extended application. By the prominence given to the opinion that traction should in all cases be made in the line of the pelvic axis, the true principle of the use of traction-rods has been obscured, and placed on too narrow a footing. Direct axis-traction is all that is required in simple cases where the resistance is offered by the soft parts alone; but it is quite insufficient in difficult delivery, where not only is the normal mechanism changed, but the resistance is greatly increased by malposition of the head, or by contraction of the pelvis.

Men may deceive themselves, and imagine that they are drawing directly in the line of the pelvic axis; but how can this be ascertained more than in a general way? It is certain also that the true line of action in difficult labour often lies out of the direction proper in the normal pelvis and head. Every skilled operator keeps the pelvic axis in view; but, consciously or not, the tactus leads him independently to adjust the direction of the force, altering it from time to time to meet the requirements of the case. It is not alone when the head is at the brim that traction is required out of the normal line, but also when the head is well in the pelvis, if its position be faulty. It is not, then, direct axis-traction alone that we must aim at, but skilfully adjusted traction; we must be able to vary the direction when necessary, and the question to be determined is, what is the best mode of obtaining the means of readily altering the line of traction, without diminishing the command over the head, or rendering the forceps liable to slip?

The pelvic curve in the forceps is necessary to obtain a proper hold of the head when it is at the brim, but it diminishes the power of simple traction, and necessitates the use of other means to obtain the proper direction of the force. In the straight forceps, the line of traction supplied by the handles coincides with the prehensile axis of the blades, and thereby a good hold of the head is secured with a minimum amount of compression. But when the pelvic curve is introduced, the two no longer lie in one line, but are inclined to each other at an angle (Fig. 1). The greater this angle, the more is the power of

Fig. 1.

prehension and simple traction diminished. The defect, so far as the hold is concerned, is readily compensated by additional compression, whilst the defect in the line of traction is corrected by a leverage action of the hand. In easy cases, so long as the resistance is not great, the amount of compression is not such as is likely to be injurious to the head, nor is the strain on the hand so great as materially to limit the power. The instrument answers fairly well, and is sufficient for the majority of ordinary cases. But when the resistance is great, the defects become apparent. The amount of lever action becomes too much for one hand, and both are brought into requisition—one pulling one way, the other another. The strain, moreover, is not confined to the operating hands alone,—it is conveyed to the fetal head. In the

efforts to adjust the traction, the handles are carried backwards, straining the pressure, or altering the position of the blades; the command over the head is lessened; and not unfrequently, when the strain is great, the forceps slip.

Another means of correcting the defects of the ordinary forceps is to give to the handles a curve complementary to that in the blades, as in Aveling's forceps. This, however, only restores the line of simple traction to that of the axis of prehension. It does not meet the fourth requirement described above, of affording the means of varying the line of traction without straining or otherwise disturbing the grasp upon the head.

With all forceps which, when applied, form, so to speak, a rigid rod, the line of simple traction can be varied only by altering the position of the blades, or moving blades and head together. A change in the position of the blades does not necessarily imply diminished command over the head, yet in some cases this must undoubtedly happen. With the other resource, that of turning the head with the blades, the movement may occasionally be advisable, but generally it would certainly derange the mechanism of the labour. It is important, therefore, that we should have at our command, when resistance is great, some other means of adjusting the line of traction, other than that supplied by the handles of the instrument. This means for facility and accuracy in the adjustment must be movable upon, and not a component part of, the rigid instrument. The requirement is met by adding a separate traction-rod, freely movable upon the forceps proper.

All the forms of traction-rods which have as yet been devised are open to the serious objection that they greatly complicate the instrument; some simpler means is most desirable; and it would be a further recommendation if it could be applied to any form of the forceps, and be used or laid aside as desired. This, I would suggest, is to be found in a simple hook, such as is here figured (Fig. 2). What I

Fig. 2.

first employed was the ordinary crotchet and blunt hook combined, using the crotchet end as the hook, and it answered very well. Held in the left hand, the tractor can, when wanted, be attached between the shanks and over the lock. With it so placed, and the right hand grasping the handles in the ordinary manner, traction is made simultaneously with both hands, the right acting in the line of the handles, the left at a proper angle, so that the resultant will coincide with the line of the desired movement. The force can be thus exerted in any direction, and changed at any time, without affecting the hold of the instrument, or throwing a strain other than direct traction upon the foetal head. Perfect facility in the most delicate modification in the direction of the force is thus secured; simple traction without strain alone is used, whilst the means is simplicity itself, and can be used with any forceps. It is, I contend, a great mistake to relinquish the hold of the prehensile handles, as recommended by Tarnier and his followers. We thus lose much of the valuable information which is conveyed through the instrument to the mind of the operator—that skilled tactus, the full value of which can be estimated by those only who possess it.

