A NEW OBSTETRIC FORCEPS*

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THE anticipation of trouble during labor by the careful examination of patients during their pregnancies and at the onset of labor and the improvement of the technic of cesarean section has greatly reduced the incidence of difficult forceps operations. Though it is known that the amniotic sac becomes infected very soon after the rupture of the membranes, whether vaginal examinations have been made or not, the perfection of the low cesarean section by Beck, DeLee, Latzko, and others has decreased the dangers of peritonitis so much that in borderline cases long trial labors can now be advised, resorting to one of these operations should failure occur. There is no question that the cesarean section is indicated when there is any bony obstruction and craniotomy, if the child has been seriously compromised. We are no longer justified in attempting difficult operations through the birth canal in such cases, when the high infant mortality and the injury to the mother are considered.

The actual misjudging of the size of the baby and pelvis, though it occasionally happens, does not play a large part in difficult labors. A greater proportion of these are caused by the malpositions of the

*The completed instrument herewith described was first presented at a meeting of the New York Obstetrical Society, November 10, 1925.

child's head due to torsion or rotation of the uterus which are so frequently found in deformed pelves. The woman can usually overcome a moderate bony obstruction by her own forces and the resultant molding of the head, provided the head can be fitted squarely into the axis of the pelvis. This frequently can be done by binders and by changing the position of the patient during labor. If the presenting part does not adapt itself to the inlet, allowing the head to act as a ball valve, early rupture of the membranes is common with a

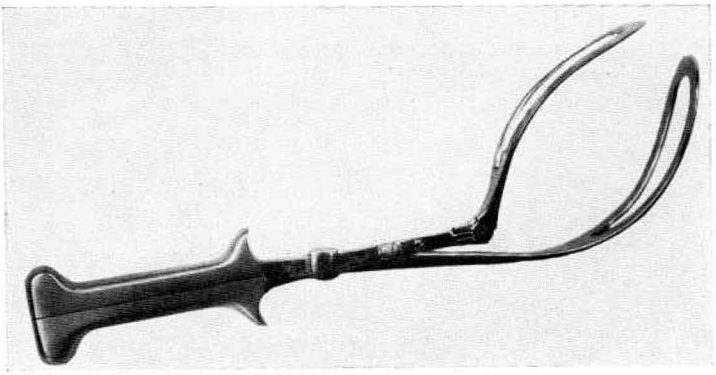

Fig. 1.—Barton forceps assembled.

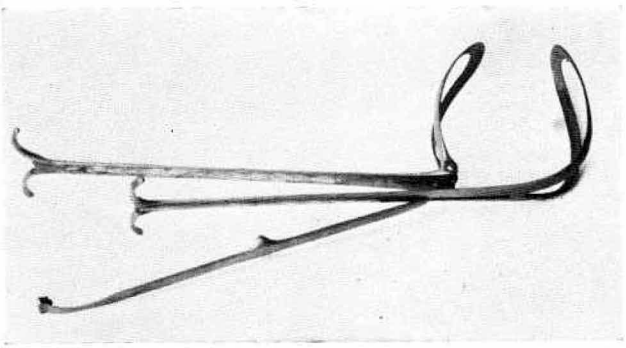

Fig. 2.—Farabeuf cephalometer.

resultant long and difficult labor. The use of the De Ribes or Voorhees bag is often necessary to complete the dilatation of the cervix. After dilatation of the cervix, combined manipulations from above and below permit correction of the malposition, though failure to do this has occurred earlier in labor. Unfortunately, secondary uterine inertia frequently occurs with the head still high in the pelvis and above the brim. Under such condition, with no bony obstruction and with the soft parts out of the way, version or forceps can be resorted to rather than cesarean section. It is in such cases that the Barton

forceps are frequently of great use. The mortality for the mother in cesarean section is still so high that we feel that a thorough study of the mechanism of labor is of value.

