

inferior to that of the forceps, while it is as difficult to introduce and manipulate.

Cases in which it is Applicable.—The vectis has been recommended in cases in which the low forceps operation is suitable, provided the pains have not entirely ceased. There is no doubt that it may be quite capable of overcoming a slight impediment to the passage of the head. It is applied over various parts of the head, most commonly over the occiput, in the same manner, and with the same precautions, as one blade of the forceps. Dr. Ramsbotham says: "We shall find it necessary to apply it to different parts of the cranium, and perhaps the face also, successively, in order to relieve the head from its fixed condition and favor its descent." Such an operation obviously requires quite as much dexterity as the application of the forceps; while, if we bear in mind its comparatively slight power and the risk of injury to the maternal structures, we must admit that the disuse of the instrument in modern practice is amply justified.

FIG. 185.



Vectis with hinged handle.

FIG. 186.



Wilmot's fillet.

The vectis may, however, find a useful application when employed to rectify malpositions, especially in certain occipito-posterior presentations. This action of the instrument has already been considered (page 334), and, under such circumstances, it may prove of service where the forceps is inapplicable. When so employed it is passed carefully over the occiput, and, while the maternal structures are guarded from injury, downward traction is made during the continuance of a pain. So used, its application is perfectly simple and free from danger, and for this purpose it may be retained as part of the obstetric armamentarium.

The Fillet is the oldest of obstetric instruments, having been frequently employed before the invention of the forceps, and even in the time of Smellie it was much used in the metropolis. It has since completely fallen out of favor as a scientific instrument, although its use is every now and again advocated, and it is certainly a favorite instrument with some practitioners. This is to be explained by the apparent simplicity of the operation, and the fact that it can generally be performed without the knowledge of the patient. The latter, however, is one strong reason why it should not be used.

Nature of the Instrument.—The fillet consists, in its most improved form (that which is recommended by Dr. Eardley Wilmot¹) (Fig. 186), of a slip of whalebone fixed into a handle composed of two separate halves which join into one. The whalebone loop is slipped over either the occiput or face, and traction used at the handle.²

When applied over the face, after the head has rotated, it would probably do no harm; but if it were so placed when the head was high in the pelvis, traction would necessarily produce extension of the chin before the proper time, and would thus interfere with the natural mechanism of delivery. If placed over the occiput, it is impossible to make traction in the direction of the pelvic axes, as the instrument will then infallibly slip. If traction be made in any other direction, there must be a risk of injuring the maternal structures, or of changing the position of the head. Hence there is every reason for discarding the fillet as a tractor, or as a substitute for the forceps, even in the simplest cases.

It is quite possible that it may find a useful application in certain cases in which the vectis may also be used, viz., as a rectifier of malposition; and, from the comparative facility of its introduction, it would probably be the preferable instrument of the two.

CHAPTER V.

OPERATIONS INVOLVING DESTRUCTION OF THE FÆTUS.

Operations involving the destruction and mutilation of the child were among the first practised in midwifery. Craniotomy was evidently known in the time of Hippocrates, as he mentions a mode of extracting the head by means of hooks. Celsus describes a similar operation, and was acquainted with the manner of extracting the fœtus in transverse presentations by decapitation. Similar procedures were

¹ *Obst. Trans.*, 1874, vol. xv, p. 172.

² The whalebone fillet originated with the Japanese, and was a fearfully destructive instrument with them, traction being made with a windlass.—*Ed.*

also practised and described by Aetius and others among the ancient writers. The physicians of the Arabian school not only employed perforators for opening the head, but were acquainted with instruments for compressing and extracting it.

Religious Objections to Craniotomy.—Until the end of the seventeenth century this class of operation was not considered justifiable in the case of living children; it then came to be discussed whether the life of the child might not be sacrificed to save that of the mother. It was authoritatively ruled by the Theological Faculty of Paris that the destruction of the child in any case was mortal sin. "Si l'on ne peut tirer l'enfant sans le tuer, on ne peut sans péché mortel le tirer." This dictum of the Roman Church had great influence on Continental midwifery, more especially in France, where, up to a recent date, the leading obstetricians considered craniotomy to be only justifiable when the death of the fœtus had been positively ascertained. Even at the present day there are not wanting practitioners who, in their praiseworthy objection to the destruction of a living child, counsel delay until the child has died—a practice thoroughly illogical, and only sparing the operator's feelings at the cost of greatly increased risk to the mother. In England the safety of the child has always been considered subservient to that of the mother; and it has been admitted that, in every case in which the extraction of a living fœtus by any of the ordinary means is impossible, its mutilation is perfectly justifiable.

Formerly Performed with Unjustifiable Frequency.—It must be admitted that the frequency with which craniotomy has been performed in England constitutes a great blot on British midwifery. During the mastership of Dr. Labbat, at the Rotunda Hospital, the forceps was never once applied in 21,867 labors. Even in the time of Clarke and Collins, when its frequency was much diminished, craniotomy was performed three or four times as often as forceps delivery. These figures indicate a destruction of fœtal life which we cannot look back to without a shudder, and which, it is to be feared, justify the reproaches which our Continental brethren have cast upon our practice. Fortunately, professional opinion has now completely recognized the sacred duty of saving the infant's life whenever it is practicable to do so; and British obstetricians now teach as carefully as those of any other nation the imperative necessity of using every endeavor to avoid the destruction of the fœtus.

