

REPORT OF SIX CASES OF CRANIOTOMY.

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The object of this paper is not to stir up the question of craniotomy on the living child, nor to prove that craniotomy is the operation of election in the class of cases to be described, but simply to present the six cases as they occurred, to show the indications for the operation as they arose, the difficulties to be overcome, concluding with a few remarks on the operation in general and the presentation of a new instrument for its performance.

In the last two years I have had opportunity to perform this operation six times. Three cases were in the service of the Chicago Lying-in Hospital Dispensary, three in consultation with other physicians. Three of the women were of a race in which contracted pelvis is common, the Russian Jewess, the fourth a woman with a pelvis that is rare in any class, of the masculine type, the fifth was a large dead baby and the sixth a brow presentation, the fetus being already lost.

All the cases occurred in the homes of poor people, two in veritable hovels that could not even boast of ventilation or light. The mothers in all cases recovered, two are pregnant at present and will probably be subjects for obstetric operation in a few weeks. These two cases are the following.

Case I. Mrs. H. G., Russian Jewess, age 23, II para, first labor lasting three days, premature rupture of the bag of waters, spontaneous termination, child still-born, cause unknown. Present labor began May 16th, 1895. Patient avers she is at full term and being of very low intelligence no other data are obtainable. At 7 A. M., after a few weak pains, the membranes ruptured. A midwife was in attendance all day and the succeeding night. At 4 A. M. she diagnosed a prolapse of the cord and 24 hours after rupture of the bag of waters I was called to the case.

Examination. Small delicately built woman, pains five minutes apart, quite strong, attended by expulsive efforts. Uterus at the ribs, abdomen not pendulous. Occipito laeva anterior. Head flexed and freely movable above the inlet. Heart tones in left flank on a level with the navel, 140 per minute. Internally, perineum well preserved, cervix not effaced, os admits two fingers. Loop of pulsating cord in vagina; head movable above the inlet, sagittal suture runs near the symphysis, caput succedaneum already forming.

Pelvis small, sacrum sharply concave, presents an acute angle in its lower third, promontory within easy reach, conjugata diagonalis 10 cm. This was confirmed by Dr. C. B. Reed. Conjugata vera, taking into consideration the evidences of rachitis, the height of the pubis, and its inclination, was estimated at 8 cm.,  $3\frac{1}{4}$  inches. Spines 24.3, crests 26.5, Baudelocque 18.2, height 146 cm., 4 feet  $9\frac{1}{2}$  inches. Diagnosis, small pelvis, of the flat rachitic type with a conjugata vera of about 8 cm. Prolapse of the cord with the head freely movable about the inlet.

A gentle attempt to force the cord above the head with two fingers failing, and further operation being refused by the husband, the patient was placed in the lateral position with a large pillow under the hips, on that side where the cord had not prolapsed, i. e., the right. In spite of the fact that the cord was subjected to no direct pressure, the heart tones soon became rapid and irregular, meconium came away in large amounts and the patient complained of unusually active fetal movements. Operation was again advised but the husband insisted on temporizing till a consultant could be called. This caused several hours delay, during which time the heart tones became inaudible and the cord ceased pulsating. Consultant advised waiting for full dilatation. Soon, however, the patience of the family gave out, the parturient called loudly for aid and operation was permitted. The child being dead it devolved upon us to deliver it with the least possible injury to the mother. This, of course, was by craniotomy. The patient was put on the kitchen table, chloroform given by Dr. Reed, antiseptics with lysol. Perforation of the posterior parietal bone with Naegele's perforator. The writer's modification of Anvard's cranioclast was used. Extraction with two blades was tried but the bone grasped by the instrument tore out. The three blades were then applied and under strong traction the delivery was completed. Third stage, normal. A slight cervix tear on the right side was the only injury the patient suffered.

Child, male, 8 pounds without brain, blood and meconium.

On the second day, peritonitis symptoms. Ergot, morphia, ice-bag. On the fourth day, fetid lochia, later vulvitis for which, lead water applications. Patient discharged well on the twelfth day.

Case II occurred in a dark hall room on the third floor of a tenement house. I para, age 21, called the services of the Chicago Lying-in Hospital Dispensary on the morning of Jan. 22, 1896. Labor had been in progress sixteen hours when the bag of waters

ruptured, fresh meconium escaping with the liquor amnii. Eight hours after this we were called, the pains being very strong. Examination: Small delicately built woman, highly excited by the severe pains and delay in labor. Fundus uteri at the ensiform, occipito laeva anterior, head fixed in the inlet, chin well flexed. Heart tones to the left near the navel varying from 80 to 160 per minute during auscultation. Vaginally perineum intact, cervix hangs down like a cuff, admits the hand, head fixed in the inlet but not fully engaged, caput succedaneum large.

