assistant through the abdominal walls, and steadied by a crotchet introduced into the foramen magnum, or fixed into an orbit, or in the lower jaw. The cephalotribe may then be applied to complete the extraction.

Cranioclast.—It is necessary to distinguish between two instruments, each of which bears the name of cranioclast. The original model was the device of Sir J. Y. Simpson, and was intended by him to replace the cephalotribe. It is substantially a powerful pair of craniotomy-forceps. The larger blade, which is intended to be placed upon the outer surface of the head, is fenestrated and grooved. The smaller one, for introduction into the perforated skull, is solid and supplied with ridges which fit into the grooves upon the opposite blade. The two blades articulate by means of a button-lock. By a twisting movement, the cranioclast, when applied, can be employed to wrench off the bones of the calvarium, different portions of the skull being seized successively with the view of accomplishing that result. As the fractured bones are covered by the scalp, they are prevented from inflicting injury during the subsequent course of delivery. But the cranioclast is not only of use in breaking up the cranial vault, it is likewise the most effective of all the instruments employed for extraction of the perforated head.

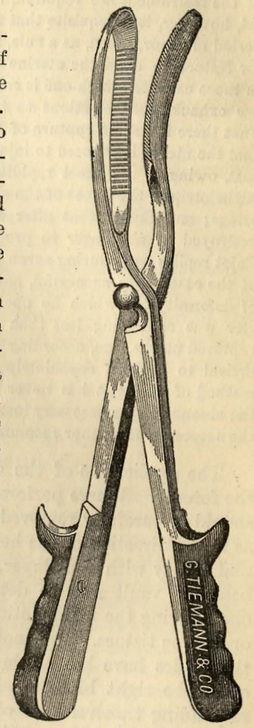

Fig. 198.—Simpson's cranioclast.

The principal defect of the Simpson cranioclast is that it attempts to combine in the same instrument the functions of crusher and tractor. Now, as in the cephalotribe, the devices which make it the most effective instrument in the one direction weaken its utility in the other. Braun's modified cranioclast is intended to serve purely as a tractor. All idea of its undertaking to break up the skull is discarded. The work of compression and disarticulation is left to the counter-pressure of the pelvic walls, and to the employment of craniotomy-forceps and the cephalotribe. The term *cranioclast* is therefore a misnomer. Mundé's proposed substitute of "craniotractor" is descriptive of its real action. Yet the modifications of Braun were as simple as they have proved appropriate. A pelvic

curve has been given to the blades; the handles have been lengthened so that the lock, even when the instrument is introduced high up, is

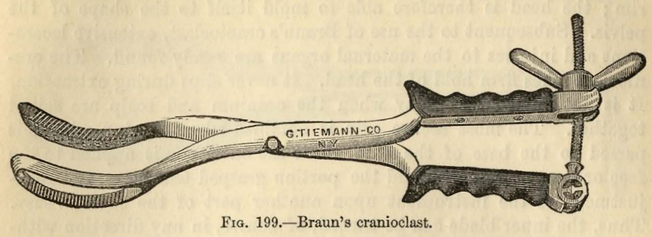

Fig. 199.—Braun's cranioclast.

outside the vulva; and, finally, an apparatus for compression has been added. The advantages of Braun's cranioclast over its rival, the cephalotribe, are as follows: it is of comparatively small size; again, one branch lies inside the head, in a space not otherwise occupied; the outer branch imbeds itself in the soft coverings of the head,

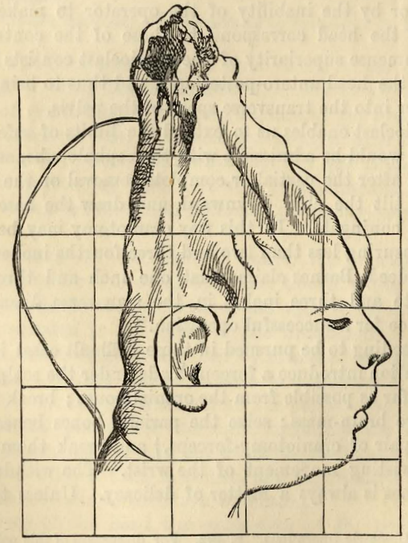

Fig. 200.—Head of child after delivery with the cranioclast. (Simpson.)

and thus is protected from doing harm. After a few tractions the cranioclast occupies the middle of the pelvis, where it can be so guarded by the hand that it need not even come into contact with the

vaginal walls; as the head is drawn into the pelvis, the pressure is not concentrated at one or two points, but is diffused over the entire pelvic rim; the head is therefore able to mold itself to the shape of the pelvis. Subsequent to the use of Braun's cranioclast, extensive lacerations and injuries to the maternal organs are rarely found. The cranioclast takes firm hold of the head. It never slips during extraction. It is not apt to tear away when the cranium and scalp are seized together. The most secure grip is obtained when the inner blade is passed to the base of the skull, while the outer one is applied to the face or over an ear. Should the portion grasped tear away, the readjustment of the instrument upon another part of the skull is easy. Thus, the inner blade can be turned, of course, in any direction without difficulty, while the outer blade is easily disengaged from the scalp-tissues and changed in its position by direct pressure from the fingers and slight leverage movements of the handle.