An objection may be advanced that the power is applied less directly than with Tarnier's rods, and therefore there is loss of force. Even if this be the case, it is certainly largely counterbalanced by the gain in simplicity. And, after all, does not this suggestion look very like what has before been advanced? It embodies the action to which many have recourse, when they use both hands with the forceps; but it defines more clearly the principle, and gives greater precision to the action. It recalls to mind the fillet over the lock, suggested by H. F. Nägele, in 1843; and the peculiar instrument of Herman, with a similar application.¹ But the idea associated with these is what I would wholly discard—that of leverage; whereas what is sought for and specially insisted upon, in the use of the simple tractor, is direct traction only.

The chief question is, Does the plan fulfil the end in view? I have now used it in several difficult forceps cases, and am satisfied that I obtained with the simple tractor the same advantage I had found from using a modified Tarnier's forceps. In one case I have had the opportunity of comparing the two methods with the same patient, and therefore as near as possible under the same conditions. The first time, I employed the late Dr. Macdonald's modification of Tarnier's forceps, the second, the ordinary Simpson's forceps with the hook tractor; the latter answered in every way as satisfactorily as the more complicated instrument. Those of my friends who have tried the tractor have reported favourably upon it. Experience alone will decide the relative merits, with the sure result of the "survival of the fittest."

A CASE OF RUPTURE OF THE SPLEEN.

By C. E. FAUNCE, M.R.C.S. ENG.,
Surgeon, Army Medical Staff.

JOHN D., aged 25, a private in the 2nd Battalion Northumberland Fusiliers, was brought to the Station Hospital, Meean Meer, on March 30th, 1886, having been found dead in his bed that morning, at a camp about three miles away. He was on the road to the hills for his health. From evidence given at a court of inquiry held, with reference to the death of J. D., the following facts were elicited as to his condition up to the time he was last seen alive. A comrade who went out with him, on March 29th, at 7.45 P.M., to the head-quarter canteen, stated that on the way thither deceased fell heavily on to his left side, into a drain, but he only complained of having hurt his "shins," and went on to the canteen where they had some beer. Returning to the camp, deceased again fell, but rose all right, and said "good-night" to his companion.

At 10 o'clock P.M., he was found lying near a tent, by a sergeant, who, with the help of another man, took him to his tent and put him to bed. At 3 A.M., a comrade who was sleeping in the same tent woke up and found the deceased "creeping about," saying that he wanted "to go to the rear;" but when he tried to take him thither he refused to go; he therefore put him back to bed again, and the next time he saw him, he was dead—he was found dead in his bed at 5 A.M.

Although the man was stated to have been sober, he had evidently been drinking a good deal without becoming absolutely drunk. He had served in India for six years, and during that time had been five times in hospital for ague; and it was on account of his debility from malaria that he was being sent to the hills.

Post mortem Examination, made about Four Hours after Death.—There were no marks of external violence, except a recent looking bruise, about two inches long, over the crest of the ilium. On opening the abdomen, a large quantity of dark-coloured blood escaped, measuring two pints. The peritoneum was normal in appearance, and the intestines did not show any signs of injury or congestion. The stomach was empty, and no odour of alcohol was detected. On removing the intestines and examining the cavity of the abdomen, the spleen was felt to be ruptured, with a number of large blood-clots lying in its vicinity. This rupture extended along the whole convex surface of the organ, and at its lower part right through its substance. The spleen weighed 22 ounces, was very congested, and extremely friable. The liver weighed 52 ounces; it was pigmented and congested, but its substance was firm. All the other organs were healthy.

TESTIMONIAL TO DR. HERBERT BIRMINGHAM.—Dr. Birmingham, late medical officer of Castlebar Dispensary, on the eve of his departure to Australia, was last week presented with an address by his numerous friends of Ballinrobe. The address was accompanied by a valuable set of surgical instruments.

¹ See Dr. Albert Smith's paper, before referred to.