Pelvis small, spinae ischii project sharply into it, rami pubis run close together, promontory of sacrum covered by the head. Spines 24 cm., crests 25.8 cm., Baudelocque 18.2, inter-trochanteric 28, circumference of pelvis 78.5 cm. Between posterior superior spines of sacrum 9.5, height of patient 155 cm., 5 feet 1 inch.

Diagnosis. Generally contracted pelvis, pelvis justo minor, head impacted in the inlet, threatened asphyxia of the fetus.

Table, chloroform, assistants, Dr. G. I. Bluhm and two senior medical students. Forceps applied in the left oblique the sagittal suture being in the right oblique. Ten moderately strong tractions made as nearly as possible in the axis of the inlet did not succeed in moving the head and six stronger pulls did no better. It was evidently impossible to bring that head through the inlet, the disproportion being greater than we thought.

Now what to do? The head being fixed, version was out of the question, further, version is not a good operation in a generally contracted pelvis. Caesarean section offered a bad prognosis. There remained symphysiotomy and craniotomy.

The fetal heart tones were 40 per minute and irregular, the asphyxia had been progressing over 8 hours. The chances of the child then were bad, and those of the mother after the long labor, the attempts with the forceps, the impossibility of getting good after-care, made us decide in favor of the less serious operation.

Perforation of the anterior parietal bone with Naegele's perforator, evacuation of the brain with a douche. The first application of the blades of the cranioclast was unsuccessful. The second held but the extraction met considerable resistance. Third stage normal.

Female fetus, weight without brain, blood and meconium 8½ pounds. No cervix tear or perineal injury.

On the 4th day rise of temperature to 101.4 degrees and fetid lochia—cathartic and ergot. No further trouble. Up on twelfth day,

about her work the fourteenth. She is now four months pregnant—we will probably induce labor in the seventh month.

Case III. This case presents more than ordinary interest from several points of view. Mrs. L. M., age 32, Russian Jewess, V para, called the services of the Dispensary June 10th at 10 A. M. She had had four children of whom two were still-born, cause unknown. Pains had begun early in the morning and continued all day till 10 P. M., when they were 7 minutes apart and quite strong. During the night the pains kept up about 4 minutes apart attended by powerful expulsive efforts. At 6 A. M., there being no progress, assistance was sent for.

Examination. Thin, small woman in a highly anxious nervous condition. Pains frequent, strong, expulsive. Uterus at the ribs, fetus, occipito laeva anterior. Head freely movable over inlet, heart tones on the left a little below the navel; above the pubis a soft bulging tumor, not the bladder which was empty. A furrow is visible above this, on the uterus about four inches from the pubis extending from the left above to the right below. This was a well marked "contraction ring" and pointed to a dangerous thinning and dilatation of the lower uterine segment.

Internally. Rectocele, vaginocele, vulva turgid with varicose veins and edematous. This condition had arisen in the last two hours. Cervix completely dilated, bag of waters intact, head movable in the inlet.

Pelvis small, sacrum flat, symphysis low, the linea innominata showed the sharp angle near the promontory characteristic of rickets, conjugata diagonalis  $10\frac{3}{4}$  cm., conjugata vera estimated  $8\frac{3}{4}$  cm., spines 23, crests 26, bi-trochanteric 28, Baudelocque 17.5, circumference 80 cm.

Diagnosis. Flat, rachitic pelvis with a C. V. of about  $8\frac{3}{4}$  cm.

Thinking the head could still be forced through the inlet by the strong pains I ruptured the bag of waters and waited. One hour later examination showed the head fixed on the inlet, anterior parietal bone presenting, sagittal suture running transversely about an inch from the promontory of the sacrum, small fontanelle very high to the left, large fontanelle to the right and low. On the abdomen the contraction ring had receded above the navel, the lower uterine segment could be seen ballooning out at each pain. The round ligaments were tense and very tender, especially the left. Evidently something had to be done as the uterus was on the point of rupturing. The child was living.

The following operations presented their claims for consideration—symphysiotomy, version and extraction, high forceps, and craniotomy.