Divisions of the Subject.—The operation now under consideration may be necessary: 1st, when the head requires either to be simply perforated, or afterward more completely broken up and extracted—an operation which has received various names, but is generally known in England as *craniotomy*, and which may or may not require to be followed by further diminution of the trunk; 2d, when the arm presents, and turning is impossible. This necessitates one of two procedures—*decapitation*, with the separate extraction of the body and head, or *evisceration*. In both classes of cases similar instruments are employed, and those generally in use at the present time may be first briefly described.

Instruments Employed.—The object of the *perforator* is to pierce the skull of the child, so as to admit of the brain being broken up and the consequent collapse and diminution in size of the cranium. The perforator invented by Denman, or some modification of it, has been principally employed. It requires the handles to be separated in order to open the blades, and this cannot be done by the operator himself. This difficulty is overcome in the modification of Naegele's perforator used in Edinburgh, in which the handles are so constructed that they open the points when pressed together, and are separated by a steel rod with a joint at its centre to prevent their opening too soon. By this arrangement the instrument can be manipulated by one hand only. The sharp-pointed portion has an external cutting edge, with projecting shoulders at its base to prevent its penetrating too far

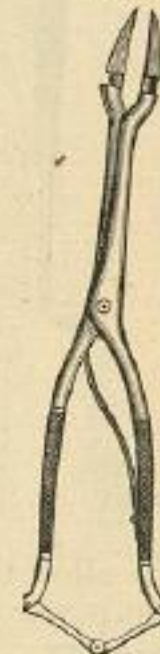
FIG. 187.



FIG. 188.



FIG. 189.



Various forms of perforators.

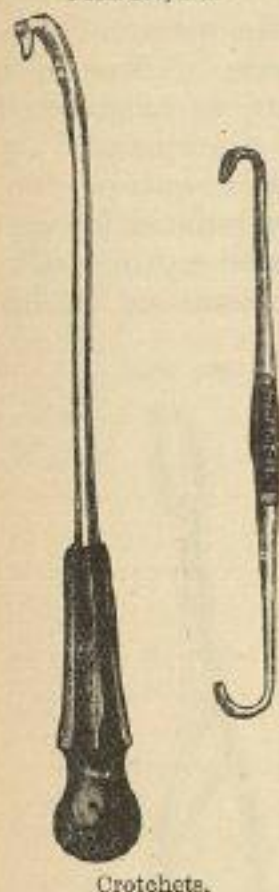
into the cranium. Many modifications of these arrangements have since been contrived (Figs. 187, 188, 189). In some parts of the Continent a perforator is used constructed on the principle of the trephine; but this is vastly more difficult to work and has the great disadvantage of simply boring a hole in the skull, instead of splitting it up, as is done by the sharp-pointed instrument.

The instruments for extraction are the *crotchet* and *craniotomy forceps*.

Crotchets and Craniotomy Forceps.—The crotchet is a sharp-pointed hook of highly tempered steel, which can be fixed on some portion of the skull, either internal or external, traction being made by the handle. The shank of the instrument is either straight or curved (Figs. 190 and 191), the latter being preferable, and it is either attached to a wooden handle or forged in a single piece of metal. A modification of this instrument is known as *Oldham's vertebral hook*. It consists of a slender hook, measuring with its handle thirteen

inches in length, which is passed through the foramen magnum and fixed in the vertebral canal, so as to secure a firm hold for traction. All forms of crotchets are open to the serious objection of being liable

FIGS. 190, 191.



Crotchets.

to slip, or break through the bone to which they are fixed, so wounding either the soft parts of the mother, or the fingers of the operator placed as a guard. Hence they are discountenanced by most recent writers, and may with propriety be regarded as obsolete instruments.

Their place as tractors is well supplied by the more modern craniotomy forceps (Fig. 192). These are intended to lay hold of the skull, one blade being introduced within the cranium, the other externally, and, when a firm grasp has been obtained, downward traction is made. A second object it fulfils is to break away and remove portions of the skull when perforation and traction alone are insufficient to effect delivery. Many forms of craniotomy forceps are in use—some armed with formidable teeth; others, of simpler construction, depending on their roughened and serrated internal surfaces for firmness of grasp. For general use, there is no better instrument than the *cranioclast* of Sir James Y. Simpson (Fig. 193), which admirably fulfils both these indications. It consists of two separate blades fastened by a button joint. The extremities of the blades are of a duck-billed shape, and are sufficiently curved to allow of a firm grasp of the skull being taken: the upper blade is deeply grooved to allow the lower to sink into it, and this gives the instrument great power in fracturing the cranial bones, when that is found to be necessary. It need not, however, be employed for the latter purpose; and the blades, being serrated on their under surface, form as perfect a pair of craniotomy forceps as any in ordinary use. Provided with it, we are spared the necessity of procuring a number of instruments for extraction.

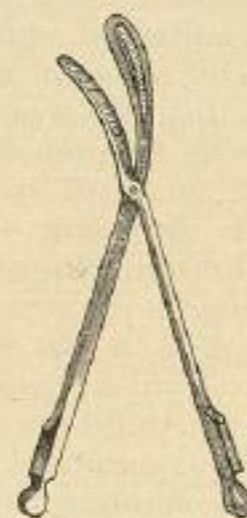
Cephalotribe.—Amongst modern improvements in midwifery there are few which have led to more discussion than the use of the *cephalotribe*. This instrument, originally invented by Baudelocque, was long employed on the Continent before it was used in England, the prejudice against it being no doubt due to its formidable size and appearance.^[1] Of late years many of our leading obstetricians have used it in preference to either the crotchet or craniotomy forceps, and have materially modified and improved its construction, so that the most objectionable features of the older instruments are now entirely removed.

