

WHAT IS THE BEST TREATMENT
IN
CONTRACTED PELTS?

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WHAT IS THE BEST TREATMENT IN CASES OF LABOR IN
CONTRACTED OR DEFORMED PELTS, RANGING FROM
TWO AND A HALF TO FOUR INCHES—FORCEPS OR
VERSION?

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PART I.

I SHOULD be wanting in courtesy and respect if I did not respond to the resolution which was passed at the meeting of the Section on Obstetrics of this Academy, last June, to present in a more extended form to the Academy the observations I made extemporaneously at the meeting of the Section in May last.

I was not aware, until a short time since, that your worthy President desired that I should occupy the first meeting, at the opening of the Academy, after the summer vacation. I realized, from my professional engagements occurring out of the city for two or three weeks, that I should not be able to perfectly fulfill my obligations to the Section, and I am fully aware that these observations are not so complete nor so thorough as I could wish.

The question for consideration and discussion at the May meeting of the Section on Obstetrics was, "What is the Best Treatment in Cases of Labor in Contracted Pelves?"

Instead of this general question, which embraces a considerable field, I propose dividing it into two parts, viz.:

1. What is the best treatment in cases of labor in con-

tracted or deformed pelves, ranging from two and a half or two and three-quarters to four inches?

2. Is craniotomy, cephalotripsy, or cranioclastm, preferable, in a case of labor when the pelvis ranges from two and a half or two and three-quarters to one and a half inch, to the Cæsarean section?

I intend this evening to occupy your attention with the first question, and shall defer the second to another opportunity. Both questions are highly-important, clinical, and practical ones, and I trust the subject is one which will merit a free discussion by the many able and experienced obstetricians present. No point in the wide field of obstetrics has attracted more attention than this subject, and none where such a great difference of opinion has been manifested during the last fifteen or twenty years.

We must concede we are under great obligations to our predecessors for the genius they have displayed and the industry they have shown in investigating the importance of treatment in contracted pelves. So much light has been accumulated at the present day, with the improvements of instruments, the investigation as to the formation of the different kinds of deformities of the pelvis, and the mechanism appertaining to the class of labor incident to their defects, that we can look, I believe, upon the treatment of contracted or deformed pelves from the normal, with more confidence of success, especially for the mother, than apprehension. I shall confine my remarks and observations to a few practical points springing up from my own experience, differing from or affirming the opinions and views of those obstetricians who have given their attention to this subject. To solve the question before us, as to the best treatment, we shall have to consider whether version or forceps be most preferable and judicious, or what are the advantages and success of one over the other?

Two important principles are to be recognized, and these should guide our action:

1. To select such operations as may conduce to the

safety of the mother and child, and avoid craniotomy if possible.

2. To deliver the patient with as much ease and safety, and as early, as correct and judicious treatment to her pelvic structures and her future health may require.

Before expressing my opinion regarding these points, allow me to present the clinical history of two cases of labor, and which are brought forward as typical of those kinds of cases which we occasionally meet with in active practice. One occurred in a uniformly contracted pelvis, and the other in a simple flat, non-rickety pelvis. I shall reserve the history of a case of kyphotic pelvis with a diameter of only one and seven-eighths inch in the inferior strait, and the presentation of a double ankylosed pelvis, the "Robert pelvis;" and the recital of a case of labor in a simple flat pelvis of two inches diameter at the superior strait, to the time when I take up the second part, or contractions from two and a half or two and three-quarters to one and a half inch in diameter.

CASE I. *Simple Flat Pelvis*.—M. C., aged twenty-one years, was taken in labor November, 1868, at 6 A. M., in Bellevue Hospital, with moderately active pains, occurring every fifteen minutes till 9 A. M., when the membranes ruptured and the waters were evacuated, the os uteri opened to the size of half a dollar. By 12 o'clock the os uteri was nearly fully dilated. I visited the patient at 1 P. M., just previous to my lecture at 1½ P. M. A deformity of the pelvis was recognized, having a diameter, as I supposed, of three inches at most; the head presenting, and placed slightly obliquely transverse at the superior strait; pains active. I decided to deliver the patient by version. After being fully anesthetized by chloroform, and afterward by sulphuric ether, she was brought before the class in the amphitheatre. External manipulation was adopted: after raising the head from the superior strait, and bringing the breech down, the hand was introduced into the vagina, when a knee was recognized and version, by two fingers, accomplished. During the delivery of the body of the fœtus, the back of the child was made to look posteriorly, abdo-

men upward; the occiput directed to the left sacro-iliac space, child's face looking slightly upward, instead, as is usual, downward. Firm pressure was made on the forehead of the child, and the occiput pressed against the latero-posterior part of the pelvis; the posterior part of the child's head occupying the larger or the sacro-iliac space of the pelvis. In this position, by the external pressure on the head, the frontal, as well as the occipital, was made to shelve some little under the parietal bones, thus diminishing the long diameter as much as one-quarter inch; then, with firm, steady and decided pressure the head was forced downward and backward, while the body of the child was brought forward, when the head passed into the cavity of the pelvis, and the child was delivered in the ordinary way after version—face posteriorly, back upward. The tilting obliquely or canting the head is only following the instructions we notice in many cases of labor, as it is not always synclitically placed. The child weighed over nine pounds. The absolute measurement of the child's head was two and a half inches bitemporal after delivery. The indentation was fully half an inch, and the child lived for a few minutes. I am fully aware of the uncertainty of being exact in the measurement of deformed pelvis by any instrument or finger. Having made trial of the various pelvimeters, I confess my attachment to the use of the finger after the different positions the patient may be placed in for examination. In my estimate I allowed more for the thickness of the soft structures. Time of delivery, half an hour.

The patient had no unfavorable symptom, and progressed satisfactorily to a perfect recovery.

CASE II. *Generally Contracted Pelvis*.—March 4th, 1875, at 9 A. M., I was requested to visit, in consultation with Dr. C. C. Lee, Mrs. S., aged twenty-three, primipara, in labor, and arrived at full term. She was taken in labor on the 3d, and seen by Dr. Lee at 11 P. M. Labor had advanced but little; os uteri not opened. He left her till morning. Summoned at 4 A. M. on the 4th; at 6 A. M. os uteri

dilated so as to admit the finger, and very thin. Pains frequent and of some severity, membranes ruptured, waters evacuated; she remained in this state till I saw her at 9 A. M. Chloroform had been administered on account of the severe pains and the nervousness of the patient. On examination I recognized the head of the child presenting, and the occiput dipping into the superior strait posteriorly. Head well flexed, and covered by the expanded cervix; os uteri opened to the size of a five-cent piece, or seven-eighths of an inch. Full dose of laudanum ordered, forty to fifty drops, to procure some sleep if possible, and to be visited at 1 P. M. Very little sleep obtained. Pains not so frequent nor so severe. As there was no improvement in the labor, patient restless, and the pulse over 100, it was decided to aid the delivery, and for this purpose to apply my long, small, thin-bladed forceps (Fig. 3), instead of resorting to the dilators, or by manipulation on the cervix with the finger in stretching the os uteri. She had now been in labor twenty-two hours, and seven hours from the rupture of the membranes; os uteri the same size as it was at 6 A. M. Chloroform was administered at 2 P. M. The small, thin-bladed forceps applied. The forceps were selected in this case as offering an earlier relief than by version, which latter could not have been accomplished with so much safety nor so soon, I believe, as the cervix was thin and not dilated to the extent of two inches, sufficient to allow the introduction of the hand, unless the two-finger turning, with external manipulation, was carried out. In fifteen to twenty minutes the cervix was sufficiently expanded to withdraw the small-bladed forceps, and apply a stronger and larger instrument, the os having a diameter of two inches, with the occiput partly through the cervix. It was at this stage I suspected a uniformly contracted pelvis. Traction was made slightly downward and backward. During the traction with the large forceps, the cord came down two or three times and was easily replaced. As fully three-quarters of an hour had elapsed since the trial of the forceps, and no advance having been made in the further descent of the head in the cavity, the child being

dead, with the consent of the husband and the concurrence of Drs. Lee and Smith, embryotomy was performed. It was apparent the pelvis was uniformly contracted, with a diameter of about three and three-quarters inches; and as there was no prospect of her being delivered in any other way, the head was perforated with the forceps on, brain evacuated, and traction made, and the child delivered in fifteen minutes. Time of operation one hour and three-quarters; child weighed eight pounds. There was some slight pelvic irritation afterward for a day or two, and the patient recovered perfectly.

It is my impression that there could have been no better course adopted than this, if we desired the delivery of the patient in the condition the os uteri was in. It illustrates clearly to my mind, and from the experience I have had in the early application of the forceps, that greater benefit will result not only to the mother and the child, as by delay and procrastination, more unfavorable symptoms may arise which would tend to the unfortunate issue of the case. I have never seen any bad results in the application of the forceps in like cases, and some of the patients have been inspected ocularly soon after delivery. On the other hand, two perfect and complete circular amputations of the whole vaginal portion of the uterus have occurred under my supervision, when the delay and neglect to use the forceps was evident. In both these cases, the vaginal portion was examined and measured, in one in some parts one and a half inch, and in the other one inch. In a third instance the measurement was three-quarters of an inch.

In July I saw, with Dr. J. P. White, a case of eclampsia in a case of pregnancy of eight and a half months. The convulsion was very severe, the patient remained comatose for three days, and for a time was partially paralyzed, but recovered perfectly. In this case labor was instituted, and the contraction of the pelvis could not have been more than three and three-quarters inches. The child was obliged to be sacrificed in this case also. The history I have given of the cases of uniformly contracted pelvis, as well as in the one I shall relate in

a kyphotic pelvis, occurred on the same day, and required the same treatment in this early stage of labor. It is an innovation which may appear injudicious and culpable, if we are to receive the opinions of the older as well as the latest authorities of the obstetric art. If authorities had been the guide for myself in the treatment of these cases, at this early stage of labor, as well as in many others I have seen for several years, I fear I should not have met with so favorable a result as the issue presents, for the mother, as the contingencies of delay would have imperiled the lives of the mothers still more. To obey the *dicta* of those whose views are accredited with Nature's handiwork, would, I believe, as it has been in a great many instances, the silent sacrificial act, the death of both mother and child. I am aware the views I hold conflict with the highest authorities, but I have presumed for many years to differ on this point from them and avoid tradition. Let us hear, to lead off, what my preceptor, Dr. Meigs, says: "The os uteri must be dilated and gone up over the child's head. A man should hardly be justified who inserts his forceps within the os uteri, he must *wait* until the circle can no more be felt." Dr. Bedford says: "To attempt to introduce the blades of the forceps into an undilated os, would in my opinion, be but a passport to the death of the patient, for admitting the possibility of the introduction of the instruments, would not the traction necessary for the delivery of the head be almost followed by the rupture of the uterus?" Dr. H. Miller says: "1. If the whole of the os uteri can be felt, no matter how large the circle may be, or even if the half of it can be easily reached by the fingers, there will be contusion of it by the forceps, and danger of craniotomy.

"2. The head of the child must have descended into the excavation, and the os uteri widely dilated."

Dr. Hodge: "The os uteri should be fully dilated, or at least easily dilated."

Velpeau: "The os uteri should be completely dilated for a greater or less period of time."

Chailly the same.

Cazeaux, my preceptor: "The dilatation or dilatability of the os uteri is even more indispensable here than in the case of version, and we must be cautious that this condition exists."

The three latest authorities on this point are Leischman, Schroeder, and Barnes.

Barnes says: "The cervix must be fully dilated" (p. 89); "also os when three fingers can be introduced, say two and a half inches."

Leischman: "A complete dilatation of the os uteri is indeed, in a sense, absolutely essential, and it is certain that a greater degree of dilatation is necessary for the forceps than for any other of the operations for delivery." He says, agreeing with Ramsbotham, that "there may be cases where it is only one and three-quarters inch dilated."

Schroeder (American edition, 1874, p. 174) remarks: "The cervix uteri must be obliterated, and the os so far dilated that the head can easily pass through it." As Schroeder's views are the latest German opinion on this clinical and practical point, I will state them further: "As regards this condition of the os, the forceps may be applied in an urgent case, as soon as the blades can be passed through the os from an inch and three-quarters to two inches; in case of contracted pelvis, from two and a half to three and a half inches. When the os is as yet little dilated, and while the dilatation continues, it is fixed there, and the progress of the head is retained for a long time; *even then*, there is *no* active interference required, unless the state of the mother demands it. The forceps, in most cases, proves of no avail, and *nothing* more, therefore, remains but to let the child die, and thus facilitate the delivery for the mother by perforation of a dead child."

Dr. W. Goodell, of Philadelphia, in his remarks before the Obstetrical Society, June 26, 1872, says that, as a rule, he "waited for the os to dilate, or to be dilatable; but he applied them as a dilating wedge to a rigid os."

Dr. George Johnson, late Master of the Rotunda Maternity Hospital, has been accustomed to apply the instruments when the os uteri is an inch and six-eighths in diameter, for

the last four or five years, with the ordinary-sized forceps (Barnes's), and which form of forceps could not be used with safety in the small size of the os uteri as can my own. I present two diagrams, one taken from Dr. Johnson's Sixth Clinical Report, and one of my own, showing the form of the blades of the instruments and the space each requires, and in which it can be introduced. (See Figs, 1 and 2.) I need not enlarge further on this point, with the exception of saying that in some of the cases after the early application of the forceps into the cervix uteri when it has been dilated from one to two inches, the object of the application of the forceps was simply for the instrument to retain the head of the child in contact with the os uteri during and after a pain, and in some cases aid in flexing the head when the vertex presents, so that the occiput may be put in apposition with the os tincae, and thus become the natural dilator of the cervix.