While at the present time, there are a number of different types of obstetric forceps which may be successfully employed in low forceps and midforceps operations, no one of them, however, in high forceps operations is equally efficient. This is due to the fact that the forms of the various forceps, as now constructed, render them not equally well adapted to both the head and the pelvic axis except in the low positions and necessitate, in the high forceps operation, the adoption of either the pelvic or cephalic methods of application. As a result of this lack of simultaneous adaptability in the pelvic method of ap-

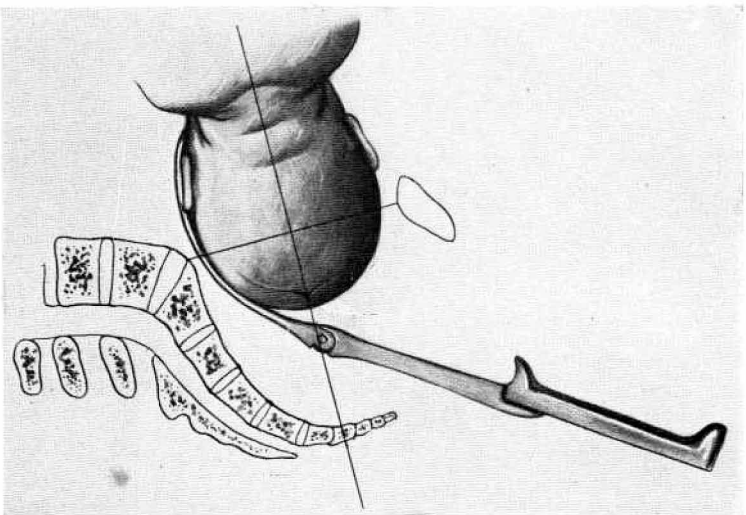

Fig. 3.—Introduction of anterior blade in midline posteriorly.

plication, the relation between the forceps and the head is faulty; in the cephalic application, the relation between the forceps and the pelvic axis is faulty.

With both the pelvic and cephalic methods of application, certain unfavorable conditions are associated, which may be stated as follows:

In the pelvic application, the grasp of the head by the blades is either over the face and the occiput, or over one brow and the opposite mastoid region, according to where the occipitofrontal diameter of the head lies in the transverse or oblique diameters of the pelvis and, as the cephalic curve of the blades is not well adapted to the surfaces with which they are in apposition, difficulty is experienced in locking the forceps; during traction, if the head becomes slightly extended, the blades are liable to slip; the line of traction is not coincident with the axis of the superior strait; normal rotation during descent is interfered with, and the compression of the head by the blades is in the least favorable diameter and is often followed by intracranial hemorrhage.

In the cephalic application, while the blades may be accurately applied over

the parietal bones, the long axis of the forceps is not coincident with the axis of the superior strait and results in a faulty line of traction; the head is tilted laterally toward the pubes, relatively increasing the size of the head in excess of the biparietal diameter (Figs. 8 and 9); during descent, the posterior blade bridges over the hollow of the sacrum and interferes with the entrance of the head into the pelvis.

In addition, many forceps have widely diverging blades in advance of the head which, unless great care is exercised, are the starting point of the serious lacerations. It should be evident, therefore, that it is not possible to apply any forceps, whose blades are parallel with the shanks, by either the pelvic or cephalic methods, but that the result will be a disturbance of the normal relation of the head to the pelvic

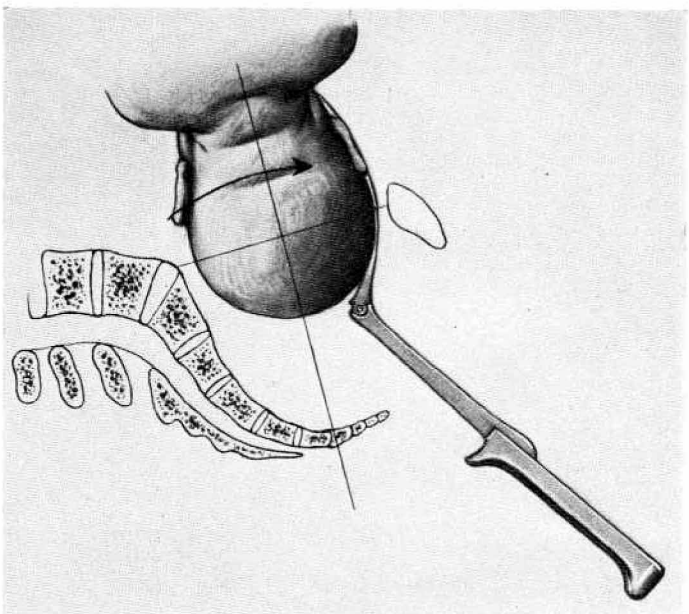

Fig. 4.—Anterior blade rotated to position in front of head.

axis by either a rotatory or lateral displacement, bringing longer diameters of the head in conjunction with shorter diameters of the pelvis, increasing the amount of traction force necessary to effect delivery and also the risk of undue compression of the head and injury to the structures of the parturient canal.