The cephalotribe consists of two powerful solid blades, which are applied to the head after perforation, and approximated by means of a screw so as to crush the cranial bones, and after this it may also be

[1] It was introduced into our country in 1843, under the name of *brise-tête*.—Ed.]

used for extraction. The peculiar value of the instrument is that, when properly applied, it crushes the firm base of the skull, which is left untouched by craniotomy; or, if it does not, it at least causes the base to turn edgewise within the blades, so as to be in a more favorable position for extraction. Another and specially valuable property is that it crushes the bones *within* the scalp, which forms a most efficient protective covering to their sharp edges. In this way one of the principal dangers of craniotomy—the wounding of the maternal passages by spiculæ of bone—is entirely avoided.

FIG. 192.



Craniotomy forceps.

FIG. 193.



Simpson's cranioclast.

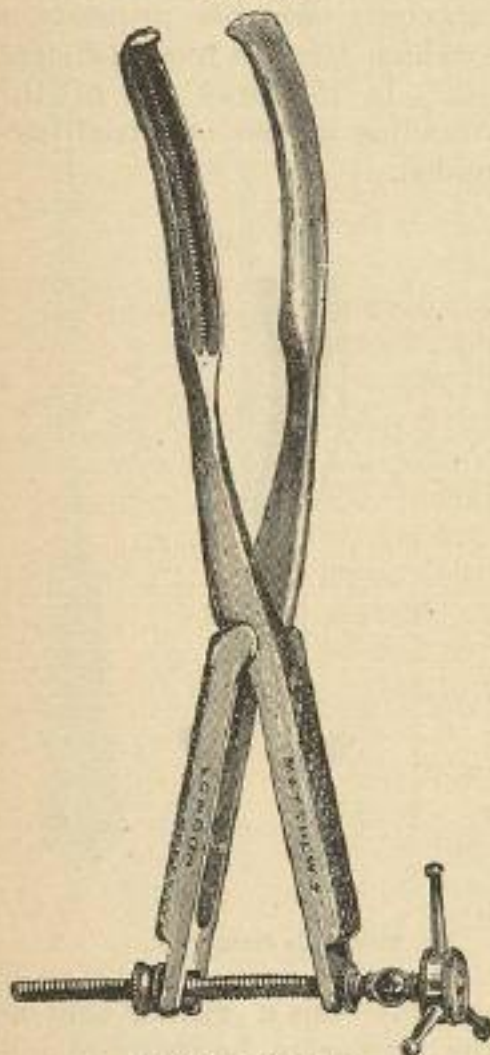
The cephalotribe, therefore, acts in two ways—as a crusher and as a tractor. Some obstetricians believe the former to be its more important use, and even maintain that the cephalotribe is unsuited for traction. This view is specially maintained by Pajot, who teaches that, after the size of the skull has been diminished by repeated crushings, its expulsion should be left to the natural powers. There are some grounds for believing that in the greater degrees of obstruction the tractile power of the instrument should not be called into use; but, in the large majority of cases, the facility with which the crushed head may be withdrawn by it constitutes one of its chief claims to the attention of the obstetrician. No one who has used it in this way, and experienced the rapid and easy manner in which it accomplishes delivery, can have any doubt on this point.

There is every reason to believe that cephalotripsy will be much extended in Great Britain, and that it will be considered, as I believe it unquestionably deserves to be, the ordinary operation in cases requiring destruction of the fetus.^[1] The comparative merits of cephalotripsy and craniotomy will be subsequently considered.

[1] This is certainly not its future in the United States, where foetal destruction is being avoided, under the largely diminished fatality of the Cæsarean section and symphysectomy.—Ed.]

The most perfect cephalotribe is probably that known as Braxton Hicks's (Fig. 194), which is a modification of Simpson's. It is not

FIG. 194.



Hicks's cephalotribe.

of unwieldy size, but sufficiently powerful for any case, and not extravagant in price. The blades have a slight pelvic curve, which materially facilitates their introduction, yet not sufficiently marked to interfere with their being slightly rotated after application. Dr. Kidd, of Dublin, prefers a straight blade; while Dr. Matthews Duncan thought it better to use a somewhat bulkier instrument, modelled on the type of the Continental cephalotribes. The principle of action of all these is identical, and their differences are not of very material importance.

Section of the Skull by the Forceps-saw, or Ecraseur.—Another mode of diminishing the fetal skull is by removing it in sections. The object is aimed at in the *forceps-saw* of Van Huevel, which consists of two large blades, not unlike those of the cephalotribe in appearance. Within these there is a complicated mechanism, working a chain-saw from below upward, which cuts through the fetal skull; the separated portions are subsequently withdrawn piecemeal. This instrument is highly spoken of by the Belgian obstetricians, who believe that it affords by far the safest and most effectual way of reducing the bulk of the fetal skull. A somewhat similar instrument has been invented by Tarnier. In Great Britain these instruments are practically unknown; and, although they must be admitted to be theoretically excellent, the complexity and cost of the apparatus have always stood in the way of their being used.

Dr. Barnes has suggested that the same results may be obtained by dividing the head with a strong wire *écraseur*. So far as I know, this suggestion has never yet been carried out in practice, not even by himself, and therefore it is not possible to say much about it. I should imagine, however, that there would be considerable difficulty in satisfactorily passing the loop of wire over the skull in a pelvis in which there is any well-marked deformity.