The cranioclast may often advantageously be used as a tractor in cases where the head has been previously crushed and flattened by the cephalotribe, but, where extraction with the latter is rendered difficult by slipping, or by the inability of the operator to make the altered diameters of the head correspond to those of the contracted pelvic space, the immense superiority of the cranioclast consists in the capacity to seize the head antero-posteriorly, and thus to bring its lengthened diameter into the transverse space of the pelvis.

The cranioclast enables us to extend the limits of safe delivery far beyond what would be admissible with the cephalotribe, as with its aid it is possible, after the partial or complete removal of the flat bones of the skull, to tilt the chin downward, and draw the base by the edge through the conjugate. In this way craniotomy may be resorted to in pelves measuring less than two and three fourths inches antero-posteriorly. Indeed, Barnes claims that one inch and three fourths in the conjugate and three inches in the transverse diameter furnish sufficient space for a successful operation.*

The proceeding to be pursued in these difficult cases is as follows: After perforation introduce a forceps-blade under the scalp, and detach the latter as far as possible from the cranial bones; break up and wash out the entire brain-mass; seize the parietal bones beneath the scalp with a good pair of craniotomy-forceps,† and break them away piecemeal by a twisting movement of the wrist. The withdrawal of the fractured bones is always a matter of delicacy. Unless the soft parts

* Barnes, "Obstetric Operations," p. 402. For discussion of this point, see "Treatment of Contracted Pelves."

† Meigs's craniotomy-forceps has been largely used in America, and may be confidently recommended. There are two forms, one straight and the other curved. Dr. Taylor's modification consisted chiefly in increasing the length of the instrument, so as to render it more available in operations at the superior strait.

are carefully guarded by the hand, the maternal tissues are apt to be cut and lacerated by the sharp edges and splintered corners of the bones.

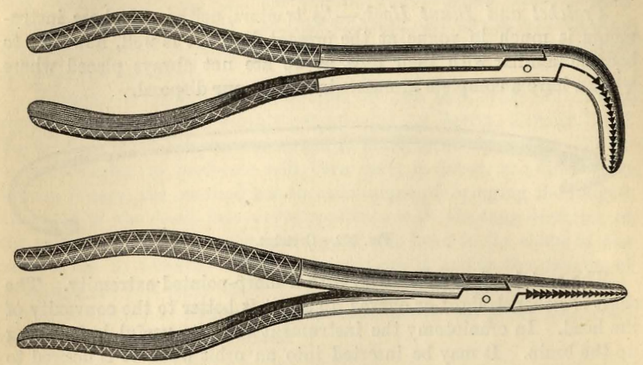

Fig. 201.—Meigs's craniotomy-forceps (modified by Professor I. E. Taylor).

Skene* has found it a great aid, in some cases, to use a large-sized Sims speculum to bring the head into view, and to go through the various steps of craniotomy with the guidance of the eye. The suggestion is an excellent one, but when the head is high up, as is the rule in difficult cases, I have not always found it practicable to expose in this way the presenting part. Horwitz† recommends, in difficult cases of the unexpanded cervix, to perforate through a large Fergusson speculum.

After the removal of the parietal bones, the fenestrated blade should be placed under the chin, or in the mouth, while the smaller one is introduced inside the perforation, and applied so that the frontal bones are included in the grasp of the instrument. The blades should then be screwed tightly together by means of the apparatus for compression, and the head turned so that its bizygomatic diameter is brought into the transverse diameter of the pelvis. As the distance between the orbital plates and the chin, including the instrument, does not exceed two inches, and the width of the base is only about three inches, it is evident that, in skillful and experienced hands, this method is capable of almost indefinite extension.

After delivery of the head, the extraction of the body may still cause difficulty. If, then, through an opening made with a perforator between the clavicle and shoulder-blade, the smaller blade be intro-

* Skene, "Trans. of the Am. Gynæc. Soc.," vol. ii.

† Horwitz, "Uber ein Perforations Verfahren," "Ztschr. f. Geburtsh. u. Gynaek.," Bd. iv, p. 1.