Regarding symphysiotomy, the degree of pelvic contraction was not great, the patient had given birth spontaneously to four children, so it was reasonable to expect that a less mutilating operation would suffice to deliver her.

We decided to do a version, hoping that the aftercoming head would pass more easily through the narrowed inlet. The left hand easily displaced the head and got into the lower uterine segment. This was excessively dilated and with very thin walls. High up could be felt the contraction ring tightly around the body of the child and higher on the posterior surface than in front. The condition of the lower uterine segment was certainly dangerous and any attempt to turn the child would surely have precipitated its rupture. On withdrawing the hand the head was brought over the inlet in such a way as to correct the former faulty position, which succeeded so well that it became fixed in the inlet with a large segment passing into the pelvis. The high forceps operation was now tried. Breus' axis traction forceps was used, but simply as Carl Braun emphasized, as an instrument of trial, a diagnostic instrument. Six slow powerful tractions were without effect, two being made in the Walcher, or hanging position. Two additional tractions were made with Simpson's forceps, also without effect.

It was evident that the head, which seemed very hard, would not go through the inlet. The child in the meantime had begun to suffer, the heart tones were 80 per minute and irregular.

The operation of symphysiotomy was now explained to the husband and mother of the patient, but after a hurried consultation they refused permission.

Craniotomy was the only operation left and as the condition of the patient was none too good, this was done quickly. Perforation with the Naegele perforator, cranioclastis with the newer modification of Anvard's cranioclast. The instrument held excellently, but the head still met with resistance in passing the superior straight.

Examination after the third stage showed no injury to the genital tract. The hand passed into a great space, which represented the lower uterine segment and on the top sat the contracted fundus of the uterus. Through the thin walls could be felt the pelvis, the promontory and the aorta, with surprising distinctness.

Patient was put to bed in fair condition. She reacted slowly to

stimulation, there being considerable prostration the next day, which gave rise to the thought—would she have reacted had one of the more severe operations been performed?

The baby a male, 8 pounds without brain, blood and meconium, was 55 cm. long. The head was very hard, ossification of the fontanelles being nearly complete, and this probably had a good deal to do with the dystocia, because the spacial disproportion between the head and the pelvis was not so great. The puerperium was undisturbed.

The points of special interest in this case are, first, the rapidity with which the lower uterine segment dilated when the resistance to the engagement of the head became confirmed, and this too before the discharge of the liquor amnii. All the cases of uterine rupture that I know or are found in the literature occurred after the rupture of the bag of waters (8).

The tendency to rupture of the uterus varies in different women and in the same woman at different labors. The uterine muscle may be very soft and allow a dangerous dilatation very early in labor. The low general health of this patient makes this explanation probable.

Second, the occurrence of anterior parietal bone presentation. As Litzman (1) pointed out, deformed pelvis interfere with labor as much by producing anomalies in the mechanism as in causing spacial disproportion between the passage and the passenger. This is very true of the flat pelvis where the course of labor presents such characteristics as allow us to state simply from observation of the mechanism of labor, what kind of a pelvis we have to deal with.

The most common of these irregularities is posterior parietal bone presentation, i. e., where the head is inclined on the inlet so that the sagittal suture runs near the pubis, or even in marked cases the ear presents. Next comes anterior parietal bone presentation where the sagittal suture runs near the promontory and in marked cases the anterior ear presents.

The importance of these malpositions is that the entrance of the head into the pelvis is hindered, and further it is a clinical fact that uterus rupture occurs very frequently with them. The cervix and lower uterine segment rapidly dilate especially behind where the stretching is greatest, but where it cannot be observed, and the thinning very soon becomes dangerous. Schroeder (2) lays especial stress on this point. So it was with this case—inside of three hours

after the rupture of the membranes the lower utérine segment had become so thin that a version was extremely hazardous.

Case IV. Mrs. G., I para, age 27, under the care of a midwife, for 18 hours. Labor was delayed but the pains were normal and the condition of the patient good. The midwife gave ergot and soon the pains became continuous, the patient was thrown into a frenzied condition. Dr. I. A. Abt was called and applied the forceps, the conditions for this operation being present; but even many and powerful tractions made no effect on the head (3).

Upon my arrival two hours later I found the pains infrequent and weak, the patient in a state of jactitation and making no effort whatever.

Occipito laeva anterior, heart tones 140 but faint and irregular.