Cases requiring Craniotomy.—The most common cause for which craniotomy or cephalotripsy is performed is a want of proper proportion between the head and the maternal passages. This may arise from a variety of causes. The most important, and that most often necessitating the operation, is osseous deformity. This may exist

either in the brim, cavity, or outlet, and it is most often met with in the antero-posterior diameter of the brim. Obstetric authorities differ considerably as to the precise amount of contraction which will prevent the passage of a living child at term. Thus Clarke and Burns believe that a living child cannot pass through a pelvis in which the antero-posterior diameter at the brim is less than three and one-quarter inches. Ramsbotham fixes the limit at three inches, and Osborne and Hamilton at two and three-quarters inches. The latter is the extreme limit at which the birth of a living child is possible; but there can be no doubt that, under favorable circumstances, it may be possible to draw the fetus, after turning, through a pelvis of that size. The opposite limit of the operation is still more open to discussion. Various authorities have considered it quite possible to draw a mutilated fetus through a pelvis in which the antero-posterior diameter does not exceed one and one-half inch, and, indeed, have succeeded in doing so. But then there must be a fair amount of space in the transverse diameter of the pelvis to admit of the necessary manipulations. If there be a clear space here of three inches and upward, it is no doubt possible to deliver *per vias naturales*; but in such extreme deformities, the difficulties are so great, and the bruising of the maternal structures so extensive, that it becomes an operation of the greatest possible severity, with results nearly as unfavorable to the mother as the Cæsarean section.^[1] Hence some Continental authorities have not scrupled to prefer the latter operation in the worst forms of pelvic deformity. The rule in English practice always has been that craniotomy must be performed whenever it is practicable; and there can be no doubt that it is, generally speaking, the right one.

Between from two and three-quarters to three inches antero-posterior diameter in the one direction, and one and three-quarters inches in the other, may be said to be the limits of craniotomy, provided, in the latter case, there be a fair amount of space in the transverse diameter. The same limits may be laid down with regard to tumors or other sources of obstruction.

There are a few other conditions in which craniotomy is justifiable, independently of pelvic contraction, such as certain conditions of the soft parts which are supposed to render the passage of the head peculiarly dangerous to the mother. Among them may be mentioned swelling and inflammation of the vagina from the length of the previous labor, bands and cicatrices of the vagina, and occlusion and rigidity of the os. It is hardly too much to say that with a proper use of the resources of midwifery, the destruction of a living fetus for any of these conditions might be obviated. The most common of them is undoubtedly swelling of the soft parts causing impaction of the head, an occurrence which ought to be invariably prevented by a timely use of the forceps. Should interference unfortunately be delayed until impaction has actually taken place, doubtless no other resource but craniotomy would be left; but such cases, it is to be hoped, are now of rare occurrence in British practice. Undue rigidity

[1] The experience of our country indicates that in extreme pelvic deformity the conservative Cæsarean section has the less risk of the two.—Ed.]

of the os can be overcome by dilatation with the caoutchouc bags, or, in more serious cases, by incision, which would certainly be less perilous to the mother than dragging even a mutilated foetus through the small and rigid aperture. In the case of bands and cicatrices in the vagina, dilatation or incision will generally suffice to remove the obstruction; but even were this not so here, as in excessive rigidity of the perineum, it would be better that slight lacerations should take place than that the child should be killed.

Certain complications of labor are held to justify craniotomy, such as rupture of the uterus, convulsions, and hemorrhage. The application of the forceps or turning will generally answer our purpose equally well, especially as we have the means of dilating the os sufficiently to admit of one or other of them being performed when the natural dilatation is not sufficient. Craniotomy in rupture of the uterus will also be rarely indicated, as we have seen that cœliotomy appears to afford a better chance to the mother in those cases in which the foetus has partially or entirely escaped from the uterine cavity.

Want of proportion between the foetus and the pelvis, depending on undue size of the head, either natural or the result of disease, may render the operation essential. In the former of these cases we shall generally have first attempted delivery with the forceps, and, if it has failed, there can be no doubt as to the propriety of lessening the bulk of the head by perforation, unless we determine to attempt delivery by symphysiotomy (see p. 557).