The simple flat pelvis, non-rickety, as well as the uniformly contracted, are the class of pelvis we are more generally called to treat, and they are confined, not to the lower classes of society, but in the higher walks of life. I have, however met with the obliquely-ovate, the funnel-shaped, and the kyphotic pelvis. I present for inspection to you a pelvis of the simple flat order, and the cranium of a child which was delivered in Bellevue Hospital, by version, and whose case I have related, giving a measurement of two and a half inches in diameter, with indentation; and another child's cranium delivered naturally through a uniformly contracted pelvis of three and a half to three quarters inch.

The contrast in the form and shape of these crania is very decided, giving an illustration of the character of the deformity of the pelvis, which is also very clear and significant as to the method of treatment which we have considered as appropriate.

I believe these kinds of pelvis are frequently overlooked, and when the delivery is tedious and slow the labor is classed under the type of tedious labor, especially if it is an occipito-posterior presentation of the child's head, while in reality the cause was a uniformly contracted pelvis of three and a half or three and three-quarters inches in diameter.

It is not the kind of deformities only we have to deal with, but other considerations should influence our treatment. . We are not to be unmindful of the more or less advanced state of gestation, variation in the size of the child's head, its body, male or female, its state of life or death, the presentation, the more or less regular position, the capacity for moulding of the head, owing to its flexibility or a more or less perfect ossification. On the part of the mother a more or less powerful contraction of the uterus, more or less energetic action of expulsion, a variable inclination of the pelvis, sometimes the long axis of the child's body to the long axis of the uterus, or a greater or less amount of laxity of the nervous system, and the time of labor—all these are so many important circumstances which may and do change the result of the labor to such a degree that the indications derived from the pelvic contraction are themselves susceptible of great modification in the kind of treatment, version, or the forceps, and the success of it. It is therefore evident that it is not entirely in the faulty confirmation of the pelvis that the treatment lies, but it is the last one of the elements in the solution of the problem; still there is no doubt the difficulties of labor generally bear relation to the extent of the osseous deformity.

The principal point of importance to consider is, What are the character and formation of the pelvis, which should modify and direct the course of treatment? The profession have been too much inclined to consider simply the contraction, as existing at the antero-posterior diameter of the superior strait, without bearing in mind the presence or absence of contraction in the other portions of the pelvis. It is true the contraction is more generally recognized in the simple flat pelvis than in the generally contracted one, and the treatment incident to both of these is, I believe, as a general rule, entirely different. The pelvis I present to you is a most excellent specimen of the simple flat type, and one rather unusual to meet with—ample at the sides, cavity natural, but decidedly contracted in the antero-posterior diameter of the brim, of only three inches. Such pelves pre-

sent an ample amount of space on either side for the occupancy of the occiput, and present favorable considerations for version, while they may be a bar to the unsuccessful application of the forceps. The deformity in the generally contracted pelvis does not admit of so favorable a result by version as by the forceps. The contraction is not in one point alone, but in all the diameters of the pelvis, and, if version should be accomplished, the space in the cavity of the pelvis is not sufficient or ample enough to allow of but little if any flexion of the head if the vertex presents, to permit the long diameter of the head to be changed to the smaller, the bitrachelo, nor does it admit of rotation taking place so readily should the occiput be posterior, and which I have in several instances noticed in this form of defect of the pelvis, more than in the simple flat. Should the contraction of the uterus be powerful, steady, and frequent, the head of the child will be fashioned like the cranium I have shown you, the head being round, and the occipital and frontal bones shelving under the parietal, diminishing the long diameter of the head fully one-half or three-quarters inch in some cases. In a case of labor in this form of pelvis, which I attended in April last, the brow presented, and, after a steady, firm, and energetic action of the uterus, I intentionally permitted it to go on without chloroform for one hour; the head was delivered in that position, with a large caput succedaneum on the brow, and the vertex with the occiput pressed backward on the neck like a tippet. In these brow-cases, if the head does not descend, I prefer making it a face-presentation, instead of the occiput, and they are sometimes very easily delivered. In this case, as the pains were accomplishing the work well and efficiently, I allowed the uterus to terminate the labor without chloroform, as this agent would have only retarded its accomplishment.

The cases of labor in the uniformly contracted pelvis tend more to the necessity and performance of craniotomy, than the simple flat pelvis, for the reasons which I have adduced.

This distinction, in a practical aspect, has not been presented by authors on obstetrics in that clear light which

the nature of the cases demands for treatment. Borinsky has, more than any writer, the last few years, referred to the subject, and holds views analogous to those of myself. Schroeder, although referring to the subject, advocates version as the proper treatment in all cases of contraction of the pelvis. From my own experience, I consider the uniformly contracted pelvis nearly as frequent as the simple flat, non-rickety pelvis.

The treatment by version has, at the present day, assumed a more decided and definite character since the elaborate and able article of Simpson was published in 1847, addressed to the profession, with that energetic spirit he always manifested when writing on any important obstetrical subject. His deductions are, however, drawn more generally and chiefly from the cases related by Lee, Collins, Smellie, Denman, and La Chapelle. His own experience, if we are permitted to judge from the few cases he speaks of, must have been very limited, and he refers solely to the simple flat order. The principal object and purport of his paper were "turning as a substitute for craniotomy, and long forceps, and to avoid the operation of craniotomy," as was customary at that time to resort to. No obstetrician has so clearly defined the practice which should be adopted in cases of contraction of the pelvis, and with considerable experience, than Pugh, of Chelmsford, who, in 1754, states that turning should be substituted for craniotomy, but on this single point Simpson makes no reference to him in his paper.

Pugh's language is very strong, decided, and concise: "Turning in practice is of the utmost importance; it is the grand pillar of midwifery, and operators that are well versed in it will very seldom need the help of instruments. The use of instruments is, however, not to be absolutely rejected as some authors have done, for there are some cases where they are quite necessary." Pugh, although a strong advocate for version in cases of deformity—and he has reference to the same class of cases as Simpson—says that "these are the cases where numbers of children lose their lives, and many women. The grand objection to turning with all operators is, that

the narrowness of the passages through the pelvis, which hindered the natural expulsion with the head foremost, will hinder its extraction when brought forth by the feet, so that no other method but that of opening the head has been hitherto practised; this certainly destroys the infant, but turning will remove the difficulty without proceeding to so dreadful an operation." The practice of Pugh did not receive the attention which the subject should have claimed, for we find it not recognized from his day till, if I may say so, it was exhumed by Simpson, and brought out afresh in 1847. From the time of Pugh till 1847 the forceps were resorted to, and that to a limited extent by the English authorities, and afterward the short-handle forceps appear to have taken the precedence of the long during the time of Denman, Osborne and some others. Burns was nevertheless a strong advocate for the long forceps, and scarcely refers to version in these cases. He was a decided opponent to the *laissez faire* or wait-system of treatment carried out by Denman, Osborne, and others. It was especially recommended by Madame La Chapelle and by a few Germans. As a method of treatment it was rejected in France, and as W. Jones says, "without having been sufficiently tested," though suggested by Baudelocque, who considered that the structures of the head of the child are such that it collapses more easily in its width and enters more readily when the child comes by the feet, if it be well directed, than when the head comes first. Cazeaux, in his last edition, some four years since, had changed his method of treatment materially in favor of version from the use of the forceps in pelvis ranging from two and three-quarters to three and a half inches. The principle enunciated by Ould was precisely the same as that of Pugh, and in its explanation he admits he had no practical experience of the fact. Simpson, explaining the advantages of version, considered the head of the child in its *ensemble* as a truncated cone, having for its upper base the biparietal diameter of three and a half to three and three-quarters inches, and for its lower base the bimastoid, two and a half to three and a quarter. The latter, the bimastoid representing the base of the cranium, is a solid

osseous mass, and therefore irreducible, while the former is elastic and perfectly reducible to the extent of from one-third to one half, for, owing to the presence of the sutures and fontanelles, we must remember the base will be increased in proportion to the size of the child's head, and this is the principal point of the difficulty to be overcome in the direction of the case, whether by version or the forceps, or naturally, I may add, for Nature has her own beneficent influence, and teaches us sometimes how we should imitate her method of delivery.

The explanation which Simpson has presented has not been recognized as being entirely correct, and other explanations are deemed more accurate in aiding to solve the mechanism of the delivery of the child's head, in cases of contraction of the pelvis, after the delivery of the body, or when the head presents. Hodge's objection has its practical truthfulness, when he says that "the base of the cone of the head should be located at its superior part, the rear base being at the occipital extremity, and its apex at the chin and not at all at the base of the cranium." As bearing on this view of the subject, and as it has, in some measure, aided me in the management of difficult cases after version, and the direction of the head through the superior strait, I will refer to a case I saw with Dr. J. Sidney Crane, many years ago, among several others of a like nature, where the pelvis was slightly contracted at the brim, about three and three-quarters in the conjugate. In two successive labors, the forceps were obliged to be resorted to. In the last labor I saw her with Dr. Crane, and as the labor had continued for several hours, the vertex presenting, and no advance toward delivery, she was delivered with the forceps. In the third labor I was requested to take charge of her. When her labor commenced I was summoned, and every preparation made for a like event as before. I saw her two hours after the commencement of her pains. On examination I recognized the head presenting in a perfectly flexed condition, the occiput dipping, as clear and distinct into and through a cervix about half opened, and the head as plumb as it could

possibly be, truly synclitically, in the right oblique diameter; membranes intact; uterine forces strong and efficient; cervix thin and dilatable. I tapped the membrane during a pain; the head descended through the cervix, and the child was born in a few minutes after. The child weighed eight pounds, which was as much as her former children.

An illustration of an opposite character may be pertinent to the subject. In some instances where the deformity has been slight, and the vertex (not the occiput) presented, the frontal bone somewhat lower than the posterior, and the application of the forceps has not succeeded in removing the difficulty, I have made the vertex, either by the finger on the brow, or the right-angle blunt-hook on the chin, a face-presentation, the forceps was then applied over the transverse or smaller diameter of the head, three and a half inches, instead of as before over the long oblique of four and a half inches.

A very instructive case of this nature was operated on in 1870, in the presence of Dr. Baldwin, President of the National Medical Association, and three or four other delegates, with success. These illustrations by Nature and by art, changing the relation of the head in its diameter from the longer to the smaller diameter in some cases, tend to militate against the absolute indications which Pugh and Simpson have enunciated.

The advocates of version assert as favorable for this operation—

That the head is placed transversely; is caught in its smallest diameter, the bitemporal, and that the osseous base is the first to enter;

That the bones bend in and overlap better, and that it is half an inch less than the biparietal;

That the cord can be well and safely protected;

That the child can bear very great strain with impunity, and conjoined with propulsion from above to the extent of two hundred pounds;

That, when version fails, the operation of cephalotripsy or craniotomy is no more difficult than when the head presents.

The objections to the forceps are—

That they injure the structures of the parent, and the head of the child ;

That they occupy the fronto-occipital diameter of the head, the head being transverse ;

That, when compression is made, the diameter of the bi-parietal will be increased or bulged out, and these prevent the descent of the head of the child ;

That they are merely tractors, and that, if compression is made, the compression cannot be but very little ;

That the forceps cannot be applied as early for delivery as turning ;

That the cord may be pressed by one blade of the forceps on the medulla oblongata.

From some of these objections against the forceps I must dissent, while believing as I do in the great advantage of version in some cases.

In relation to the forceps being placed fronto-occipital, if the long-curved forceps are used, this will happen ; but, as a general rule, though the head of the child is obliquely transverse, there is ample space for the blades of the instrument to be applied, and they will then more usually take the oblique position—one on the occipito-mastoid, and the other on the fronto-orbicular—whichever position the head may be located in the pelvis, right or left.

If we select, however, the long, straight forceps, the head will be grasped more in the transverse, with one blade near or over the occipito-parietal, and the other fronto-parietal, as they cannot be applied directly antero-posterior.

That compression made transversely we all admit will not impart as much injury to the child's head, and that it is safer than propulsion from turning when much force is used ;

That the mother's structures are not suffering, as the compression is to be made, and firmly made, on the child's head, and thus in some measure relieving them from pressure ;

That compression may be made to the extent of half an inch, this being the limit of the compression by the instru-

ments as well as in version, unless the head is very flexible, and as much as we should desire in the use of them, if the diameter ranges as low as three and a half inches ;

That full, firm, and decided compression is justifiable, as there can be no more injury done than we witness in the moulding process by Nature when the head has been compressed as small as two and a half inches, and living children the result.

I will concede that the compressive power of the pelvis, through strong and expulsive action on the child's head, and its flexibility in many cases, is entirely different from that of the forceps, which is only in one direction, as it is in version from the compression made by the promontory of the sacrum on the infant's cranium.

That the reason which is urged in favor of version being earlier performed, is incorrect, if the ordinary rules for version are adopted : that the cervix should be opened to the extent of two inches to admit the hand to effect turning, will be amply sufficient for the application of the forceps, even if the os uteri is as small in diameter as six or seven-eighths of an inch.

But the hand need not be introduced, for by external manipulation and two fingers it may and will succeed.