Large, apparently well built woman. Crests 29, spines 26.5, Baudelocque 19, bi-trochanteric 30, circumference 84. The narrowness of the pelvic outlet was striking, the lateral walls of the pelvis converged from above downward, the spines of the ischia were close together, the descending rami pubis were only three fingers apart and the ischial tuberosities, measured after the method of Breisky, were 9 cm. apart. The sacrum turned somewhat forward. The whole pelvis gave the impression as being of the masculine type. (4).

The head was well down, the caput succedaneum large, sagittal suture transverse. large fontanelle to the right, low down, the small fontanelle to the left and on a higher level. Edge of cervix could not be felt.

Forceps were applied in the left oblique and several light tractions made to determine the mobility of the head. Then five powerful efforts were made, at the same time trying to rotate the occiput forward. The effect on the head was nil and the blades were removed from the pelvis with difficulty. Had this patient been in a hospital the question of symphysiotomy would have come up. I consider it foolhardy to attempt an operation requiring such careful aftertreatment, in a place where you cannot get it. To take the woman to a hospital would require three hours, a delay that would have been fatal to the child whose condition was not the best, and dangerous to the mother.

After consulting with Dr. Abt we decided upon craniotomy. The newer cranioclast was used and held well. The extraction of the head was easy but the shoulders gave great trouble which was over-

come by delivering first the posterior arm and shoulder, then the anterior. Even the trunk came through with difficulty.

Child, a girl; weighed  $8\frac{1}{2}$  pounds without brain, blood and meconium.

Puerperium undisturbed, patient up on the tenth day.

Striking in this case was the evil effect of ergot. Until it was given labor was taking a natural course, and it is possible that the pains might have conformed the head to the pelvis and finally have squeezed it through the narrow outlet. It is just this class of cases where one is tempted to keep up efforts at delivery with forceps and after an hour's hard work may be rewarded with a dead child, while the mother has suffered severe lacerations and contusions.

Case V. Mrs. X, Italian, V para, age 30, was seen in consultation with Dr. J. J. Alderson and Dr. J. Robinson. She had three living children at term and one still-birth, cause unknown. Has suffered a deep laceration of the perineum extending into the anus but has control of the bowel. Patient has been in labor 24 hours during the last 10 of which the pains have been severe and expulsive. The cervix has been completely dilated for a long time, but there has been no progress—the head remains fixed on the inlet and a caput succedaneum is forming. Dr. Alderson applied the forceps but in spite of good, well-directed tractions could make no effect on the head. The child was alive after the operation. At this point the writer was called.

Examination. Short, stout woman, pale, exhausted, pulse 132 and weak. Abdomen very tense and tender so that nothing could be felt. The uterus was contracted almost tetanically, the round ligaments were tight and painful on pressure. Auscultation revealed the uterine souffle on the left side and heart tones on the right, but these were entirely synchronous with the radial pulse. No fetal heart tones could be heard.

Internally. Vulva swollen so that each labium was as thick as one's wrist, head at the inlet but the caput succedaneum was visible at the vulva, and so extensive that no suture or fontanelle could be felt. The family being anxious to save the child, everything was prepared for version or symphysiotomy, and also for craniotomy in the event that the child was dead.

Table, chloroform, antiseptics with lysol. The hand was carefully passed alongside the head; just above the promontory an ear was



felt and over the chest, the umbilical cord limp and pulseless. Of course now there was nothing to do but craniotomy.

The instrument worked well as in the preceding cases, but the extraction required considerable power. The anterior arm was caught in the nape of the neck and caused trouble in delivery of the shoulders.

Third stage normal; a small laceration in the recto-vaginal septum repaired with two silk worm gut sutures. Patient put to bed in fair condition, pulse 92.

Baby 9½ pounds, without brain and blood. 60 cm. long, 38 cm. around shoulders, 29 around hips.

Puerperium normal. Control of bowel complete.

At the time of labor a hasty pelvic examination was made. Crests 27.5, spines 24.3. The pelvis seemed quite roomy, and this patient would very likely have delivered herself had the baby been of normal size.

Case VI. Mrs. Z. was seen July 29, 1896, in consultation with Dr. A. E. Coy and Dr. D. N. Eisendrath. IV para, first labor 48 hours, forceps; second, footling; third, forceps; all children living.

Present labor began at 4 A. M. and the pains were strong from the first. On Dr. Coy's examination at 5 P. M. the cervix was dilated, the head well in the inlet, face presenting, chin to the right behind. Attempts to correct the presentation and bring down the occiput failed, as also did a trial of version. The forceps had no better success. Dr. Eisendrath essayed similar operations but owing to an almost tetanic condition of the uterus was not successful.