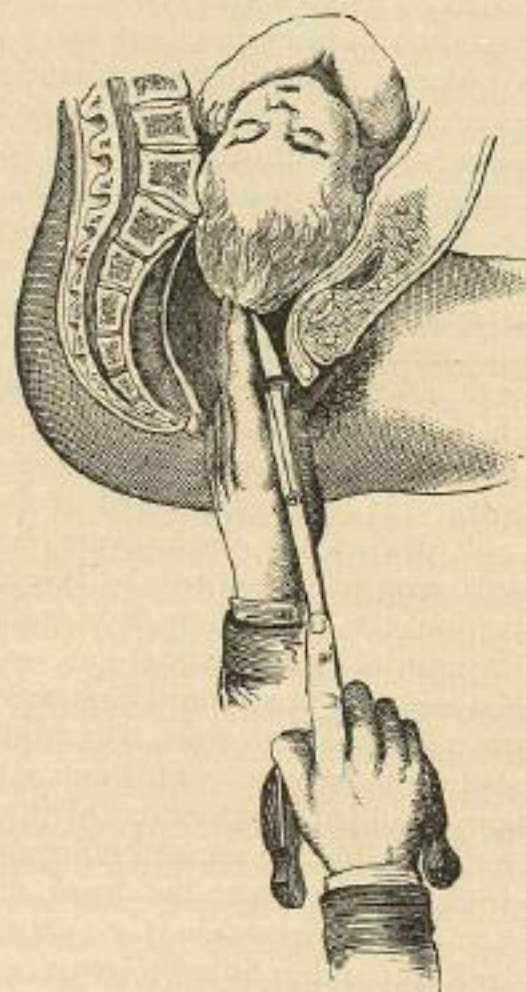
In most obstetric works we are recommended to perforate rather than apply the forceps, when we are convinced that the child has ceased to live. This advice is based on the greater facility with which craniotomy can be performed, and its supposed greater safety to the mother. There can be no doubt of the ease with which the child can be extracted after perforation, when the pelvis is not contracted; and, if we could always be sure of our diagnosis, the rule might be a good one. Before acting on it, however, we must bear in mind the extreme difficulty of positively ascertaining the death of the foetus. Of the signs usually relied on for this purpose, there are scarcely any which are not open to fallacy, except peeling of the scalp, and disintegration of the cranial bones, which do not take place unless the child has been dead for a length of time, and are, therefore, useless in most instances. Discharge of the meconium constantly takes place when the child is alive; a cold and pulseless prolapsed cord may belong to a twin; and a fetal heart may become temporarily inaudible, although the child is not dead. If, indeed, we have carefully watched the foetal heart all through the labor, and heard it become more and more feeble, and finally stop altogether, we might be certain that the child has died; but surely such observations would rather indicate an early recourse to the forceps or version, so as to obviate the fatal result we know to be impending.

Perforation of the After-coming Head.—In certain breech presentations, or after turning, it may be found impossible to extract the head without diminishing its size by perforating behind the ear. In

such cases we know to a certainty whether the child be alive or dead, before resorting to the operation.

The preliminary step, whether we resort to cephalotripsy or craniotomy, is perforation, which will, therefore, be first described. In the former the desirability of first perforating the head is not always recognized. To endeavor to crush the head without perforating is needlessly to increase the difficulties of the case, and it should be remembered, as a cardinal rule, that perforation is an essential preliminary to the proper use of the cephalotribe.

FIG. 195.



Perforation of the skull.

Before perforating we must carefully ascertain the exact relation of the os to the presenting part, since, in many cases, the operation is performed before the os is fully dilated, when there is a risk of wounding the cervix. Two or more fingers of the left hand should be passed up to the head and placed against the most prominent part of the parietal bone. Under these, used as guard (Fig. 195), the perforator should be cautiously introduced until the scalp is reached. It is important to fix on a bony part of the skull, and not on a suture or fontanelle, for puncture, because our object is to break up the vault of the cranium as much as possible, so as to allow the skull to collapse. When the instrument has reached the point we have selected, it should be made to penetrate the scalp and skull with a semi-rotatory boring

motion, and advanced until it has sunk up to the rests, which will oppose its further progress. Occasionally considerable force will be necessary to effect penetration, more especially if the scalp be swollen by long-continued pressure; and this stage of the operation will be facilitated by causing an assistant to steady the head by pressure on the fetus through the abdomen, more especially if it be still free above the pelvic brim. We must then press together the handles of the instrument, which will have the effect of widely separating the cutting portion, and making an incision through the bones. After this the point should be turned around, and again opened at right angles to the former incision, so as to make a free crucial opening. During this process care must be taken to bury the perforator in the skull up to the rests, so as to avoid the possibility of injuring the maternal soft parts. The instrument should now be introduced within the skull and moved freely about, so as to thoroughly and completely break up the brain. Especial care must be taken to reach the medulla oblongata and base of the brain, for, if these are not destroyed, we might subject ourselves to the distress of extracting a child in whom life was not extinct. If this part of the operation be thoroughly performed, there will be no necessity for washing out the brain by the injection of warm water, as is sometimes recommended, for the broken-up tissue will escape freely through the opening made by the perforator.

The perforation of the after-coming head does not generally offer any particular difficulty. It is accomplished in the same manner, the child's body being well drawn out of the way by an assistant. The point of the perforator, carefully guarded by the finger, is guided up to the occiput, or behind the ear, where it is inserted, or perforation may be performed through the hard palate.

If there be no necessity for very rapid delivery, and the pains be still present, it is often advisable to wait ten minutes or a quarter of an hour before proceeding to extract. This delay will allow the skull to collapse and become moulded to the cavity of the pelvis, when forced down by the pains, and possibly the natural efforts may suffice to finish the labor in that time; or, at least, the head will have descended further, and will be in a better position for extraction. Should perforation be required after having failed to deliver with the forceps—and this is only likely to be the case when the obstruction is comparatively slight—it is certainly a good plan to perforate without removing the forceps, which may then be used as tractors.