Dr. Milne, of Edinburgh, who is a strong advocate for turning in cases of contracted pelvis, and still more so for premature labor, remarks, respecting the use of the forceps in the high operations when the head is at the brim : " If the head will not come down without great force in such cases, necessitating great compression of the cranium, this fact alone is damning to the high operation. The long forceps are of necessity damaging to the mother and child, and when unjustifiably undertaken will haunt the operator when awake or asleep. The forceps ought not to be used as a compressor, but a tractor ; when you employ it to squeeze and crush the head you prostitute it entirely. It is true you may with a considerable fight extract a living child, although reverses often happen. But, what of the future history, not to speak of maternal injury, to which we shall refer ? "

" As regards the long-forceps children—I mean their his-

tory—not a few practitioners have noticed their merging into idiocy from the compression being great antero-posteriorly.” In the practical remarks I shall make on the subject I shall, from a long and extensive experience, be constrained to take conservative ground, though an advocate of such procedure in cases we are considering.

If this gentleman, before he had passed such denunciations on the conservative use of the long forceps and high operations, had consulted Hecker and Weber on the subject of the future condition of the infant consequent on labor, he could not have attributed to the instruments the unfortunate circumstances he has.

The dissections of these gentlemen show the important fact that mechanical injury of the foetal head, neck, or trunk, is not necessary for the production of intense congestion and blood-extravasation of the serous membranes of the brain, spinal cord, and chest. Ollivier has observed especially, and others maintain, that while at natural birth the spinal cord is perfectly developed, the brain is still in a very rudimentary state, and consequently able to bear considerable disturbance without ultimate injury to its function. In fact, in the newborn child, brain-life is entirely absent. Dr. J. Crichton Brown, in 1860, attributed idiocy sometimes to difficult labor solely.

With the strong denunciation against the long forceps, curved or straight, I am compelled to assert that, having in a very large number of cases operated with the head at or above the superior strait, in public and private practice, I have yet to realize the unfavorable condition, from their application, referred to; and yet extraordinary and great force, which some consider imperative, I have not resorted to. In version some force is called for, not only on the body of the child, but the head, by pressure from above the pubes. Has not great force been used on the body of the child, even to the very limit of human traction on the neck of the child, so that the tissues have been heard to crack and snap with the force employed? Is this more mild in treatment than the compression of the forceps

and its results as supposed? But are not both these methods justifiable? Can we in the delicate position we are placed in; in cases of this kind, with the head of the child grasped in one instance by the blades of the forceps, or the after-coming head nipped and compressed by the promontory of the sacrum, can we hesitate to use that measure of force which may be required, tempered with judicious action as to our object and experience from the nature of the case—or shall we wait for the child to die or the employment of craniotomy? In judicious hands I believe it to be perfectly correct and right to do so, for success may crown our efforts. But in the failure we must adopt the alternative, and prepare for the sacrificial act, and save the mother.

Let us canvass some of the facts presented to us by a few authorities, and among these the latest, even if they have been referred to by others:

Of the seventeen children reported by McClintock, of Dublin, delivered by version, nine died.

Of the nineteen cases of Madame La Chapelle, five belong to the class of slight contraction in which all the children were saved, one mother only dying of peritonitis.

In ten cases of considerable contraction all the children died, and four mothers died.

Of the nine cases of Dr. W. Goodell, of Philadelphia, eight children were living and one died. A most excellent success under the course of management adopted, with powerful traction and propulsion from above the pubes on the head of the child.

In Jones's reported cases, of fifty-one in contracted pelves ranging from four to three and a half inches, delivered by the forceps, fully one-half of the children died, while, in McClintock's forty-seven by version, nearly all the cases were slightly contracted at the superior strait, being the simple flat pelvis, and most of the women had given birth to their children by natural efforts before.

Nevertheless, in every instance great force was employed subsequently to turning. No reference is made by Dr.

McClintock to propulsion from above the pubes to aid the delivery. In one case powerful force was used in order to bring the head into the cavity of the pelvis. Dr. McClintock admits he is not a strong advocate for version, and that he is no expert operator with the long forceps. He thinks the good opinion of the method by version has been exaggerated by its advocates, and that it is only in slightly contracted pelves that it can be resorted to with any chance of success. Dr. Goodell's results are the most favorable of all the authors with whom I am acquainted. With the amount of traction, with the propulsion which was used, and the success attending it (although there were much cracking and snapping of the tissues of the child's neck as he says), we must admit the children made a narrow escape of their lives.

We are all aware that the force of traction upon a child's neck may be considerable in some instances, and that a living child's cervical structures are much stronger than a dead one's. Should the remark by the Edinburgh accoucheur, that "the forceps may be considered as the cause of producing, by the compression of the blades, idiocy," and which I have referred to as having very little, if any, cause in establishing it, be brought as an argument against the use of the long forceps in the superior strait, and especially in deformities?

We are not, however, to forget that in version the danger is equally as imminent, if not more so in some respects, for the welfare of the child. Joerg asserts that immediate death, although the heart continues to pulsate for several minutes after birth, follows mechanical injury, such as stretching or twisting of the cervical vertebræ. It is true that children may recover from considerable injury in this situation. We recognize also, from positive investigation after death, that the future existence of the child may show affections of the glottis pharynx, tongue, lips, spastic rigidity of the limbs in the consequent arrested development of some of these parts, and these results may be referred to injury at the base of the brain and medulla oblongata. Little has observed more than fifty cases of injury, of mind and body, from abnormal parturition,

the subsequent symptoms indicating that the brain and medulla oblongata had permanently suffered, and the only one of the nervous centres which presented symptoms of lesion was the medulla oblongata.

Looking at the various reasons for the employment either of version or the forceps, for the benefit and welfare of the mother and child, considering the contingencies attending each method, either of them being elective operations, our special object should be, if possible, to avoid perforation of the cranium of the child. It is certainly very difficult to decide upon which we shall elect, and we must be guided by the peculiar circumstance of each case which may be presented for our counsel. In the simple flat, non-rickety pelvis, version may be preferable, but it is not as available, I believe, as a general rule, in the uniformly contracted one. The powerful traction and propulsion which were exercised in some of the cases of Dr. W. Goodell were certainly very great. I shall refer to case No. 8, a uniformly contracted pelvis, as one of the typical cases for this method. Dr. Goodell says that Dr. Roberts and himself together exerted a force of not less than two hundred pounds; in Case IX., simple flat pelvis, of two and four-fifths inches, a force of one hundred and fifty pounds.

My friend Dr. Goodell says that exerting all the manual strength he could command, he has never seen the body part from the head. I have unfortunately seen three instances, although not the operator, and the children had been dead but a few minutes.

In this class of labors, to uniting propulsion from above the pubes with traction on the body and neck of the child, Dr. Goodell considers his success was to be attributed. He remarks that, "so far as I can judge from the history of the cases from Simpson, of the delivery of a child in a diameter of 2.5 inches, and which was dead; of Schroeder's case, of a living child, through a diameter of 2.8 inches; of Blot's case, of three inches, and Taylor's case" (my own) of $2\frac{1}{2}$, as he has it, but which should be $2\frac{1}{2}$ inches; "in none of these cases did the operators, excepting myself, invoke the very sub-

stantial help of a propelling force, and hence the inference is logical, that the conjunction of traction and propulsion offers better results than version in these cases."

In reply to this remark of Dr. Goodell, I must say that I have for fully fifteen years adopted this double method of treatment in these cases, and performed it several times before large classes of students at the Bellevue and Charity Hospitals. At the Women's Infirmary the same course has been witnessed by many of my friends. The specimen of the head I present to you this evening, and which Dr. Goodell refers to, was delivered in this way before a packed audience in a very large amphitheatre at the Bellevue Hospital. The head was not fractured at the time of delivery, but the fracture occurred from a fall afterward. The bones were bent in, and the specimen is one of the most perfect illustrations of the kettle-drum indentation you can find.

The indentation is more anterior to the fronto-parietal suture. It also demonstrates that there was no compression of the parietal plates by the sides of the pelvis, as they are as wide as when delivered naturally, head first. This practice I claim no originality for. Pugh, as I stated, was the able advocate for version, and on this point he records his opinion as follows (Pugh's "Midwifery," 1754, page 53): "After the body is delivered, keep your left hand on the neck still in its place, never let that go; direct the nurse, or one of the most handy women about you, to get upon the bed, kneeling close by the side of your patient, with her face to you, and put her hand under the bedclothes, close to your patient's pubes, with the inner part of her arms turned to your patient's body; then with your right hand feel externally for the child's head, and the most proper place for it, not exactly over the pubes, but on one side toward the groin; then fix the hind-part of the palms of both her hands upon the child's head, bidding her press down *pretty* strongly, you pulling the child at the same time, and by this method, and with such assistance, I have never once failed of success." He says still further: "The child's head is capable of being

moulded into many shapes, as the bones are flexible, and will admit of being bent a great deal without any injury, or very little."

I have not, in my operations on the after-coming head, used the great amount of propulsion, or of traction on the neck of the child that my friend Dr. Goodell has, nor have I ever applied to forceps operations the extraordinary force that has been described by some writers. I believe that it is absolutely necessary, in the management of this class of labors, that we should, if version is adopted, try if possible to adapt the head to the largest part of the pelvis, which is the sacro-iliac space. Examining the cranium of the child I have shown this evening, it will be perceived that there is no compression of the parietal bones, and the head is as large and as natural, except the indentation. It must be apparent that, if a cranium of that size could be delivered through a pelvis with a sacro-iliac space as large as that, though the conjugate was only two and a half inches, it is probable that if some other method of managing the head could be adopted it might succeed. There are objections to the manner of delivering the after-coming head in these cases in the ordinary way. The head as I have found has been placed slightly obliquely transverse and not directly transverse, as is usually considered. The smaller diameter of the head, the bitemporal, rests upon the narrow part of the pelvis, the conjugate. If traction, therefore, by one or two fingers inserted into the mouth of the child is made, the superior malar bone would be made the larger part of the head, and would be brought in apposition with the contraction and the head could not be delivered. The first step to be carried out or adopted is, after the body is born, and the head is brought into the proper position and relation to the pelvis, the smaller diameter, the bitemporal, is made to correspond with the contraction. The body is carried backward, and the head is to be pressed downward and backward toward the cavity of the pelvis with propulsion from above the pubes in the same direction as the body. Should it be found to be advancing ever so little and yet retaining its position, then by bringing the body of

the child quickly forward toward the pubes and making firm and decided pressure on the head downward and forward in the axis of the outlet, it will sometimes pass very easily and quickly into the cavity and be soon delivered.

Another method may be adopted, which has sometimes succeeded in my hands, and where the diameter has been as small as three to two and a half inches, if the first method has not succeeded, and there appears more delay than we had anticipated, and to avoid craniotomy, lift the body of the child as much anteriorly as it will properly admit of, then with the assistance from above direct the posterior part of the child's head to the sacro-iliac space, and press with some force on the forehead of the child, the face looking upward. I will illustrate this method by the recital of a case which occurred at the Woman's Infirmary. The patient had a simple flat pelvis, with a contraction of three inches; she was eight months and one week advanced in pregnancy. She had been delivered once before by craniotomy a few years since. Premature labor was induced by Lazarewitch's method. When the os uteri was two inches in diameter, external version was made and the two-finger turning adopted. The body of the child was delivered intentionally with the back looking downward, face upward, occiput to the left sacro-iliac space. With the valuable assistance of my friends Drs. Burall and Ward, propulsion was made by pressing the posterior part of the head into the sacro-iliac space, then downward and backward, and traction forward in the axis of the outlet by having the body carried upward. In a few minutes the child was delivered in a semi-asphyxiated state, and by careful and persistent attention was restored. Child weighed over eight pounds. This patient, eighteen months after, entered as my private patient in the Bellevue Hospital, at the eighth month of pregnancy, and premature labor was induced by the water-bags, and she was delivered before the class in the course of an hour by the same method. Child living, and weighed over seven pounds.

The application of this manner of delivery is sanctioned,

as a general rule, in the cases of the obliquely-ovate pelvis, by adapting the posterior part of the child's head to the largest part of the pelvis. In my second paper I shall have more to say on this method, as applicable to more diminished pelves. Dr. Goodell carries out the same plan I first stated, only he reverses the direction of the body of the child, I believe, by bringing it first in the direction of the outlet and swinging the body backward on the perinæum, accompanied by propulsion from above. Should this method not succeed, he tries the to-and-fro movement, or what he styles the "pump-handle plan." The swinging, to-and-fro movement is especially resorted to by some obstetricians in the delivery of the child by the forceps, if gentle traction is not successful. The side-to-side manipulation, when the forceps are applied transversely, not antero-posteriorly, on the child's head at the superior strait, is necessary for tilting or canting the head in some cases, and will succeed in delivering the child, when strong pressure and traction fail; for, the tilting or obliquely delivering the head, independent of the pressure from above and the traction from below, is the great principle to effect the delivery of the child's head from its "durance vile," in these cases.

I pass from the treatment of version, to offer a few remarks on the forceps.

As I do not find that the head of the child in these cases is placed, as it is generally believed to be, always directly transverse, but slightly obliquely transverse, there is sufficient room for the application of the *long, straight* forceps, not the *curved*, with one blade in the sacro-iliac field posteriorly, and over the side of the occipital bone, and the other in front of the acetabula and over the fronto-parietal suture, or the side of the frontal bone. If the long, curved forceps are used, the head will be seized either slightly oblique, or directly over the frontal and occipito-parietal bones—in truth, directly on the long diameter of the child's head. As an illustration of the value of the long, straight forceps over the curved, I will cite the following case, among others, of their beneficial use, and

which induces me to give them the preference in these cases over the long curved ones.