Upon arrival at the house at 9 P. M. I found the following conditions. Rather delicate, thin woman, German, pains every two minutes, strong and bearing down. Abdominally the breech could be felt in the fundus, the breast to the right, the hard occiput to the left over the inlet, and a deep groove between the occiput and the back. Heart tones audible on the right side but they were synchronous with the maternal pulse.

Vaginally, considerable swelling and contusion of the vulva, cystocele, no lacerations. Cervix out of reach. Brow of fetus in the axis of the pelvis, large fontanelle on the left, chin high up on the right, caput succedaneum over brow and eyes, facial line in the right oblique diameter of the pelvis, nearing the transverse. The child being dead and the condition of the patient demanding rapid delivery, craniotomy was performed. Table, chloroform, antisepsis with lysol. Perforation with Naegele's instrument through the pos-

terior orbit. The solid blade of the cranioclast was put into the cranial cavity, a second blade over the forehead and as the extraction with these did not succeed, the third blade was passed over the chin and neck. Extraction easy.

After the third stage, the urine drawn by catheter being bloody, this viscus was filled with a dilute lysol solution and proven unharmed. Uterine douche of hot lysol 1 per cent. A slight cervical tear was the only injury the mother sustained. She was put to bed in fair condition, pulse 96.

Baby weighed 8½ pounds without blood and brain. Puerperium normal.

Three weeks later the pelvic mensuration gave: Crests 27.3, spines 24.6, bi-trochanteric 29, Baudelocque 20, circumference 83. Between posterior superior spines 9, between tubera ischii 10.3. Conjugata diagonalis over 12 cm. The pelvic was only slightly less roomy than normal. Uterine involution good.

The history of craniotomy extends further back than Hippocrates. It was the only method the ancients had to terminate cases of obstructed labor. In the middle ages, version, which was taught by the father of medicine, was forgotten and craniotomy was done very frequently on both the living and the dead child. When Ambroise Pare in 1550 introduced the operation of podalic version and extraction, the frequency of the crushing operation grew less, and with the invention of the forceps in 1723, the obstetricians considered themselves equal to all emergencies.

Indeed the pendulum swung too far, and too much was expected of the new instrument. The forceps was used as an instrument of extraction at any hazard and many women lost their own lives as did their children in the continuous and violent attempts at delivery. Cases are recorded from these times where hundreds of tractions extending over periods of hours were practiced, to the fatality of both patients. This was just before the knowledge of contracted pelvis became general, and one can hardly imagine the atrocities committed with the forceps under such conditions.

The great Osiander (died 1822), the founder of the most operative obstetric school, claimed in a forty years' practice not to have done a craniotomy. He taught that it, as well as premature labor, was a most dangerous and useless operation. The result of his teachings can still be seen in Germany and they had a lasting effect even on this side of the Atlantic.

The radical views of Osiander were not all accepted during his

time, because while Osiander senior lay on his death-bed, his son performed a craniotomy in the father's own clinic. That the teachings of this man have been felt in this country and that they have not been eradicated even yet, experience in private practice amply proves.

Aversion to the operation when the fetus is dead cannot be explained, for why should any one have pity on a dead fetus—but craniotomy when the child is alive awakens a just abhorrence.

Of the cases reported three of the children were dead, one practically lost, case II heart tones 40, two children in fair condition.

In this connection one should remember the words of Carl Schroeder (5), one of the world's greatest obstetricians, a man respected for his attainments, and beloved for his kindness by his colleagues, his pupils and the people among whom he lived.

"If the child lives one must undertake perforation when the termination of the labor is necessary in the interest of the mother, but when this cannot be brought about safely for the child by forceps or version. To be sure the extent of this indication depends on the prognosis of Caesarean section and perhaps of symphysiotomy but if these operations cannot be considered, the indication is justified, because in all these cases the preservation of the child's life, if not absolutely impossible is still in the highest degree improbable, and especially after long delays the mother comes into imminent danger of life.

"That physician, who, in his practice follows this indication, will save many, yes if he decides early, will save all the mothers, while he who rejects the perforation of the living child, or who limits it to the extremest cases, will sacrifice one mother's life after the other and yet save hardly a single child for them." A few words regarding the prognosis.