We have now to decide on the method of extraction, and our choice generally lies between the cephalotribe and the craniotomy forceps, although in some few cases, in which the pelvic contraction is slight, version may be advantageously employed. Some have even advised version as a preliminary step in all cases requiring craniotomy, the skull being perforated through the roof of the mouth, and subsequently crushed with the cephalotribe.¹

Comparative Merits of Cephalotripsy and Craniotomy.—Those who have used both must, I think, admit that in any ordinary case, in

¹ See Donald on "Methods of Craniotomy," *Obst. Trans.*, vol. xxxi. p. 28.

which the obstruction is not great, and only a comparatively slight diminution in the size of the head is required, cephalotripsy is infinitely the easier operation. The facility with which the skull can be crushed is sometimes remarkable, and those who will take the trouble to read the reports of the operation published by Braxton Hicks, Kidd, and others, cannot fail to be struck with the rapidity with which the broken-down head may often be extracted. This is far from being the case with the craniotomy forceps, even when the obstruction is moderate only; for it may be necessary to use considerable traction, or the blades may take a proper grasp with difficulty, or it may be essential to break down and remove a considerable portion of the vault of the cranium before the head is lessened sufficiently to pass. During the latter process, however carefully performed, there is a certain risk of injuring the maternal structures, and, in the hands of a nervous or inexperienced operator, this danger, which is entirely avoided in cephalotripsy, is far from slight. The passage of the blades of the cephalotribe is by no means difficult, and I think it must be admitted that the possible risks attending it are comparatively small. On account, therefore, of its simplicity and safety to the maternal structures, I believe cephalotripsy to be decidedly the preferable operation in all cases of moderate obstruction.

When we approach the lower limit, and have to do with a very marked amount of pelvic deformity, the two operations stand on a more equal footing. Then the deformity may be so great as to render it difficult to pass the blades of even the smallest cephalotribe sufficiently deep to grasp the head firmly, and even when they are passed, the space is often so limited as to impede the easy working of the instrument. Besides this, repeated crushings may be required to diminish the skull sufficiently. I attach but little importance to the argument that the diminution of the skull in one diameter increases its bulk in another. The necessity of removing and replacing the blades on another part of the skull, and of repeating this perhaps several times, in the manner recommended by Pajot, is a far more serious objection. To do this in a contracted pelvis involves, of necessity, the risk of much contusion. Fortunately cases of this kind are of extreme rarity, much more so than is generally believed, but when they do occur they tax the resources of the practitioner to the utmost.

On the whole, the conclusion I would be inclined to arrive at with regard to the two operations is, that in all ordinary cases cephalotripsy is safer and easier, whereas in cases with considerable pelvic deformity, the advantages of cephalotripsy are not so well marked, and craniotomy may even prove to be preferable.

The first step in using the cephalotribe is the passage of the blades. These are to be inserted in precisely the same manner, and with the same precautions, as in the high forceps operation. In many cases the os is not fully dilated, and it is absolutely essential to pass the instrument within it. Special care should, therefore, be taken to avoid any injury to its edges, and, for this purpose, two or three fingers of the left hand, or even the whole hand, should be passed high up, so as thoroughly to protect the maternal structures. In order that the base of the skull

may be reached and effectually crushed, the blades must be deeply inserted, and, in doing this, great care and gentleness must be used. As the projecting promontory of the sacrum generally tilts the head forward, the handles of the instrument, after locking, must be well pressed backward toward the perineum. If the blades do not lock easily, or if any obstruction to their passage be experienced, one of them must be withdrawn and reintroduced, just as in a forceps operation. Care must be taken, as the instrument is being inserted, to fix and steady the head by abdominal pressure, since it is generally far above the brim and would readily recede if this precaution were neglected. When the blades are *in situ*, we proceed to crush by turning the screw slowly, and as the blades are approximated the bones yield and the cephalotribe sinks into the cranium. The crushed portion then measures, of course, no more than the thickness of the blades, that is, about one and one-half inches. This is necessarily accompanied by some bulging of the part of the cranium that is not within the grasp of the

FIG. 196.



Fetal head crushed by the cephalotribe.

the pelvic cavity. This was the plan adopted by Dubois, and, according to Tarnier, was the secret of his great success in the operation. Pajot's method of repeated crushings, in the greater degrees of contrac-

tion, is based on the same idea, and he recommends that the instrument should be introduced at intervals of two, three, or four hours, according to the state of the patient, until the head is thoroughly crushed; no attempts at traction being used, and expulsion being left to the natural powers. This, he says, should always be done when the contraction is below two and one-half inches, and he maintains that it is quite possible to effect delivery by this means when there is only one and one-half inches in the antero-posterior diameter. The repeated introduction of the blades in this fashion must necessarily be hazardous, except in the hands of a very skilful operator; and I believe that if a second application fail to overcome the difficulty, which will only be very exceptionally the case, it would be better to resort to the measures presently to be described.

tion, is based on the same idea, and he recommends that the instrument should be introduced at intervals of two, three, or four hours, according to the state of the patient, until the head is thoroughly crushed; no attempts at traction being used, and expulsion being left to the natural powers. This, he says, should always be done when the contraction is below two and one-half inches, and he maintains that it is quite possible to effect delivery by this means when there is only one and one-half inches in the antero-posterior diameter. The repeated introduction of the blades in this fashion must necessarily be hazardous, except in the hands of a very skilful operator; and I believe that if a second application fail to overcome the difficulty, which will only be very exceptionally the case, it would be better to resort to the measures presently to be described.

Prof. Alex. R. Simpson, of Edinburgh,¹ has suggested the use of an instrument which he calls a "basilyst." Its object is to break up the base of the fetal skull from within, after the method originally proposed by Guyon. The screw-like portion of the instrument (Fig. 197), which is inserted through the perforation made in the cranial vault, is driven through the hard base, which is then disintegrated by the separate movable blade. If experience proves that this instrument can be readily worked, it promises to be a valuable addition to our armamentarium, since it will effectually destroy the most resistant portion of the skull, without risk of injury to the maternal structures, and thus very materially facilitate extraction.