E. T., aged twenty-eight years, came into the Bellevue Hospital May 4, 1867, at 6 P.M. The os uteri, on examination, admitted the finger. At 12 M., May 5th, the os was fully dilated. At 2 P.M., membranes ruptured. Dr. G. T. Elliot saw her at 8.30 P.M. Head in the left occipitiliac transverse position. Deformity of the pelvis recognized. Supposing that the head was advancing, he left the patient, and I was sent for at 7 A.M., May 6th, and saw her with him at 8.15 A.M. Caput increased. No advance of the head. No impaction. Head readily moved above the brim, and the operation of version quite feasible, and elective. Fœtal heart audible. We decided, after consultation, to deliver with forceps. The first blade was readily applied in front of the left sacro-iliac synchondrosis, the second blade behind the right acetabulum. My friend and colleague was accustomed to use his forceps with a movable slide, something like Mende's, so as not to compress the head of the child. Strong efforts were made with his curved forceps as tractors, but without effect. Craniotomy being suggested by him, the long, straight forceps were requested to be made trial of. Application easy. Compression made, and traction directly backward and downward on the perinæum. In a few moments the child was delivered. Efforts to restore the child were ineffectual. Diameter, three and a half inches. Child, seven pounds. I am an advocate for version, considering all the arguments in favor of the principle, as I believe it will have to be adopted in many cases, and take the place of the forceps if they fail. If we accept the statement of some authorities, living children have been delivered through pelves of two and three-quarters to three inches diameter by the forceps. In this statement, however, no mention has been made of the size of the child, the sex, or the flexibility of the head, or the moulding of it, and therefore we cannot form a proper estimate of their application in pelves ranging from two and one-quarter to three and one-half inches. The success of such cases is in the

opinion of various authors the exception to the general rule. Meigs, Hodge, Dewees, Ramsbotham, Churchill, Gardien, Boivin, Chailly, Velpeau, have referred to such cases, but they give little or no personal experience themselves. It is a difficult task to deliver the head of a child at the superior strait at full term through a pelvis of three and a half inches, even with the long, straight forceps, unless special circumstances favor it; but it is an extremely difficult work when it occurs in a generally contracted one. I think it better in some cases, for the reasons I have adduced, to adopt that course with firm compression, than it is to resort to version, and then almost certainly have to perforate. Meigs gives no sanction to the compression of the head, and he met with very few cases of deformed pelvis. Hodge is a strong advocate for the forceps, and believes in acting with firm and decided compression. Hour after hour has been spent by some in making trial of the forceps, and no success has followed the effort. On such treatment as that, comment is deemed unnecessary. In none of the cases reported, where the forceps have been tried in cases of contracted pelvis, has the different kind of pelvis been mentioned. We cannot, therefore, draw or form any estimate of the valuable resources of version, which must take the precedence of either form of forceps, for the forceps are considered as ranging in their usefulness in pelvis from three and one-quarter to four and one-quarter inches, and seldom are applicable even in pelvis of three inches. The compression of the child's head, if it is well ossified, will be very small; but when the flat bones are thinner and soft, the fontanelles large, and the head small, then it can be delivered. In some cases the head is small and sufficiently moulded by the forceps, but the shoulders and body of the child may be so large, and the traction-force required so considerable, as not to succeed. With version, in cases of this nature, the traction on the body and the propulsion from above the pubes are more available. In some cases I have succeeded with version after I have failed with the forceps, and reversely. I am always unwilling to continue with the forceps—whether at the superior strait, or in

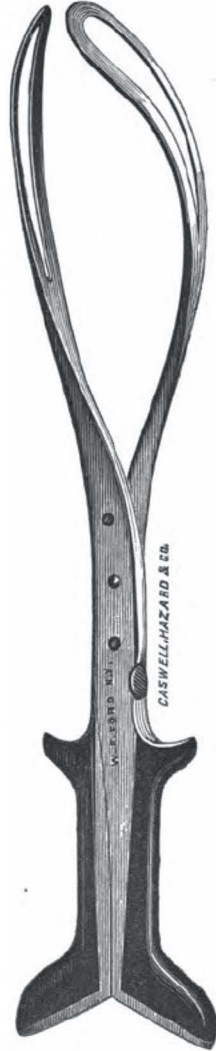
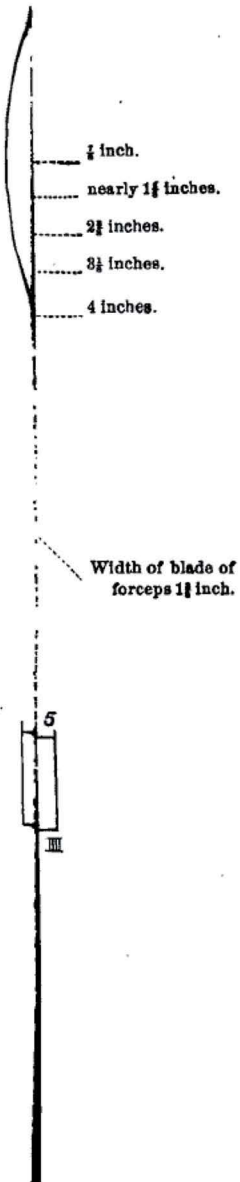
the cavity of the pelvis—very long at a time, or with very strong efforts, believing that a withdrawal of the instrument and its reapplication in a few minutes are best, even if it is three or four times applied. Permitting the uterus after each application to aid in altering its position some, I have, after a while, been able to deliver the child by merely lifting the instrument in the proper axis of the pelvis with two fingers. In a contracted pelvis—the simple flat pelvis—if I have not been fortunate in changing the location of the head, and there is no prospect of delivery in half an hour, I would proceed to version. In the uniformly contracted pelvis, the forceps are, I believe, the proper remedy; and if, after a short time, success is not obtained, which it is in many cases, it is my firm conviction, as the occiput is more generally posterior in these cases than in others, embryotomy will have to be performed.

A slight reference to the practice of the French would not be amiss at this moment. The practice adopted by P. Dubois, Depaul, Pajot, and Blot, in cases of moderate contraction is, after waiting till the complete dilatation of the os, to apply the forceps and make moderate traction. If this proves insufficient, the instruments are to be removed, and not applied again for two hours. If no result be obtained, and if a second or third application be fruitless, recourse should be had to embryotomy; version is seldom entertained.

To avert the operation of embryotomy has been the special purpose of all these investigations and experiences, and, as I remarked at the commencement of my paper, it is our duty in every way to try to save both mother and child; but, if we cannot save the child, by all means the mother.

In cases of this character the accoucheur's conscience and responsibility are very greatly at stake. He is unable to lay down any immutable regulations for his guidance. Is he to act, or is he to forbear? If he delays, the child will be sacrificed. If he acts by either method, the life of the child is in great jeopardy, and he must be neither too rash nor too dilatory; for, by delay, many a valuable parent's life has been lost. Some obstetricians only wait for the spontaneous

FIG. 3.



SMALL FORCEPS: Length, 16 inches; greatest width when closed, $2\frac{1}{4}$ inches; breadth of blades, $1\frac{1}{4}$ inch; weight, $1\frac{1}{2}$ pound.

death of the fœtus, before they deem it right to interfere. This course of treatment has been advised by some prominent accoucheurs, and by one of comparatively recent date. The *laissez-faire* treatment of Denman, Osborne, and others, who were decided representatives of the procrastination treatment, and who wait for Nature to assert her prerogative, has, I believe, swept many a mother from existence.

PART II.

IS CRANIOTOMY, CEPHALOTRIPSY, OR CRANIOCLASM, PREFERABLE TO THE CÆSAREAN SECTION IN PELVES RANGING FROM ONE AND A HALF TO TWO AND A HALF INCHES?

Read March 2, 1876.

THE obligations I am under to the Section on Obstetrics of this Academy, to prepare a paper on the question "What is the Best Method of Treatment in a Case of Labor with Contracted Pelvis?" are now to be fulfilled. This question I have considered as a general one, and therefore have thought proper to divide it into two parts.

The first part I read September 16, 1875, before this Academy of Medicine, and in it confined my remarks to the deformities ranging from two and a half to three and three-quarters inches antero-posterior. In that paper I particularly referred to two kinds of deformities which we are every now and then meeting with in private as well as in public practice, and the treatment applicable to each. Dwelling upon the two different deformities, I showed that in the generally contracted pelvis, when the diameter ranges from three and a quarter to three and three-quarters inches, and the simple flat pelvis, ranging from two and three-quarters to three and three-quarters inches,

the treatment ought to be entirely different. In the simple flat pelvis, where the application of the forceps after a short attempt had failed, *version* would be the most appropriate method to adopt, under the expectation that by traction on the body of the child after version, with propulsion from above the pubes, the child might and could be delivered without embryotomy, while in the generally contracted pelvis, should *version* be adopted, *embryotomy* would have to be performed in some instances. I also stated that in the simple flat pelvis the long, *straight* forceps would be preferable to the long, curved ones. In the generally contracted pelvis the curved forceps are the most efficient and suitable instruments. I presented two specimens of infants' crania, illustrating the form of the head and the moulding of these heads consequent on the different formation of the pelvis, and demonstrating the character or type of the pelvis. The cranium which was delivered naturally through the generally contracted pelvis was round, caused by the overlapping of the frontal and occipital bones, by the parietal diminishing the *long diameter* of the child's head fully one-half to three-quarters of an inch. In the other cranium, delivered through a simple flat pelvis of two and a half inches antero-posterior, by version and propulsion from above the pubes, the head was flattened or indented at the junction of the parietal and frontal bones, which is the usual place. The dimensions of the child's head in all the other diameters were of the ordinary measurements of a child at full term.

The *second part* of my paper I enter upon this evening, and shall consider the question, "*Is craniotomy, cephalotripsy, or cranioclasm, preferable to the Cesarean section in pelvis deformed from one and a half to two and a half inches?*" and present the history of a case of labor in a kyphotic pelvis of one and seven-eighths inch diameter at the inferior strait.

The question is one of considerable moment, to which the attention of the accoucheur should be invited, involving a highly responsible position. We are all aware that, in natural labor,

the accoucheur has little else to do than to watch his patient, and patiently await the termination. In obstructive labors, from any cause, and especially in deformed pelves, no matter whether the pelvis is ever so slightly diminished in its antero-posterior diameter, or of a slight generally contracted formation, difficulties soon manifest themselves, and a series of symptoms spring up, which require all his wisdom to secure the safety of his patient, as a double responsibility rests upon him, for two lives are involved. Under such trying circumstances the accoucheur will have great cause for congratulation if, by his most judicious efforts, he is able to preserve the most valuable life—*that of the mother*. In the whole range of surgical and obstetrical practice, there is no occasion which calls for more deliberation, more precise knowledge, and a clearer judgment, than are required to enable the obstetrician to determine in difficult cases of labor, in deformed pelves, how long he may trust to Nature without compromising the life of the mother, or entailing upon her an existence of misery worse than death itself; or, on the other hand, to fix the precise time when he is unfortunately importuned to sacrifice the life of the child for that of the mother, or, by the performance of the Cæsarean section, perchance save the child, and possibly the mother. The several operations—craniotomy, cephalotripsy, cranioclasin, or the Cæsarean section—have their unfavorable and unfortunate aspects, and the decision upon the peculiarities or circumstances of the case must rest with the judgment and experience of the operator.

In the British Isles the profession are generally, though with few exceptions, adverse to the Cæsarean section. Radford was strongly in favor of it, especially if early performed, even if the “blackness of the account,” as he styles it, of the mortality consequent upon the operation was so great. At the time he wrote, in 1848, the record was, out of forty-nine women who had been delivered by the Cæsarean section, only four were saved.

Greenhalgh's (of London) experience has determined him, for the future, never again to attempt delivery “*per vias natu-*

rales," unless there is fully two inches in some part of the antero-posterior diameter of the brim. He says that craniotomy and extraction by the crotchet or cephalotribe, in cases of extreme deformity of the pelvis, are more difficult and probably more fatal to the patient than the Cæsarean section.

P. Dubois believes that, "when the contraction of the pelvis approaches two or even two and one-fourth inches, recourse must be had to the Cæsarean section." De Paul entertains the same opinion. The Germans, taking as an exponent Schroeder on the subject, consider 2.1 as the extreme limit of craniotomy, and the Cæsarean section is, therefore, the sole means of delivery.

Schroeder, however, remarks that, "as there is a possibility of another way of delivery than the Cæsarean section in the highest degree of pelvic contraction, it may be necessary to perform craniotomy, whether the child be alive or dead."

Cazeaux observes that, "when the pelvis offers at least two inches in its smallest diameter, embryotomy must be performed, even if the child is alive."

Leischman remarks that, "as ample proof has been adduced that craniotomy has been successfully performed in contraction of one and three-fourths inch, and that it may be in one and a half, when the conjugate diameter exceeds this limit, we are in no case justified in at once deciding in favor of the Cæsarean section."

Barnes declares that "it is perfectly unjustifiable to neglect embryotomy, and to cast the woman's life upon the slender chances offered by the Cæsarean section." Out of

480 operations in England	236 recovered,	244 died.	Ratio, 50 per cent.
712 " Germany	332 " "	380 " "	" 53 "
344 " France	153 " "	191 " "	" 55 "
11 " Belgium	4 " "	7 " "	" 63 "
46 " Italy	5 " "	41 " "	" 87 "
12 " America	4 " "	4 " "	" 33 "

The general average of these records would give a mortality of fifty-three per cent. Let us, however, from this exceedingly unfavorable presentation of mortality, turn to that of Dr

Harris, which is the latest record. In his paper published in the February number, for 1872, of the *Obstetrical Journal*, seventeen operations are recorded; out of these $73\frac{1}{3}$ per cent. were operated on the first day and recovered, and $26\frac{2}{3}$ per cent. died; $86\frac{2}{3}$ per cent. of the children were saved by operating early.