The late Dr. W. W. Jaggard said: "The necessary mortality of craniotomy is zero." Winckel says: "The percentage of maternal deaths in the hands of skillful operators is reckoned at 0 after perforation, and as at least 8.4 per cent after the Caesarean section. The former is entirely free from danger, and the latter can be designated as quite dangerous, etc."

In cases where labor has become so complicated that the operation is imperatively demanded, especially where violent attempts at delivery have been made, a certain number of deaths must occur, but these can not be laid at the door of craniotomy. For this reason all statistics regarding the operation are valueless, unless the foregoing

operations have been considered, i. e., whether the craniotomy has been undertaken as a primary operation or only as a last resource.

In seventy-one cases by Leopold (6) of Dresden, two deaths occurred and both from eclampsia for which the operation was undertaken. This leaves the mortality of the operation itself as zero. Fehling (6) in twenty-three cases lost one woman from eclampsia. These statistics are taken from the present antiseptic and aseptic era and from good operators, being the only reliable figures that could be found. Busey (7) of Washington, in an eloquent plea for the abolishment of craniotomy on the living child, gives many different statistics. According to his totals the mortality varies from 7 to 12 per cent. This includes cases where Caesarean section should have been done for the absolute indication and in all cases where ineffectual attempts at delivery had preceded the craniotomy, the last hope.

Why should there be any mortality from craniotomy if it is properly carried out? The operation can always be done slowly, there is plenty of time to prepare everything according to the most stringent rules of asepsis. The perforation of the head under the guidance of the fingers is done with absolutely no injury to the mother and the subsequent application of the cranioclast is simpler and easier even than the forceps. Care is required in the extraction of the child to protect the soft parts from splinters of bone. If the cervix is not dilated gentle traction repeated often for there is no hurry, dilates it evenly and safely. Absolute cleanliness protects the patient from infection. In this way I have done these six craniotomies and the only injuries inflicted were slight cervix tears which occur even in normal labors. All the mothers recovered, and this, too, in spite of serious and forced operations previously attempted upon them.

The instruments which were used I present here, one, the ordinary Naegele perforator, of the form of a glove-stretcher, the other my own modification of the Auvard cranioclast.

There are a great many cranioclasts on the market and I would hesitate to introduce a new one to you did I not believe that it possesses many and distinct advantages:

First, it is smaller and lighter, but at the same time more powerful. The cranioclasts and cephalotribes on the market all are unnecessarily long and clumsy.

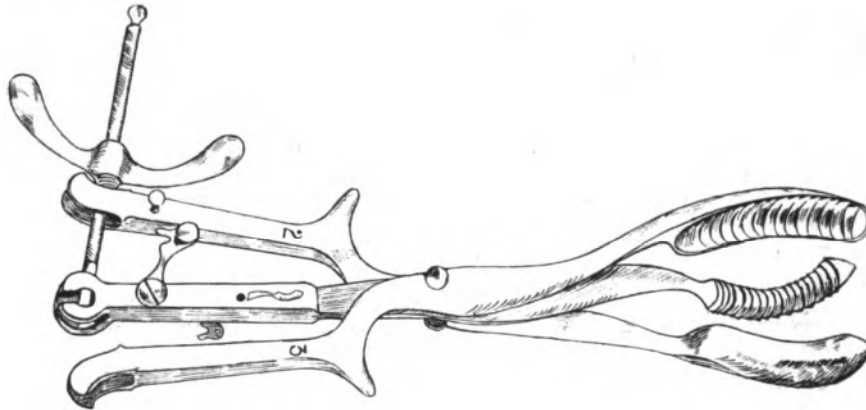
Second, there are no fenestrated blades through which spiculae of bone can project and injure the soft parts, or into which a fold of mucous membrane can fall and get into the grasp of the instrument.

Third, owing to the size and shape of the ridges on the blades, the grasp is sure, the instrument cannot pull out.

Fourth, this instrument reduces the head to a minimum size, because it acts at the same time as a cranioclast and a cephalotribe. Thus the old discussions as to the relative merits of these two instruments are now definitely settled.

This instrument was not constructed from theory, but is the last of four models all of which were tried on the mannikin and the living. Those who have seen it used bear me out when I say that it serves admirably its purpose.

The middle blade is passed into the skull through the opening made by the perforator. Blade 2 is passed over the face, locked,



screwed down by means of the powerful thumbscrew. Blade 3 is now passed over the occiput and screwed down likewise. Both having been fastened by means of the catch and pin, the compressor is removed and the extraction of the child completed, following the rules for forceps.

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