It is necessary, therefore, that forceps designed to avoid the above-mentioned conditions should possess certain qualifications, namely, their form should be such that they are adaptable to both head and pelvic axis at the same time, permitting a cephalic application without disturbing the normal relation of the head to the pelvis; they should have no widely diverging blades in advance of the head; they should, in no way, interfere with the normal mechanism of labor. The Barton forceps was designed to comply with these qualifications.

DESCRIPTION OF FORCEPS

These forceps differ from the usual types in that the blades join the shanks at an angle, as shown in Fig. 1. This angle is the normal angle between the axis of the superior strait of the pelvis and the axis of the pelvic outlet. This construction permits an accurate cephalic application, in cases of arrest of the head at the pelvic brim, in either the transverse or an oblique diameter, without disturbing the normal relation of the head to the pelvic axis.

Owing to the peculiar shape of the anterior blade, for the purpose of application, it is necessary to incorporate a joint at the junction of the blade and shank. By means of this joint, the blade can be swung through an arc of a circle until it is nearly parallel with the shank, as shown in Figs. 3 and 4.

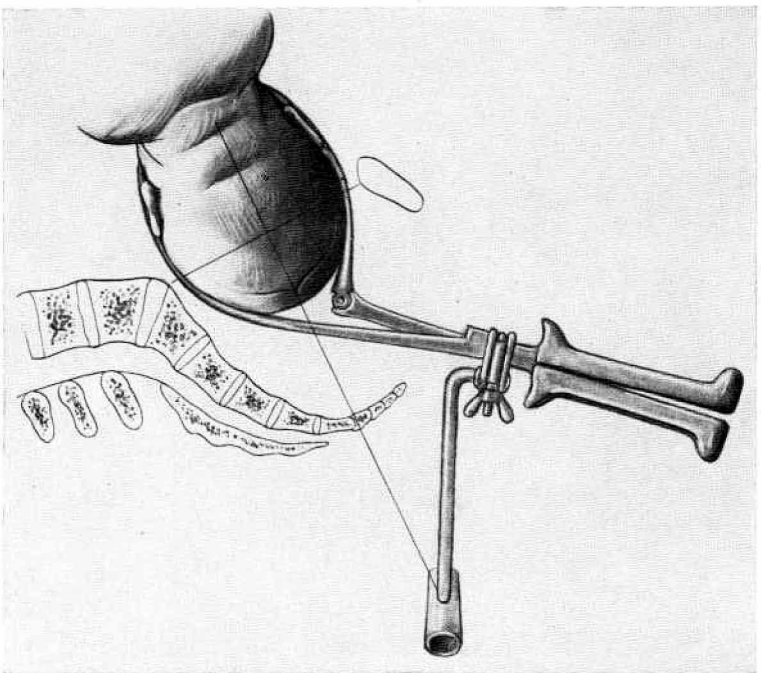

Fig. 5.—Posterior blade introduced, forceps locked, axis-traction rod attached. Note normal relation of head to pelvic axis and handle of axis-traction attachment in line with the axis of the superior strait.

The lock of the forceps is so constructed that a gliding motion of one member on the other is permitted; this insures the adaptability of the blades to heads of varying sizes without destroying the symmetry of the space between the blades.

The axis-traction attachment consists of the customary cross-bar handle pivoted on the end of the traction rod. The other extremity of the traction rod is pivoted to the yoke which partially encircles the shanks of the forceps. On one side of the yoke is a lug through which passes a tension bolt, the horizontal portion of the tension bolt lying in vertical slots on each side of the yoke. (Fig. 5.)

To apply the axis-traction attachment to the forceps, loosen the winged-nut sufficiently to permit the tension bolt to be raised from the vertical slots and rotated ninety degrees. Apply the yoke to the forcep shanks from below, rotate tension bolt to proper position for its horizontal portion to enter the vertical slots, and tighten the winged nut.