Dufiellay, of France, analyzed all the cases which had been operated on between 1845 and 1861. Where the woman had been operated on early, before the strength of the patient was exhausted, three-fourths, or eighty-one per cent., recovered; where marked symptoms of exhaustion were manifest, only nineteen per cent. were successful. Cazeaux had previously shown that, when the operation is early performed, it was more successful. Keyser's record, nevertheless, states that when the operation was performed after the labor had lasted

24 hours there were	20 recovered,	40 $\frac{1}{2}$ died.
24 to 72 hours	34	" 41 $\frac{1}{2}$ "
over 72 hours	8	" 21 $\frac{1}{2}$ "
	62	103 $\frac{1}{2}$

Taking the same time as to the life of the child, out of one hundred and fifty-eight cases operated on

	After 24 hours, 42 living, 16 died.		
From 24 to 72	" 48	" 24	"
After the 72	" 11	" 17	"
	101	57	Nearly one-half died.

This is also the opinion of Radford. Keyser's opinion does not, with his showing, aid in sustaining the views of Harris and others as to the earlier the operation the more successful the result. It will be conceded, when we review the cases of Cæsarean section, when performed in the country, a more favorable result would be more likely to occur than in the large cities or hospitals. It has been asserted by the French provincial surgeons that three-fourths or four-fifths of the women who underwent the Cæsarean section recovered. If so, this would tend to attest the views of Harris and others,

and therefore in patients operated on in the country the result would be more successful than in the city.

Pahan Dufiellay's favorable opinion of the Cæsarean section does not, however, seem to have met with the confidence of all the obstetricians, some calling in question the method of his statistics.

If the statistics of Dufiellay and Harris are recognized as bearing on the question as to the propriety and absolute necessity in extreme cases of deformity from whatever cause (for it is not only an operation of forced necessity, but one of election), we should only consider it as indicating an approximation to a probable mortality. Still, they tend to show that not only the Cæsarean section, but embryotomy, and all capital operations, as ovariectomy, when performed early, especially in the country, would present a more favorable evidence of success. It is a very difficult task to present a comparative estimate between the operation of Cæsarean section and craniotomy, for the operation of embryotomy is called for in cases of emergency, as in convulsions, hæmorrhages, and other contingent circumstances, and certainly should not be classed in a comparative investigation. If a comparative examination, between the two operations, in contracted pelves of one and three-fourths to two and one-half inches, of the antero-posterior, or transversely in the inferior strait, have been recorded, I am not aware of it.

Hicks and Phillips have shown in vol. xiii., 1872, of the "Obstetrical Transactions of London," that the cases collected from Lee, Churchill, McClintock, Collins, and Ramsbotham, and some others, forming the statistics from the records of craniotomy are unworthy of confidence, and that there are but *few instances* where the operator is *accountable* for the result.

No one will deny that the danger increases more and more rapidly where the smaller diameter or contraction is apparent, through which a mutilated foetus is to be dragged in those cases, than where the contraction is not as great.

The cases requiring instruments, until very lately, were

delivered chiefly by the craniotomy forceps, or the crotchet after perforation, principally the *crotchet*, and generally after long delay.

The success of craniotomy is very much influenced by the period at which the operation is performed; by the presence or absence of complications; by the previous attempts, and often repeated, at delivery; by the condition of health of the mother at the time of the operation; and equally so by the choice of instruments, the manner and tact of operating, the full comprehension of the relations of the child's head to the pelvis, and the correct principles of delivering it through the different straits of the pelvis after the head has been decerebrated and crushed.

Analyzing these cases, and even from the highest sources, the unfavorable results will be traced to unnecessary and culpable delay, procrastination in resorting to artificial delivery, which was put off too long, or, if adopted, was continued till the patient was in a state of extreme exhaustion, and *death* the result.

The excessive deformities we are considering diminishing the pelvis fully if not more than one-half of its natural proportions, demand certainly one of the *two operations*, either the sacrificial act of the life of the child, "barbarous and horrible," as it has been termed, or the Cæsarean section as the *dernier ressort*, with the unfortunate sequences attending the operation, even if early performed, to the mother, whose chances, I believe, are far greater than by craniotomy and its addenda.

If embryotomy is to be performed, abandoning all hope for the infant, our whole solicitude should be directed to the safety of the mother. To a want of that necessary energy, decision, and promptness of action, at the opportune moment, is, as I conceive, to be attributed the unfavorable and unfortunate issue in many cases.

Charrière, in his excellent memoir, in relating his experience on this point, says that, "when *bad results* occur, they must be attributed chiefly to the causes which require the

accoucheur's interference, mainly in lingering and powerless labor, bad or incessant contractions, all of which produce such a state of extreme nervous exhaustion as to place the patient in the worst condition."

The statistics of Dr. Jones, of Paris, in 1847-'49, when cephalotripsy was performed, show that in pelves whose conjugate was not less than two and a half, out of eight women, five died. Dr. Greenhalgh in six cases; diameter not below two and a half, five died. According to Dr. Mundé's report of the Vienna School, forty-three cases of cephalotripsy; twenty-one deaths, fully one-half; in a conjugate of two inches to four inches. Henning, out of two hundred cases of cephalotripsy, thirty-nine died, or nineteen and a half. Dr. Parry, of Philadelphia, out of seventy cases collected, 61.43 per cent. recovered; fully one-third, 38.57 per cent., died. M. Joulin out of two hundred and fifty-three cases of cephalotripsy, representing, in mothers and children, five hundred and six existences; mortality sixty-five per cent.

On the other hand, thirty-seven cases have been collected, in which the employment of energetic manual and mechanical force was resorted to by his compression forceps. In these cases there were seventy-four existences, and the general mortality was not more than forty-three per cent. This result gives a difference of twelve and two-thirds in favor of energetic treatment and traction.

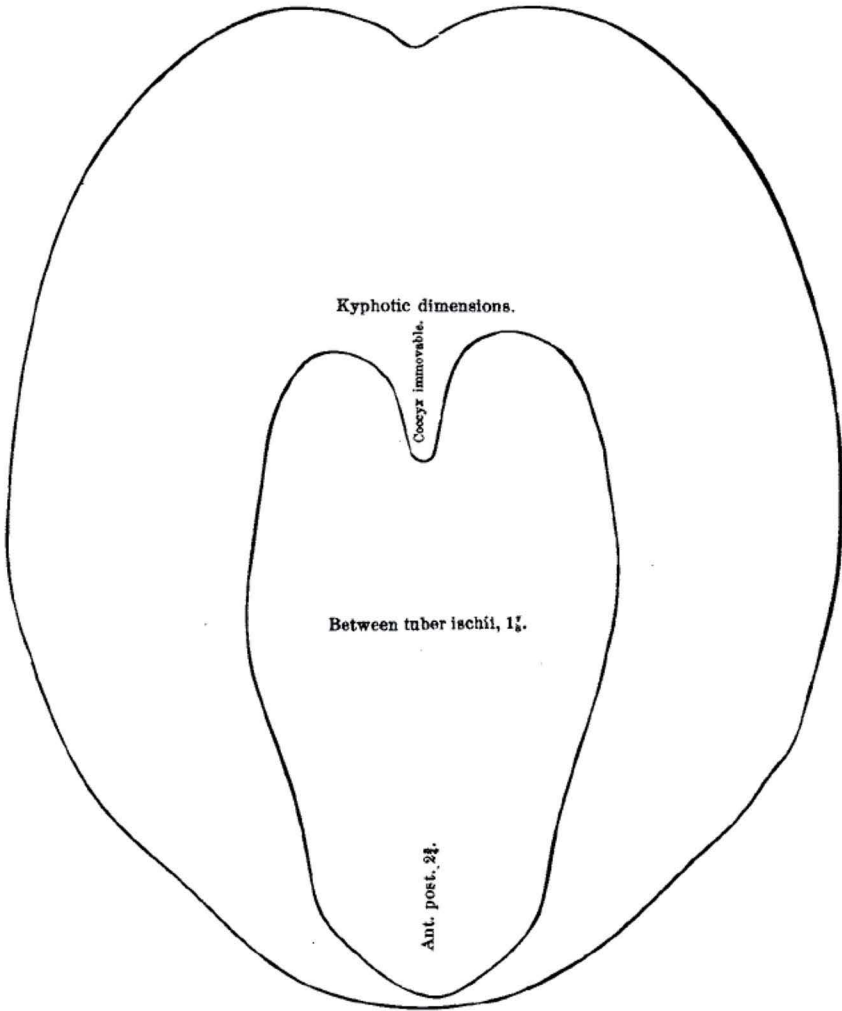
By the cranioclast (Rokitansky): In five cases, diameter of two to three inches, all the women recovered; child five and a half to six pounds. Dr. Parry, from the statistics of Harris, and Pahan Dufiellay, on the Cæsarean section, and his cases of craniotomy, considers there is nearly ten per cent. in favor of Cæsarean section. Out of the seventy cases I find

No time is fixed in	40	cases.
From one day to four or five days .	21	"
One day.....	5	"
Uncertain.....	3	"
Total.....	69	"

The cases of Greenhalgh were treated by the perforator and

FIG. 4.

Normal Dimensions.



KYPHOTIC PELVIS (OUTLET) OF MRS. V—

crochet; Jones and the Vienna school, by the cephalotribe; and Rokitsky's by the cranioclast of the same school.

Before referring to the case of kyphotic pelvis, in a living subject, that of Mrs. V., I will present you with a cast for inspection of the Robert pelvis of Cologne. It is a transversely ankylosed, contracted pelvis, diminished in every diameter, especially the inferior strait. It might be taken for a girl's pelvis of the funnel-shaped order. I present this specimen on account of the inferior strait representing the outlet as nearly the same as that of Mrs. V. between the tuber ischia, although Mrs. V.'s pelvis was in the antero-posterior diameter from the pubes of the sacrum to the pelvis one inch less; coccyx bent up. It is an exceedingly rare specimen of deformity of the female pelvis, and there are no evidences of a constitutional character tending to a rickety or malacosteon pelvic deformity.

The measurements of the Robert pelvis of Cologne are—

Antero-posterior diameter, superior strait	3 $\frac{1}{4}$
Transverse	2 $\frac{1}{4}$
Transverse (in the cavity)	2 $\frac{1}{4}$
Between tuber ischia	1 $\frac{1}{4}$
" rami ischia	1 $\frac{1}{4}$
" " pubes	1
From coccyx to pubes	4 $\frac{1}{4}$

The measurement of Mrs. V.'s pelvis, which was of the kyphotic order, the promontory of sacrum more elevated, as is usual in these pelvis, and not reached by the fingers, was presumed to be five inches. Left side of the pelvis jutting inward, and narrower than the right (*see* Fig. 3):

Transverse (in the cavity)	3 $\frac{1}{4}$
Between tuber ischia	1 $\frac{1}{4}$
" rami ischia	1 $\frac{1}{4}$
" " pubes	1 $\frac{1}{4}$
Coccyx to pubes	2 $\frac{1}{4}$

The kyphotic pelvis of Lange—

Antero-posterior superior strait	4 $\frac{1}{4}$
Inferior antero-posterior	3 $\frac{1}{4}$
Between tuber ischia	1 $\frac{1}{4}$
Half-inch smaller than Mrs. V.'s.	

The transversely contracted pelvis of Lloyd Roberts, of Manchester, England :

Antero-posterior diameter, superior strait.....	4
Antero-posterior (cavity).....	5½
Transverse, superior strait.....	3½
Transverse (cavity).....	3½
Antero-posterior inferior strait.....	4½
Between tuber ischia.....	1½
" rami ischia.....	1
Three-quarters of an inch less than the Robert pelvis of Cologne.	

In Simpson's case of contracted pelvis :

Antero-posterior superior strait.....	3½
Transverse.....	3½
Antero-posterior inferior strait.....	3
Between tuber ischia.....	½
From coccyx to pubes.....	3

In this class of deformed pelvis the contraction is at the inferior strait or outlet, while in the rickety or malacosteon pelvis the diminution is generally at the superior strait, with amplitude at the outlet. They are the reverse of each other. The inferior strait will represent very nearly the appearance of the superior strait of a malacosteon pelvis. Simpson remarks in his case, "that the spine projected to a considerable extent at the upper part of the back, and again to a smaller extent in the sacral region. The capacity of the brim, however, was not in proportion to the three and three-quarters inches antero-posterior, and three and three-quarters inches transverse, and collapses inside of the sides of the pelvis. The outlet was only half-inch transverse." From the description of Simpson I am induced to believe that the pelvis was one of the kyphotic order; for Simpson says, as confirming this view, "The osseous tissues appeared too firm for a rickety pelvis." In all these cases, except my own, the Cæsarean section was performed, and the results were unsuccessful—all dying.

The *kyphotic* pelvis is consequent upon some affection of the spine producing a kyphosis, either in the lumbar region or the lumbo-sacral region.

The causes, as a general rule, have been from falls and blows on the spine or pelvis. Out of eighteen cases, fourteen were from accidents of this kind. The absence of kyphosis and the difference in the transverse diameter of the false pelvis distinguish the double anchylosed pelvis from the kyphotic. If the kyphosis occurs in the lumbo-sacral region, there is a greater deformity in its form and shape transversely. The pelvis has no tendency to a rickety or malacosteon type, although in the Brussels pelvis, and the one by Mohr, there was some mobility of the joints observed, as we notice in some cases of *ramollissement* of the joints during gestation in natural-formed pelves. If there is lordosis with kyphosis the difficulty will be aggravated in the superior strait or just above the brim, and give the appearance of a spondylolisthetic pelvis, that is where the lumbar vertebræ slide over or down from the sacrum into the pelvis. This was the case in the pelvis described by Olshausen, which was diminished in the antero-posterior diameter to three and two-fifths inches, and that of Gluge, of Brussels, to three and two-eighths. The same with Fehling and Hatin.