Extraction by the Craniotomy Forceps.—Should we elect to trust to the craniotomy forceps for extraction, one blade is to be introduced through the perforation, and the other, placed in opposition to it, on the outside of the scalp. In moderate deformities, traction applied during the pains may of itself suffice to bring down the head. Should the obstruction be too great to admit of this, it is necessary to break down and remove the vault of the cranium. For this purpose Simpson's cranioclast answers better than any other instrument. One of the blades is passed within the cranium, the other, if possible, between the scalp and the skull, and the portion of bone grasped between them is broken off; this can generally be accomplished by a twisting motion of the wrist, without using much force. The separated portion of bone is then extracted, the greatest care being taken to guard the maternal structures, during its removal, by the fingers of the left hand. The instrument is then applied to a fresh part of the skull, and the same process repeated until as much of the vault of the cranium as may be necessary is broken up and removed.

Dr. Braxton Hicks² has conclusively shown that in difficult cases, after the removal of the cranial vault, the proper procedure is to bring down the face, since the smallest measurement of the skull after the

FIG. 197.



Prof. A. R. Simpson's basilyst.

¹ Edin. Med. Journ., vol. 1879-80, p. 865.² Obst. Trans., 1867, vol. vii. p. 57.

removal of the upper part of the cranium is from the orbital ridge to the alveolar edge of the superior maxillary bone. This alteration in the presentation he proposes to effect by a small blunt hook made for the purpose, which is forced into the orbit, by means of which the face is made to descend. Barnes recommends that this should be done by fixing the craniotomy forceps over the forehead and face, and making traction in a backward direction, so as to get the face past the projecting promontory of the sacrum. The importance of bringing down the face was long ago pointed out by Burns, but it had been lost sight of until Hicks again drew attention to it in the paper referred to. In the class of cases in which this procedure is valuable, the risk to the maternal passages, from the removal of the fractured portions of bone, must always be considerable, and it is of great importance not only to preserve the scalp as entire as possible, so as to protect them, but to use the utmost possible care in removing the broken pieces of bone.

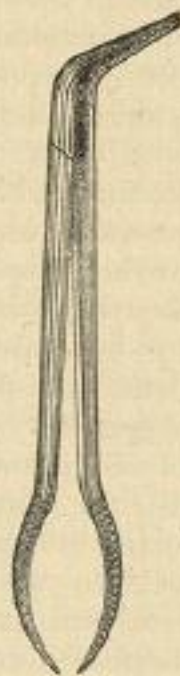
Extraction of the Body.—When the extraction of the head has been effected, either by the cephalotribe or the craniotomy forceps, there is seldom much difficulty with the body. By traction on the head one of the axillæ can easily be brought within reach, and if the body does not readily pass, the blunt hook should be introduced and traction made until the shoulder is delivered. The same can then be done with the other arm. If there be still difficulty, the cephalotribe may be used to crush the thorax. The body is, however, so compressible that this is rarely required.

[FIG. 198.]



Straight craniotomy forceps.]

[FIG. 199.]



Curved craniotomy forceps.]

[The craniotomy forceps chiefly in use with us were devised by the late Prof. Charles D. Meigs for his second operation upon Mrs. Reynolds, of Philadelphia, in 1833, and have been used repeatedly since, either as tractors or for reducing the size of the foetal head, in cases of

deformity of the pelvis.¹ Some obstetricians prefer the less curved and broader-bladed instrument of Great Britain as a tractor; but for the general purposes of picking away the cranial bones and drawing down the base of the skull in cases of extreme pelvic deformity there is no more simple appliance than that of Dr. Meigs.

To act upon an oval body like the foetal head, Dr. M. was obliged to prepare two forms of forceps—straight and curved—to be used as might be required according to the part of the skull to be broken down or drawn upon. These are lightly made, serrated, and twelve and a half inches in length.—ED.]

Embryotomy.—There only remains for us to consider the second class of destructive operations. These may be necessary in long-neglected cases of arm presentation, in which turning is found to be impracticable. Here, fortunately, the question of killing the foetus does not arise, since it will, almost necessarily, have already perished from the continuous pressure. We have two operations to select from, *decapitation* and *evisceration*. [And a third, the improved Cæsarean section.—ED.]

The former of these is an operation of great antiquity, having been fully described by Celsus. It consists in severing the neck, so as to separate the head from the body; the body is then withdrawn by means of the protruded arm, leaving the head *in utero* to be subsequently dealt with. If the neck can be reached without great difficulty—and, in the majority of cases, the shoulder is sufficiently pressed down into the pelvis to render this quite possible—there can be no doubt that it is much the simpler and safer operation.