In order to apply and manipulate the Barton forceps properly certain conditions are essential; namely, an exact cephalic application should be made, as is determined by having the sagittal suture midway between the heels of the blades; the position of the shanks and handles in the vertical plane should be such that the axis of the blades is coincident with the pelvic axis; rotatory displacement of the head should be corrected by rotating the forceps on its long axis, to either right or left as required, in conjunction with a lateral movement of the handles in the horizontal plane in a corresponding direction; the relation of the blades to the head should be such that, during descent, flexion is encouraged and not antagonized; direct traction in a line with the shanks and handles should never be employed, but instead, a modified Pajot maneuver.

Dr. Barton got the idea of his instrument from observing that dentists used a different type of extracting forceps for the molars than for the incisors. He believed that we were attempting deliveries in

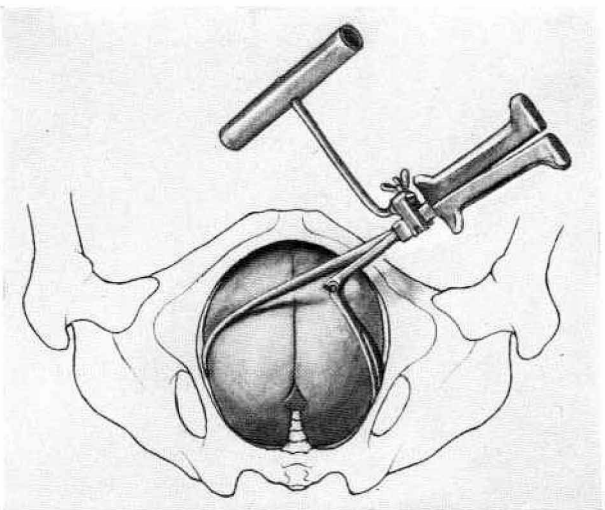

Fig. 6.—Rotation of head completed.

the upper pelvis with forceps which were designed for the lower pelvis and which could only be used to best advantage at this point. With the idea that there should be an entirely different principle in forceps intended for high application, especially in transverse and occiput posterior positions, he designed the instrument described in this article. Farabeuf had developed a similar instrument but only for the purpose of measuring the fetal head. Apparently, the possibility of such an instrument as a forceps did not occur to him. (Fig. 2.)

Dr. Barton made the first drawing of this forceps more than twenty years ago. It was not until the first model was made in 1923 that attention was attracted to the possibilities of such an instrument. Experience with the Barton forceps has shown that the first model constructed had too wide an angle between the blades and the blades were too short, especially when applied to heads above the normal in

size. This led frequently to slipping of the forceps and may account for some of the failures reported in the appended case histories. Unfortunately, this is the model owned by a majority of men using this instrument. In the present model this defect has been corrected by lessening the angles between the blades and by increasing their length.

It takes considerable time and practice on the manikin to realize that it is not a traction instrument but rather one for leverage and rotation. The direction of the pelvic axis and the relation of the forceps to this axis must always be borne in mind. When the forceps are ap-

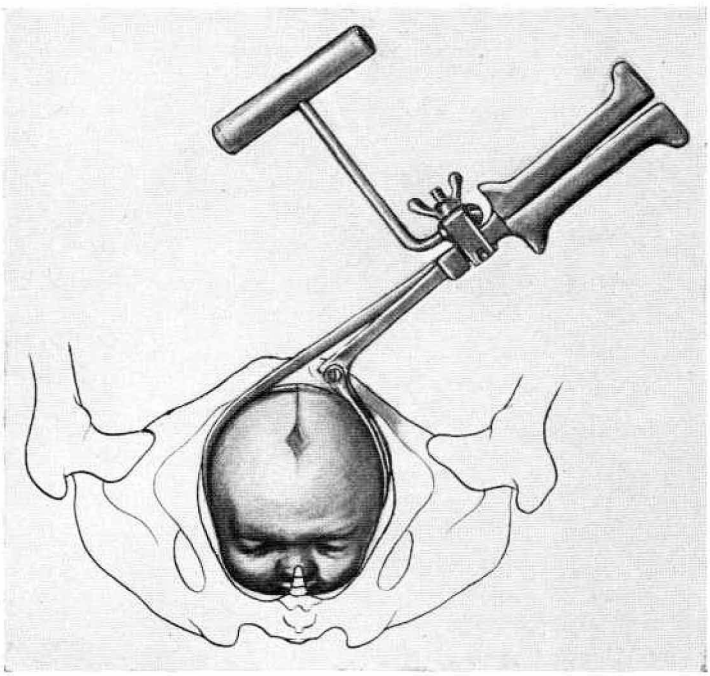

Fig. 7.—Delivery by extension of the head.