There are records of only eighteen women with thirty-six children, and eight deaths of mothers. In the eighteen cases, premature delivery was adopted in eight cases, and four of these had to be delivered with forceps. There were full-born children four times. Forceps used in ten cases, in two of which they were of no avail; with these *two* cases and nine others, embryotomy was resorted to. The Cæsarean section was twice performed; one died, one recovered. Undelivered two, make fourteen. Out of the thirty-six children, twenty-three died, two-thirds during, or at least by, the delivery; thirteen children saved.

I have at present under observation three cases of slightly oblique ovate pelvis, consequent on coxalgia in two, with a contraction at the inferior strait as small as Mrs. Valentine's, and one of these patients was presented before the class January 13, 1876—the one on whom I operated in 1870 successfully.

The final result in all these cases will be the performance of craniotomy and cephalotripsy, as the head of the child can enter the brim of the pelvis antero-posteriorly, while in the transversely contracted or double anchylosed pelvis, of the type of which I have given you an illustration, the Cæsarean section will have to be performed. Out of seven cases of this nature, six operations were by the Cæsarean section.

I was requested by Dr. Sprague, March 4, 1875, to visit Mrs. Valentine at 8 P. M. Labor had commenced at 11 A. M.; pains every fifteen or twenty minutes, slight and inefficient. On examination the os uteri would scarcely admit the end of the finger, the edge being very thin. The head of the child was capped by the expanse of the cervix, and jutted into the pelvis. As the pains proved of little avail, she was ordered to take a full dose of opium or morphia, and to be seen in the morning.

March 5th, at 9 A. M., I met Dr. Sprague. Patient obtained some sleep, and the pains for the last three or four hours occurred every fifteen to twenty minutes; they were longer in duration and seemed to have more effect. The os uteri was opened to the size of a five-cent piece, seven-eighths inch in diameter. Next visit at 2 P. M. As some of the gentlemen I had invited were prevented from being present, Dr. Sprague secured several of the house-staff of the Bellevue Hospital, in case it should be deemed necessary to have assistance for the Cæsarean section, as it was contemplated that this operation would have to be resorted to, by some of the gentlemen who had seen the case previously. At 3 P. M. there was no change; os uteri the same; head well flexed and presenting with the occiput anteriorly. My slender and narrow curved forceps were applied easily, the object being to fix the head by means of them against the os uteri, retain it there during and after a pain, using but little if any traction, as the forceps could add no additional width to the head, and they were an efficient aid to Nature. Without an operation of this kind, the head would have remained some hours longer without any advance, as we had noticed before. The continuance

of the head in this position in the cervix would have produced the unfortunate results consequent on delay, by pressure on the internal organs and the pelvis. As the forceps were safely applied, the reason for their application was to allow the head to become the dilator with their assistance, as it does naturally. The cervix became expanded fully one-half, if not more, in twenty minutes; the thin-bladed forceps were removed, and the larger and stronger pair of instruments I am accustomed to use substituted. After gentle traction the os uteri was more dilated, and the head lower in the cavity of the pelvis; the cranium was then perforated, the cephalotribe applied, and firm pressure with the ratchet made, and the head crushed, till the handles were in apposition. As the head was now in the cavity of the pelvis, the base of the cranium could be reached more efficiently to break it if necessary. The cephalotribe had accomplished all that was expected from that instrument, and was removed. My right-angle blunt-hook (Fig. 8) was then inserted into the vault down to the base, and the head brought down to the inferior strait obliquely. Meigs's forceps, with an addition of four inches I had made to them (Fig. 7), were then resorted to. One blade was thrust into the cranium down to the base, and, the other grasping the head externally, the head was delivered sideways without much if any difficulty, and the body by steady traction was soon born.

The delivery did not require as much strength or force as, if any more than, some forceps operations in generally narrow pelvises. While waiting for the placenta to be delivered, a few moments after its expulsion, a rapid and full stream of blood took place from the uterus, as if a Croton-water faucet had been turned. Instantly I used very strong and powerful flagellation over the uterine region, with as much force as could well be given to a towel doubled up, saturated with ice water, and as instantaneously was the hæmorrhage arrested. The round, globular uterus was now felt under the hand. An electric shock could not have acted more efficiently. (I much prefer that the ice should be finely crushed and placed in the middle of the napkin, and the two ends held for application.) By this

method, though severe, I have for many years succeeded in producing prompt and ready contraction of the relaxed uterus. After contraction has once occurred, the case is to be closely watched, and the same steps occasionally adopted if necessary, while other means may be resorted to. Internal injection, or application, no matter from what kind of remedy, would in this case have been a mere *bagatelle*, and perfectly useless. After the delivery the patient was removed to bed, she had a comfortable night, sleeping the whole evening, and was bright and cheerful in the morning. In twelve days she was walking round the room; time of delivery, one and a quarter hour; child eleven pounds.

A marked difference of opinion, within the last few years, has been manifest respecting the two operations. The want of success in craniotomy and cephalotripsy, and the unfavorable consequences attending the operation, as it is believed by some, even with the use of the cephalotribe, have had a tendency to turn aside the operation and lead them to resort to the Cæsarean section as preferable.

Modifications in the cephalotribe have been made, in accordance with the views of obstetricians, very different from the older one of Baudelocque, as the instrument of Dr. Kidd, of Dublin, will show. At the present day, the English have modified the instrument so much as to lead us to consider that it has attained almost a proper and perfect form. In France, the instruments of Pajot, De Paul, and Guyot, are considered excellent instruments. They are different from those of Braun, of Vienna, and Scanzoni, of Wurtzburg, which are heavier and larger. The instrument I have been accustomed to use is a modification of the French, but lighter, narrower, with a slighter curve, and more grooved in its blades. Since the improvements have been made in the cephalotribe, some obstetricians entertain the hope that from craniotomy and cephalotripsy it will be possible to extend the extreme limit of craniotomy to one inch, or one and a quarter inch.

Of the fifty-one cases referred to in Table 1, of Dr. W. H. Jones's work "On the Management of Labor in Contracted

Pelves," nine presented a contraction under two and a half inches; eight terminated by the mutilation of the child, and six mothers died; which gives a proportion of sixty-six per cent. The children in these cases only averaged four and one-quarter pounds. Dr. Jones remarks that, "if we consider that the total mortality of mother and child is fourteen out of eighteen, we are led to deplore the impotency of obstetrical art in cases of this description;" and that in these cases "it is the *nature* of the operation, rather than the *duration* of labor, which proves destructive; that when cephalotripsy is performed in a narrow pelvis, it is a murderous operation not only for the child, but for the mother."

Still, under this very unfavorable aspect of the operation, while alluding to a case of Cæsarean section of De Paul's, he remarks: "As he is unsettled in his mind respecting the two operations; that as there is another operation besides the Cæsarean section, that would give a chance of safety to the mother, the diminution of whose pelvis was not below one and three-quarters, I would not hesitate to practise it."

Greenhalgh, in his paper, in the Transactions of the Obstetrical Society of London, on the comparative merits of Cæsarean section and craniotomy in cases of extreme distortion of the pelvis, gives six cases of extreme distortion of the pelvis, in which the conjugate diameter did not exceed two and a half inches, requiring the use of the perforator and crotchet. All had reached the full term of pregnancy; all had suffered more or less for from thirty-two to seventy-two hours; time of extraction, three to thirty-two hours; five died in two to seven days, either from exhaustion or some inflammatory lesion; two uteri and two vaginæ were ruptured. The others recovered each after a severe attack of peritonitis; one underwent the Cæsarean section, and died the fourth day. From this exhibit, Greenhalgh thinks that craniotomy and crotchet cases are only safe within certain limits, and under certain conditions. Nothing would induce him again, under even the most favorable circumstances, to attempt delivery by the crotchet where the conjugate diameter of the brim does not fully measure two

inches, exclusive of the soft parts. I most fully coincide with Greenhalgh, especially when instruments of that kind are used, and with such delay attending the labor and operation.

Dr. Parry, in his paper on "Craniotomy and the Cæsarean Section in Small Pelves" (*American Journal of Obstetrics*, vol. v., No. 4, February, 1873), in his summary at the conclusion of his paper, says that, "if gestation has advanced to the full time, and the conjugate is two and a half inches, craniotomy affords the mother no better chance of recovery than the Cæsarean section;" and that, "if the diameter be two inches or less, exclusive of the soft parts, it is the duty of the accoucheur to perform gastro-hysterotomy, rather than craniotomy." I have cited these opinions particularly, as they are the most recent on the subject.

From the great mortality which occurred in Jones's cases, taken from the clinic of Dubois, who, as I have said, considers that it is the *nature* of the operation, rather than the duration of labor, which proves destructive, I think we need not be surprised at the opinion expressed, when we reflect on the method of the management of the cases of Dubois, as well as Greenhalgh and Braun. The average duration of the labors was forty-five hours. We are all conversant with the fact, for it is *an established one*, that the danger to the mother and child increases in a ratio proportionate to the duration of labor. Now, where all the unfavorable results follow the delay of an operation which should have been performed earlier, in conformity to this law, the *nature* of the *operation* could not be charged with the unfavorable issue, unless the operation has been bunglingly or badly performed.

Let us take a retrospect of two or three of the cases where the cephalotribe was used, as it is only by studying clinical cases that we may form a more correct and just opinion respecting the method of application of the instrument, and what its special action and purpose are, as some of these cases have influenced the minds of obstetricians in favor of Cæsarean section. A mere mention of the steps adopted would not convey a just appreciation of the method.

CASE IX.—This case is one where the antero-posterior diameter was two and a quarter inches; eighteen hours after cephalotripsy, version was performed. Dubois saw the patient nine hours after labor.

August 16th.—7.30 A. M., os uteri as large as a crown-piece; 9 A. M., complete. M. Dubois ruptured the membranes at 4 P. M. Seven hours after, as the labor had made no progress, craniotomy was performed by M. Taurin, cephalotribe applied, and the head crushed; but this could not be brought down by the strongest traction. Patient left till 5.30 P. M. Cephalotribe again used, but without being able to get a good hold on the head. M. Dubois again tried, but had great difficulty in inserting the branches of the instrument, on account of the anfractuositities caused by the broken bones of the head. After two more efforts, adjourned further operation till 8 P. M. At 8 P. M. everything *in statu quo*. Pills of extract of opium given, and patient left till 7 A. M., an interval of eleven hours.

17th.—7 A. M., patient the same, as regards the labor; skin hot and dry; pulse 120. At 9 A. M. M. Dubois (after 'twelve hours' interval) made another attempt to employ the cephalotribe, but in vain. M. Taurin was requested to turn (twenty-four hours after first visit). The foot was seized and with great difficulty brought down, but the other leg could not be. Cephalotribe applied to the pelvis of the child, but unsuccessfully. Patient under chloroform for half an hour. Patient pale, and facies looking badly; all operations were suspended. At 10.30 severe rigors. At noon (12 M.) M. Dubois came, and advised further traction by the foot. Traction was made for an hour and a half, till 1.30 P. M., and then, with the crotchet, the patient was delivered. The mother expired directly afterward. The weight of the child was five and a half pounds, with the cerebrum. From the time the membranes were ruptured, when the os uteri was fully dilated, eighteen and a half hours had elapsed before the delivery of the child. Autopsy gave: vagina torn; uterus not completely ruptured, but having a rupture of a finger's shape penetrating almost through its tissue. The dimensions of this

lesion corresponded in size with the blades of the cephalotribe.

M. Pajot adopts a method which he calls "*cephalotripsy* without traction." Satisfied as M. Pajot is of the difficulties attending cases of this nature, he proposes that, "as soon as the os uteri is sufficiently dilated, the cranium of the child be perforated, before the dilatation is complete, with the view of facilitating it, as the process of dilatation is often slow in cases of extreme narrowing." Of the *seven* cases *operated* on by Pajot, as witnessed by Jones, five were successful and two unsuccessful. In one of these cases Pajot admits it was impossible to break the biconvex diameter, which proved the only obstacle to the passage of the head. The *method* of Pajot has been considered as a kind of lithotripsy of the head, and which occupies fully as much time as, if not more hours for delivery of the child than, M. Dubois's. Can this method of Pajot, taking into consideration the length of time employed in effecting the completion of the labor, even if the head was crushed, have any advantage over that of M. Dubois by strong traction? Are not both methods to be looked upon as offering no more favorable results for the mother than does the procrastination or delay theory and treatment taught by Denman, Collins, Lee, Murphy, and others, many years since, and still adopted by some at the present day? Pajot and Dubois make the attempt to deliver the woman by the cephalotribe, but the long time it occupies to effect the delivery is *nothing more* than *testifying against* the *law* which is recognized as true, that "every hour after the rupture of the membranes entails great danger to the mother and *child*."