The whole question rests on the possibility of dividing the neck. For this purpose many instruments have been invented. The one generally recommended in this country is known as Ramsbotham's hook, and consists of a sharply curved hook with an internal cutting edge. This is guided over the neck, which is divided by a sawing motion. There is often considerable difficulty in placing the instrument over the neck, although, if this were done, it would doubtless answer well. Others have invented instruments, based on the principle of the apparatus for plugging the nostrils, by means of which a spring is passed round the neck, and to the extremity of the spring a short cord, or the chain of an *écraseur*, is attached; the spring is then withdrawn and brings the chain or cord into position. The objection to any of these apparatus is, that they are unlikely to be at hand when required, for few practitioners provide themselves with costly instruments which they may never require. It is of importance, therefore, that we should have at our command some means of dividing the neck which are available in the absence of any of these contrivances. Dubois recommended for this purpose a strong pair of blunt scissors. The neck is brought as low as possible by traction on the prolapsed arm, and the blades of the scissors guided carefully up to it. By a series of cautious snipping movements it is then completely divided from below upward. This, if the neck be readily within reach, can

¹ The illustrations given are taken from the instruments devised by Dr. Meigs as an improvement upon his original pattern, and will be seen to differ from those usually presented in American obstetrical publications.—ED.]

generally be effected without any particular difficulty. Dr. Kidd, of Dublin,¹ who strongly advocated this operation, recommended that an ordinary male elastic catheter, strongly curved and mounted on a firm stilet, or, still better, on a uterine sound, should be passed round the neck. Previous to introduction a cord should be passed through the eye of the catheter, which is left round the neck when it is withdrawn. By means of this cord a strong piece of whipcord, or the wire of an *écraseur*, can easily be drawn round the neck and used for dividing it. The former, to protect the maternal structures, may be worked through a speculum, and by a series of lateral movements the neck is easily severed. The *écraseur*, however, offers special advantage, since it entirely does away with any risk of injuring the mother.

Withdrawal of the Body and Delivery of the Head.—After the neck is divided the remainder of the operation is easy. The body is withdrawn without difficulty by the arm, and we then proceed to deliver the head. By abdominal pressure, this, in most cases, can be pushed down into the pelvis, so as to come easily within reach of the cephalotribe, which is by far the best instrument for extraction. Preliminary perforation is not necessary, since the brain can escape through the severed vertebral canal. The secret of doing this easily is to fix and press down the head sufficiently from above, otherwise it would slip away from the grasp of the instrument. The perforator and craniotomy forceps may be used, if the cephalotribe be not at hand. Perforation is, however, by no means always easy, on account of the mobility of the head. After it is accomplished, one blade of the craniotomy forceps is passed within the skull, the other externally, and the head slowly drawn down.

Evisceration.—The alternative operation of evisceration is a much more troublesome and tedious procedure, and should only be used when the neck is inaccessible. The first step is to perforate the thorax at its most depending part, and to make as wide an opening into it as possible, in order to gain access to its contents. Through this the thoracic viscera are removed piecemeal, being first broken up as much as possible by the perforator, and then, the diaphragm being penetrated, those in the abdomen. The object is to allow the body to collapse and the pelvic extremities to descend, as in spontaneous evolution. This can be much facilitated by dividing the spinal column with a strong pair of scissors introduced into the opening made in the thorax, so that the body may be doubled up as on a hinge. Here the crotchet may find a useful application, for it can be passed through the abdominal cavity and fixed on some point in the interior of the child's pelvis, and thus strong traction can be made without any risk of injury to the mother. It can be readily understood that this process is so lengthy and difficult as to render it probably the most trying of obstetric operations; it is certainly inferior in every respect to decapitation, and is only to be resorted to when that is impracticable.²

¹ Dublin Quart. Journ. of Med. Science, 1871, vol. II, p. 383.

² In nine cases of impaction of the fetus in a transverse position, in the United States, the Cæsarean operation has been performed, owing to great difficulty in accomplishing either decapitation or evisceration, and six of the women were saved. The three deaths were from exhaustion.—Harris's note to third American edition.

CHAPTER VI.

THE CÆSAREAN SECTION—PORRO-CÆSAREAN OPERATION.

History of the Cæsarean Section.—The Cæsarean section has perhaps given rise to more discussion than any other subject connected with midwifery, and there is yet much difference of opinion as to the limits of, and indications for, the operation. The period at which the Cæsarean section was first resorted to is not known with accuracy. It seems to have been practised by the Greeks, after the death of the mother; and Pliny mentions that Scipio Africanus and Manlius were born in this way. The name of Cæsar is said to have been given to children so extracted, and afterward to have been assumed as a family patronymic. These children were dedicated to Apollo, whence arose the practice of things sacred to that god being taken under the special protection of the family of the Cæsars. Many celebrities have been supposed to owe their lives to the operation, among the rest *Æsculapius*, Julius Cæsar, and Edward VI. of England. Regarding the two latter, there is conclusive proof that the tradition is without foundation. There is no doubt that the operation was constantly practised on women who had died at an advanced period of pregnancy, and indeed it has, at various times, been enforced by law. Thus, among the Romans it was decreed by Numa that no pregnant woman should be buried until the fetus had been removed by abdominal section. The Italian laws also made it necessary, and the operation has always received the strong support of the Roman Church. So lately as the middle of the eighteenth century, the King of Sicily sentenced to death a physician who had neglected to practise it. The first authentic case in which the operation was performed on a living woman occurred in 1491. It was afterward practised by Nufer in 1500^[1]; and in 1581 Rousset published a work on the subject in which a number of successful cases were related. In English works of that time it is not alluded to, although it was undoubtedly performed on the Continent, and to such an extent that its abuse became almost proverbial. We have evidence in Shakespeare, however, that the operation was familiarly known in Great Britain, since he tells us that—

... Macduff was from his mother's womb
Untimely ripped.

[This is much more likely to refer to a horn-rip, as the original expression, "ripped out," would indicate. Fourteen such operations under the horn-thrusts of the bull, ox, cow, bison, and buffalo have been recorded, and ten women with seven children escaped death. Mrs.

[1 1498.—Ed.]