plied, at the brim or above, the sagittal suture must be directed backward toward the hollow of the sacrum before any attempt at traction is made. If the sagittal suture is directed downward or anteriorly, asynclitism results, with slipping of the blades and failure of the forceps. The anterior blade is of great use and is easily applied in helping to correct anterior or posterior parietal presentation. Its function in this instance is merely as a lever. Both blades can be used in helping in the rotation of a persistent occiput posterior in the hollow of the sacrum. We have found it more useful in these cases than any other forceps with which we are acquainted. Failure is common, and birth injuries result when attempts are made to rotate the head before the biparietal diameter has come through the pelvic brim.

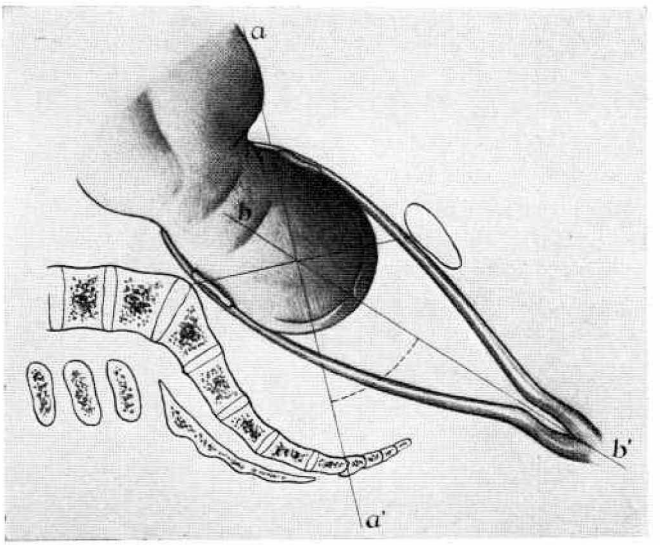

Fig. 8.—Cephalic application of the Tarnier forceps. Note lateral tilting of the head and faulty line of traction as represented by the angles formed by the lines aa^1 and bb^1.

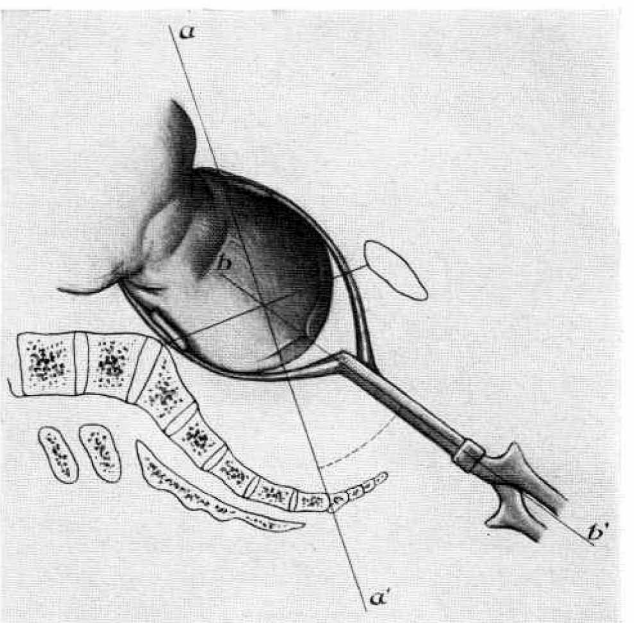

Fig. 9.—Cephalic application of the Kielland forceps. Note the lateral tilting of the head and faulty line of traction as represented by the angles formed by the lines aa^1 and bb^1.

CONCLUSIONS

1. The Barton forceps allow an easy cephalic application in the axis of the birth canal, especially when the head is high in the pelvis.

2. The Barton forceps can be easily used to help correct malpositions of the presenting part.

3. The axis of the pelvis in its relation to the position of the child's head must at all times be considered.

4. The extraction of the child is by a leverage or modified Pajot's maneuver rather than by direct traction.

5. Cases in which these forceps are useful require careful study by a skilled obstetrician. They have a definite value in his hands.

6. They will not overcome bony obstruction. They will not overcome obstruction due to soft parts without injury to both mother and baby.