In principle and result I can see no difference from the opinion, as expressed by Collins, that, "when it unfortunately happens, as in some instances which are unavoidable, in consequence of the protracted length to which we are at times compelled to permit the labor to proceed, owing to great difficulties in the passage of the head, the *child* being *alive*, the medical *attendant's mind* cannot, on his own account, feel distressed, as the only means he could adopt to guard against the

danger would be to lessen the head of the child, which, *in my* opinion, no *consideration should induce* him to do under such circumstances." With the method of such treatment the accoucheur waits quietly and patiently for the spontaneous death of the child before he has *the right* to interfere. Delay from such treatment plays the *rôle* of the perforator and the cephalotribe. But what of the mother? Let me now refer to a case which is recorded by Dr. Mundé, in his paper on "The Cranioclast as improved and used by the Vienna School" (*American Journal of Obstetrics*, May, 1873); reported also as Case LIII. in Dr. Parry's paper, same journal, February, 1873. The case was published by Dr. O. Franque, and referred to by Dr. Mundé:

D. P., aged twenty years, was admitted into the hospital with labor-pains, February 21, 1868. Her extremities were considerably deformed by rachitis, and the pelvis found generally contracted, the external conjugate being three inches and two lines, the internal two inches and five lines; left half smaller than the right side. Child dead. Perforation was performed, and Scanzoni's cephalotribe applied. This instrument, after having slipped and been reapplied eight times in different diameters, by different operators, was discarded, and podalic version attempted. As the contraction was so great, it was found impossible to pass the *arm up* far enough (contraction was only two inches and five lines) to reach and grasp the feet or knees of the child, and after five *distinct attempts* had been made in various positions of the mother, and by three different gentlemen, we were compelled to resort to other means, and seriously thought of the unfortunate *dernier ressort* of Cæsarean section. Before proceeding to this extremity, we concluded to try the various bone forceps, and with Simpson's cranioclast and the crotchet we succeeded in removing a large part of the skull, and aided by traction, as one of the arms had been drawn down, in gradually pulling at the basis cranii into the superior strait. It was now possible to seize and crush the head with the hand, and I finally made the manual extraction of the child some ten hours after the per-

foration. Child weighed, with contents of the crania, six and a half pounds; without, five and a quarter pounds. Mother died on the fourth day. "It was this case which induced Dr. Mundé to express his opinion that he had lost a great part of his faith in the cephalotribe." Dr. Parry, in his article published in the *American Journal of Obstetrics*, vol. v., February, 1873, presents the case of a colored woman, a dwarf fifty inches high, rickety, with antero-posterior diameter of an inch and a half, as he supposed, but which patient was attended afterward by Dr. Parrish, when it was recognized after the death of the patient, one month afterward, that the pelvis was an inch and seven-eighths antero-posterior.

March 14, 1872.—At 8 P. M., induced premature labor; at 9 P. M. os uteri dilated rapidly; craniotomy performed. Perforation difficult through the right parietal bone; brain evacuated and crotchet applied; no success. Hicks's cephalotribe tried; no success in the operation. Simpson's cranioclast tried; no success. Meigs's embryotomy-forceps used to pick away the skull, continued one hour. The same with the cranioclast; crotchet tried again. 11 P. M., patient very low; cephalotribe again tried to be applied. One blade supposed by one of the gentlemen to have passed through the uterus and the peritoneal cavity; no success. Delivery could not be effected by either crotchet or cranioclast. Meigs's forceps again resorted to for one hour. After trying the crotchet again, at 1.30 A. M., and with a strong effort, the head was found to engage in the superior strait.

"We then," Dr. Parry says (four and a half hours), "succeeded in breaking away a few remaining portions of the frontal bone, when we brought down the chin in the axis of the superior strait, and the head was seized by the cranioclast (that is, the face), when the child was dragged into the world, to the great relief of all present. Time of delivery, six hours." In this case of Dr. Parry's the head of the child was not made a face-presentation till fully five and a half hours elapsed, and it was by this procedure after the decerebration that the delivery was accomplished, but not till then. In March, 1874, two years later,

Dr. Parrish delivered this patient, after destroying the cranium and making it a face-presentation, and then by Meigs's forceps breaking up the base, but not till this was accomplished was the child delivered. Time, two hours. Patient died one month afterward. Antero-posterior diameter, an inch and seven-eighths.

This single case of Parry's induced him to draw the conclusion in favor of the Cæsarean section. I cite the cases of Parry and Parrish as illustrating the management of the delivery, by making, after the vault of the cranium was broken up, a face-presentation; but this was just previous to the complete delivery of the case, and that was through the action of the cranioclast crushing the face of the child. In Dr. Parrish's case the child could not be, and was not, delivered until the crushing of the base of the cranium had been accomplished. This method of treatment (so different from that of Dr. Braun or Pajot) was an appreciation of the relative proportions which exist between the diameter of the child's head and the base, and the diameter of the mother's pelvis in that kind of case. The bimastoid or the byzygomatic diameter of the child's head in each of the cases cited could not have been less than two and three-quarters inches or three inches, and unless that portion of the child's head had been fractured, or it had been made a face-presentation after complete destruction of the vault of the head, and thus brought edgewise, or it may be sideways, even without breaking the base, it could not have been delivered.

In none of the cases of Dubois, or Scanzoni, or Braun, was the face of the child made to present edgewise independent of the crushing the base or bringing it sideways, so that the smallest diameter of the child's head could present, that is, one half antero-posteriorly the dimensions of the child's face and the base transversely placed. It must be apparent, therefore, that in neither of these cases was it to be expected that the cephalotribe as a means of delivery solely, which they relied on, could succeed, as the head was movable above the brim, and the instrument could not reach high enough to produce any fracture of the base, and, if not accomplished, it could not act as a tractor to deliver the child, and, without

this object being obtained in these cases, the cephalotribe becomes a useless instrument.

The frequent repetition of crushing the head according to the method of Dubois and Pajot must entail delay, incident to it, which would produce increased exhaustion, and all the unfavorable consequences attending it, which I need not reiterate.

Dr. Hicks, in 1864, called the attention of the profession afresh to the views of Drs. Hull and Burns, who state that, "if the whole calvarium of a full-term fœtus be removed so that only the base of the skull be left, it will be readily perceived that the relations of the diameter are altogether altered. The head is then to be made a face-presentation, with the chin directed to the pubes, and the hollow of the skull to the promontory of the sacrum." Dr. Hull, the bitter opponent of Dr. Osborn, remarks as the result of his experiments, that "the head so diminished can be applied to a small aperture with a view of bringing the face edgewise, but not with the occiput foremost (for in this case the volume of the neck must be added to that of the face), not sideways, as Osborn states he placed it in the case of Elizabeth Sherwood." Here is the essential point of so much value and importance to a just comprehension of the difficulty in the extreme narrow pelvis, and upon which has hung the lives of many females, who might have been saved if this principle of treatment had been properly appreciated.

The views of Burns are clearly enunciated, for it was Burns who culled from the heated and bitter discussion between Osborn and Hull and others a principle of treatment, which is, and will be in some cases, of so much importance in the delivery of the patient safely, and which has been so much neglected and overlooked, though it differed entirely from Osborn's. Hull and Burns endeavored to combat the opinions and experience of Osborn, although they were derived entirely from one case only of extreme narrow pelvis, the pelvis of Elizabeth Sherwood, which measured in the antero-posterior, direct from the promontory of the sacrum to the

pubes, only three-quarters of an inch. On the right side of the pelvis the antero-posterior was one and seven-eighths and two and a half transversely; in fact, the same measurements as Mrs. V.'s, hers being in the inferior strait. They hold that after excerebration and destroying the calvarium, and then making the head a face-presentation, occiput posterior, chin in front, the head would come edgewise, face first, while Osborn's opinion was that in his case the head came sideways, and not face edgewise. They consider this view of Osborn's as wrong, and that if it was, it was, as Bland asserts, only by accident. This is a great injustice to Osborn, for he expressly states that, "after having made very powerful efforts at traction with the crotchet and to no purpose, for I could not perceive that I had made any impression on that solid bone, the base, or that it had been the least advanced by all my exertions, I therefore abandoned altogether the idea of breaking up the base of the cranium, and determined to try the second by endeavoring to change the position. I therefore again introduced the crotchet in the same manner, and, fixing it in the great foramen, got possession of my former purchase; then introducing two fingers of the left hand, I endeavored with them to raise one side of the fore-front of the head, and turn it a little sideways or edgeways. Immediately and easily succeeding in the attempt, the two great objects were at once accomplished, for the position was changed and the volume diminished. Continuing my exertions, the head advanced and I found a considerable portion of it brought into the pelvis, and shortly delivered." This procedure was certainly not an accidental circumstance in the delivery of Elizabeth Sherwood, but wisely conceived and promptly executed, not by making a face-presentation, but by tilting or slanting the base obliquely, which I have noted frequently in a naturally-formed pelvis, as Nature asserts her prerogative in the delivery of the child, whether syncytically or obliquely, and from her instructions we are to profit, and would profit if they were carefully studied. Osborn may have been too hasty in asserting that he could deliver with the crotchet where the diameter, an-

tero-posteriorly, was one and a quarter inch, but this does not detract from his well-earned success in the case of Elizabeth Sherwood. Sarcastic and violent as the controversy was, valuable information has been deduced from it, for we learn that it is possible for a child to be so mutilated and treated as to be delivered through a contracted brim, or inferior strait, where the diameter may be as small, or narrow, as one and a half inch at least.

From the case of Osborn and the discussion which followed, and from the experience obtained in my own practice, it is clear to my mind that there are certain principles which should guide the obstetrician in the treatment of those unfortunate cases with which we may meet, and, by comprehending the adaptation of the smallest diameter of the child's head to the smallest diameter of the mother's pelvis, the delivery would now be considerably advanced in obedience to the mechanical law Nature has established, that the smallest diameter of the head of the child should be opposed to the smallest diameter of the brim, and the largest to the largest. Without the comprehension and appreciation of this obstetrical fact, respecting the method of delivery, all the instruments that might or could be used would only tend to subvert and set aside an operation that should rest upon the aid of only one or two instruments to effect the delivery, and which should be accomplished without great prejudice to the soft structures of the mother.

On the Continent the cephalotribe has been used for many years. In Great Britain, although recognized, it has only within the last few years, from eight to ten, claimed the attention which is now given to it. As late as 1868, Hicks, who was a strong advocate for destroying the head of the child by the crotchet in 1864, has, since 1868, employed it after perforation. He says: "I have not had occasion to use the crotchet or craniotomy-forceps, and am confident it has shortened the delivery by three-quarters of the time that other instruments would take." The cephalotribe is a compressor of the vault of the cranium, and seldom more so. It has been

conceded and demonstrated, that in many cases the base is not fractured or crushed, but that the vault is bent or turned upon itself.

This evidence comes from the testimony of the authors themselves, in the use of the instrument. It is admitted, however, that, on account of the mobility of the head, it is very difficult to obtain a firm hold, and hence the frequent slipping off, or away, of the instrument. Application after application has, however, been resorted to and failed, and as many as ten or twelve times it has been attempted without much success. It has been supposed and believed that, when it was well and properly placed, the screw applied, and the handles brought together, it would retain its hold; but it sometimes changes its position, and the bimastroid is thus avoided and the base not broken—one of the marked and essential *features* claimed as the object to be gained in the use of the instrument originally.

Another important objection to the instrument is that, after the withdrawal of it, if the base has not been crushed, the vault will expand, or resiliate, sometimes to the extent of fully one-half or three-quarters of an inch, producing those irregularities of the skull which place a barrier against its being easily and correctly adjusted again. The cases of Du-bois, Parry, and others, attest this, and my own experience confirms it. On the cadaver, it is admitted that it is very difficult sometimes to effect the fracture of the base.

In the application, if the base is reached, it will sometimes require considerable force and strength in the instrument, which it may not possess, and a different instrument is therefore needed for that purpose.

Traction with the instrument, if well placed, may occasionally succeed in drawing down the child, if it is only five or six pounds, as in some of the cases cited, and effect the delivery easily (for I exempt pelves of three to three and a half inches); but, in the pelvis of the order under consideration, other instruments must be resorted to, more available to accomplish the termination of the labor. As a tractor in these

cases it is, I believe, of little value; in truth, it is almost useless, and valuable time is lost in making the effort. Another point is to be recognized. The exact position is not always known it takes upon the child's head, as the head is so obliquely placed and high up. We are not to be unmindful also, with these various objections, that there can be but one or at most two positions of the pelvis in which we can apply the instrument. It cannot certainly be applied antero-posteriorly, and therefore the space is limited. It must be introduced either in the transverse-direct or the obliquely-transverse. If the waters have been evacuated for some time—which is generally the case—and the head perforated, the head will be retained in but one position, and therefore cephalotripsy, according to Pajot's method, I conceive cannot be accomplished in the various diameters of the head of the child. As to the instrument rotating, when applied, the antero-posterior contraction confines the space of the transverse diameter, and narrows the field for operation to a space of two and a quarter by two and a half inches. This mathematical demonstration, with the remembrance of the width of the instrument being from one and a half to one and three-quarters of an inch, tends to set aside the views of those who believe in the frequency of applying the instrument, and crushing the cranium of the child in different parts of it. I believe it is a great error to suppose that the head of the child is crushed in its various diameters. If the remarks I have made are correct, then the frequent and oft-repeated attempts to use the instrument, and the long continuance of the labor, consequent upon the method adopted, are prejudicial to the welfare of the mother—incorrect and uncalled for. As a compressor of the vault, it is efficient; and it is invaluable in this respect, accomplishing its object quickly and perfectly.

The *cranioclast*, as an obstetrical instrument, has lately assumed an importance as an adjunct to the cephalotribe. It is, however, considered by some as being of more value, and that it might be substituted for it.

This instrument will also play only a certain *role* in the

management of the case, and it has, as I conceive, but a limited line of action. It is, as its name imports, simply a crusher—a breaker—and applicable especially to the solid bones, as the basis cranii, or on the face if the head is made a face-presentation after decephration. As a tractor, unless a very firm hold or purchase is effected, it has not sufficient power in pelves as small as one and three-quarters to two inches to drag down the child, unless the base is fractured and the obliquity given to the head. The hold that it obtains will frequently, by firm pressure and traction, twist or break the more slender flat bones, and more so if the child has been dead some hours and become softened, and then only a purchase of the scalp remains to pull upon, which is useless. If the child is large, the shoulders cannot be dragged through, and it fails utterly.

The cranioclasts of Simpson and the Vienna school are only a modified craniotomy-forceps. Simpson's instrument is almost identical with the craniotomy-forceps of Lee, a specimen which I present for observation. It is not powerful enough to fracture the base, if it is a strong healthy child, with the head well ossified; nor is it sufficiently long.

The cranioclast of the Vienna school is three inches longer, 1.4 inch in the handles, and 1.10 inch in the blades, than Simpson's—a much heavier and stronger instrument, weighing two and a half pounds—and has more curved and somewhat wider blades, and having a ratchet or screw attached. I do not think, from my experience, that this curve of the blades is any advantage but rather an objection when they are to be introduced into the cranium down to the base, as they cannot be easily thrust down to the base, or into the foramen magnum, if necessary. The curved blade cannot very well suit the convexity of the head where the convexity has disappeared by the collapse of the vault after the cerebrum has been evacuated. The *tendency* at the present day with some of the English obstetricians is to lean to instruments of a small curve, as we notice in the cephalotribe of Kidd, which has straight blades, and very long, with reversed lock and very short handles and ratchet.

I offer for your inspection this evening the cranioclast I have devised. (See Figs. 5 and 6.) In doing so, I wish it to be clearly understood that I consider and use the instrument as a true crusher of the solid bones of the basis cranii, or the face, where required, although it may be used as a tractor, the same as the other cranioclasts. It is lighter, smaller in the blades, and only ten lines shorter in the blades than the Vienna instrument. It can be rotated easily, from the smallness of the blade, in the cranium at the base, or in the base; weighs only one and a half pound, and will crack or crush any solid bone. But, with all the benefits derived from these instruments, of whatever kind, after the base is crushed, if necessary, other instruments will have to come in to aid in the termination of the delivery. It is conceded even by those who advocate the cranioclast as a tractor, after the destruction of the calvarium and face by the instrument, that they are frequently foiled in their efforts even in pelves ranging from two and three-quarters to three and a half inches. They realize that it becomes therefore absolutely necessary, and imperative, to substitute other instruments for that purpose, despite their predilections and prejudice.

The instruments which have to be used are either the *crotchet* or the *blunt-hook*. I have always had an aversion to the *crotchet*, no matter whose; and I have used it very seldom, except where I could have no other instrument. I give the preference to the right-angle blunt-hook, and do not use the ordinary semicircular or triangle one. I have tried this hook (having two sizes) for over thirty years. (See Fig. 8.) I consider it decidedly more available than the ordinary hook, whether with a hard and solid stem, or one that is ductile. It can be introduced with perfect ease in any part of the cranium which is perforated ever so small, and traction made; or it can be passed, before perforation or after, on the under part of the chin of the child to effect a face-presentation without cutting the flesh as the other instruments do; or it can be thrust into the orbits, or on the sides of the head, and traction made without difficulty and considerable force, if necessary; or, to

effect version, if the breech does not evolve, it can be inserted easily into the anus and the child turned. The ordinary blunt-hook will not accomplish so easily these objects as the right-angled one.

As an expression of my own experience in cases of the diameter of one and three-quarters to two and a half inches, I do not believe that either the cephalotribe or the cranioclast will meet the requirements of the case without the aid of other means generally. Nor do I believe that the cephalotribe will be superseded by the cranioclast. Each instrument has its own especial province and field of action, distinct from those of the other.

As a forceps, *Meigs's* are invaluable, either the straight or the duck-bill, according to circumstances. They are too short, however, when the operation is at the superior strait. I have had them made longer by four inches, and somewhat stronger in the blades and handle, two inches longer in the handle and two inches in the blades. The blades are serrated more deeply. They are light and easily handled. The blades are united as an ordinary forceps, and are sufficiently long to reach the base. As tractors, with the additional length given to them, they are as available as, if not more so than, some other craniotomy-forceps I have used. (*See Fig. 7.*)

The remarks I have made on the subject, thus far, have reference to the management of labor in that class of cases after perforation of the head of the child at the superior strait, and the use of the cephalotribe or cranioclast, which is the established and usual method, or programme, for conducting the labor and delivering the patient, in preference to the Cæsarean section.

I do not confine myself to this method, believing there are others more efficient and practicable which may be resorted to. *Four* different courses can be adopted or carried out. They are :

1. Craniotomy, cephalotripsy, cranioclasm, and traction by the cephalotribe or cranioclast, the *ordinary method*.
2. Craniotomy, complete cephalotripsy, with destruction.

of the vault, making the head a face-presentation, and to be delivered edgeways.—*Burns and Hull.*

3. Craniotomy, partial or complete cephalotripsy, delivering the head sideways by craniotomy-forceps, or crotchet or blunt-hook.—*Osborn.*

4. Craniotomy, cephalotripsy, with or without cranioclasm, and version performed directly after, with the trial of the blunt-hook, or crotchet, or forceps, whichever may be elected.

Regarding the first method, I have expressed my opinion. The second I have not found it necessary, though it may be in some cases. I prefer the fourth with the third methods in pelves ranging from one and three-quarters to two and a half inches. Dr. Simpson advocated version in pelves ranging from two and a half to three and a half or three and three quarters inches to avoid the use of the long forceps, and to avert craniotomy if possible. Dr. Simpson, however, never refers to the important aid of pressure from above the pubes which Pugh has so distinctly advocated. Nor does he refer to pelves narrowed to one and three-quarters to two and a half inches, or even to Pugh's views as to the version. The last method I have carried out for twelve or fifteen years, in those extreme cases, after perforation and the crushing of the vault with cranioclasm or without. I am aware that after perforation, and more especially after the use of the cephalotribe has crushed the vault, version has been objected to, on account of the fracture of the skull by the perforator, that spiculæ of bone may cut or bruise the structure of the uterus. This, I believe, is a mistake. As a general rule there are seldom very rough edges or spiculæ, after a recent perforation, and if there were, they could be safely covered by the scalp, which would cover the opening made.

In the case of Dubois, and of Von Franque related by Mundé, turning was performed at the close of the labor, when the patient was exhausted, the uterine forces nearly expended, and as almost a *dernier ressort*, as the efforts before failed entirely, and this is the usual course adopted. May I ask, if the cranium of a child can be delivered without

being perforated, having the diameter of the full capacity of a child's head at term, by *version* with *propulsion* from above the pubes, with traction, according to the amount of force necessary, and the proper direction through the axis of the pubes of two and half inches, as on the cranium I have presented, and as the history of cases from the highest authorities has certified to, why may not a child whose head has been craniotomized and decelebrated by the cephalotribe so as to present only a diameter of one and three-quarters inch from the base of the head to the top, instead of three and a half inches, be treated by the same method, as in pelves ranging from three to three and a half inches, successfully? My own experience tells me that it can be done, and I have in some instances demonstrated this fact, before large classes, in pelves from two and a half to three inches, promptly and successfully. One of the cases of two inches, in a dwarf, I will shortly refer to, and as a contrast to the one of Mrs. V. I know that some authorities have fixed the limits of version at two and three-quarters inches. Schroeder informs us he has delivered living children within that space. I deem it far preferable to the course which is pursued by applying again and again the cephalotribe or the cranioclast, and making these instruments the lever or tractor of the child, with but little purchase, and is it not better to use the body of the infant as a tractor with propulsion from above?

Schroeder considers that, in narrow pelves of two inches and five lines, there is no hope *per vias naturales*. "In practice," he says, "as long as there is another way of delivery than Cæsarean section, which is very rarely permitted and in the highest degree of contraction, it will as a rule be necessary to perform craniotomy whether the child be alive or dead." He makes no reference to version early performed after craniotomy or cephalotripsy. Pinard, in his "Thèse de Aggrégation," lately published, is an advocate for version of seven centimetres, that is, two and a quarter inches. In pelves narrowed from five to six and a half centimetres, that is, two to two and half inches, he says that, if it be ascertained

that the child is dead, version is then the only operation; but, if the child is living, version should be rejected and another operation substituted. Pelvic version is impracticable in pelvises of one and seven-eighths inch he says. Nor does he say anything about version after perforation. Exceptions have to be made to version not only in those cases where the uterus is in a state of persistent or tonic action, or too much exhausted, but where the long axis of the child's body corresponds to the long axis of the uterus; then the delivery must proceed as begun, and the labor be terminated as promptly and safely as it can well be.

As an illustration of the views I have adopted in other cases of severe contraction of the superior strait, I will cite the following:

A. S., an Italian dwarf, forty-eight inches high, twenty years of age. No constitutional disease appertaining to rickets or malacosteon. Admitted into Bellevue Hospital April, 1865. Eight months advanced in gestation. The patient was placed in my charge by the Commissioners of Public Charities and Correction. There was a lordosis of the lumbar vertebræ. The opinion of my colleagues, Drs. Elliot and Barker, was, that the antero-posterior pelvic diameter was one and three-fourths inch; my own, that it might be two inches. Transverse diameter of the usual measurement, four and three-fourths to five inches. The Cæsarean section was considered requisite.

May 20th.—I was requested to visit her at 8 A. M. Pains every fifteen minutes. Patient looking and feeling well, bright, and cheerful, and naturally so. On examination the os uteri was nearly one-half dilated; waters evacuated for half an hour. On external and internal examination I recognized the foetal head occupying the left side of the pelvis obliquely. Preparations were made for delivery by the Cæsarean section.

At 10 A. M.—Present, my colleagues, Profs. Elliot, Barker, Sayre, Thomas, the house-staff, and other gentlemen. The patient was anæsthetized, and before proceeding to the

operation I made an examination to decide more clearly the position of the child, when I perceived the head had changed its position, and a foot or hand was felt. On careful touching, I recognized it was a foot. This was seized with two fingers, and I decided to turn; and if not succeeding by that method, to resort to the Cæsarean section afterward. The foot having been seized, and external pressure made on the breech, the child was drawn down, and in a few moments the breech was brought through the superior strait, and delivered, finally the arms, and only the head remained. As I have done before in some cases, I brought the back of the child to the back of the mother, occiput posteriorly, face looking upward, so that the occiput should be placed in the left sacro-iliac space. By pressure from above by my house-physician, and retaining the head and gentle propulsion, with the child's body elevated toward the pubes, the occiput was reached, and the cranium perforated by Naegele's perforator. The brain was evacuated and steady pressure continued, and the head then pushed more over to the right sacro-iliac space, so as to be more transverse, and the smaller part of the vault, which, after the evacuation of the brain, would be only one and a half or one and three-fourths inch from the base to the top, instead of three to three and one-fourth inches naturally, brought against the promontory of the sacrum. The right-angle blunt-hook was then introduced into the lower orbit of the face (the right one), firm but gentle and steady traction made downward and forward, while the propulsion from above the pubes by Dr. Elliot was made backward and downward. After a few minutes' trial the cranium was forced through the obstacle, and the child delivered. Child weighed nine pounds. Time of delivery, three-fourths to one hour. My little patient had a most excellent recovery without any untoward symptoms, and was walking about the room on the twelfth day.

I could add other cases where the antero-posterior diameter was from two and a half to three inches, and which were brought before the students after a few hours' labor. In

some instances after perforation, the cephalotribe was used and version at once adopted by two fingers internally, and external manipulation on the breech.

In pelvic presentations in this kind of pelvis I have pursued the same treatment of the body, the occiput carried posteriorly, as I have done sometimes in pelvis ranging from three to three and one-fourth inches. I believe, for various reasons, it has an advantage over the opposite one, with the face of the child posterior, and back looking upward. This method is essentially necessary as an illustration in the obliquely-ovate pelvis, whether naturally so or created by diseases of the hip-joint or injuries. In two of the patients I have referred to I have delivered with pelvis in the inferior strait of one and seven-eighths to two inches diameter. They have since had abortion produced at the third and fourth month, and would not permit gestation to proceed to even six months. The other patient has consented to allow pregnancy to go to six or six and a half months.

From the observations I have made I deduce the following:

1. That a mutilated foetus can be delivered with safety to the mother through a space of one and three-fourths inch antero-posterior, and two and a half or three inches transverse, by craniotomy, cephalotripsy, or cranioclasm, provided the vault has been destroyed, and the face made to present edgewise, or delivering the head sidewise.

2. That after cephalotripsy, or cranioclasm, if necessary, version, early performed, with propulsion from above the pubes afterward, and before the uterine forces are exhausted, is preferable to the first proposition, and I believe more available.

3. That the cephalotribe or cranioclast cannot be considered sufficiently available as tractors after cephalotripsy, to deliver the patient in extreme contraction, and that other instruments as tractors are necessary to aid the delivery.

4. That the Cæsarean section should not be performed when the contraction or deformity is as stated above, unless some other complications or circumstances exists, or presents.

FIG. 7.



DR. TAYLOR'S MODIFIED MEIGS'S EMBRYOTOMY-FORCEPS: length, 14 $\frac{1}{4}$ inches; handle to point on lock, 10 inches; the point on lock to end, 4 $\frac{1}{4}$; breadth of blades at lock, $\frac{1}{2}$ inch.

FIG. 8.



DR. TAYLOR'S RIGHT-ANGLE BLUNT HOOK: the tip of handle to end of hook, 12 $\frac{1}{4}$ inches; length of curve of hook, 1 $\frac{1}{4}$ inch; one more blunt than the other.