may be fairly called local hypertrophies of tissue, no well defined line of demarcation can be drawn. Some of the chronic mammary or glandular tumours illustrate this. But, even in such outgrowths the first departure from normal type is shown, not only in the formation of their substance, but also in the fact that they are not in such close physiological relation with normal structures as these are with each other. The sympathy which universally prevails between the several structures and organs of the body, and which is maintained either through the blood or by the nervous system, or in both ways, varies in degree among natural structures; but between all these and tumours, a far wider divergence is found. They rise and fall less with the ebb and flow of general life, and they are less affected by changes in other structures. Thus, by the most innocent and homologous tumours, is the first step taken towards an independent life; and, it may be observed, that this independence gradually gains strength, and becomes more marked as we pass from the most innocent, through tumours of varying degrees of malignancy, to the very worst; and, as we have seen, it is to the comparative independence of their life, that the most deadly of their attributes belong. And while tumours of the most innocent type touch, and, indeed, pass into natural structures, the most malignant touch, if they do not actually pass into, the class of parasites. Parasites are living forms, having, too, in various degrees, a power of independent life. For the most part, they can flourish only in the living body; and while there, they too are within the pale of the laws of its natural life; but, within this, they have an individual life, more independent of that of the body in which they live than tumours possess; and, moreover, they can, for a longer period, maintain life altogether apart from the body they are prone to infest. They can maintain a separate life in some of its lower grades; but they can exhibit their full vital endowments only in the body to which they belong. Now at present it must be confessed, that experiments on the grafting or inoculation of tumours, even the most malignant, have not been attended by success; we cannot yet say that cancer can be thus propagated; still there are some curious facts in reference to this. In certain cases, it has been observed that, when a cancerous mass has been allowed, for some time, to be in contact with an apparently healthy surface, this healthy surface has at length become cancerous; and, in this manner, cancer seems capable, after the fashion of a parasite, of passing from part to part. From part to part of the same body only; but I wonder what would happen if such an experiment could be fairly tried between different bodies. May not the experiments on inoculation hitherto have failed because of the crude conditions under which they have been performed? But be this as it may, and setting aside this conjecture, it would really appear that the interval between the worst cancer and certain parasites must be a very narrow one. Through the various kinds of parasites we pass to altogether independent forms of life; and I cannot help thinking that, from this point of view, much interest must be attached to tumours, as indicating the first steps towards the assumption of a separate and independent existence.

But, until it can be shown that tumours may be transmitted from one person to another by grafting or inoculation, it must be acknowledged that there is this sharp line of distinction between all of them and parasites. Parasites come always from without; tumours arise only from within; from some part or natural structure of the body itself. And it may be said that, after all, nothing more is known of the origin of tumours than this. Once started, we may perhaps see something of the laws which regulate their existence, but concerning their origin we are altogether in the dark. Yet, still recognising in this darkness an obscurity which enshrouds also some of the largest facts in physiology, we may perhaps be able to discern the direction in which light must at length come.

While tumours, then, appear to be bounded by the lower and simpler forms of parasites on the one hand, they are approached by what are regarded as abnormal conditions of nutrition on the other. The process of nutrition in its simplest state is one of mere maintenance. The bulk and weight of a structure or organ is preserved, in spite of constant wear and tear. In growth, there is increase either of bulk or of weight, or of both. But why, at a particular point, growth should cease, we do not know. We can only speak of it as a natural law. It is the same with regeneration or repair after injury. There is reproduction up to a certain point, and then this, like normal growth, closes. But, within limits, the growth or natural increase of a structure or organ is regulated by the conditions under which it exists. Some of these conditions are healthy ones, others are morbid; and thus we speak of overgrowths or hypertrophies as conservative or pathological. Now, the hypertrophies which are morbid in their nature seem to lead us on to tumours. The morbid hypertrophies, as a rule, affect, more or less, the whole bulk of an organ, as in the instance of

the prostate or the thyroid gland. But the more or less is a very important fact for us, for sometimes the overgrowth involves only a portion of the structure, leaving the rest unchanged. This is abundantly illustrated in the two organs just mentioned. Only a particular part, as a single lobe, may become overgrown, and the limit to such extension we can hardly indicate. Again, the excess of substance may be produced in one or both of two ways; either by a simple enlargement of the already existing elements of the organ, or by the development anew of additional elements. The organ may become larger by an increase in the size, or in the number of its elementary structures. Thus, we have what is called simple hypertrophy, and what is called numerical hypertrophy or hyperplasia; and I think there can be little doubt that increase by hyperplasia is at least the more common process. In many cases, this is clearly revealed, as in epithelial structures generally, and glands more particularly. Now, surely, the transition from a local hyperplasia to a distinct tumour is not a very abrupt one. Nay, is it not, I repeat, sometimes very difficult, if not impracticable, as in the instance of certain masses in the mammary or prostate gland, to draw any line of distinction between them? The mystery, then, which enshrouds the origin of tumours appears to envelop also other eccentric modes of vital action which are nevertheless more akin to some of the normal processes of life. Before we shall ever be able to answer the question why or how do tumours form? it seems to me that we must be able to solve the problem of normal growth and development, and to answer the question why or how it is that these continue up to a certain point, and then suddenly cease?

A LECTURE ON THE HISTORY OF EMBRYULCIA.

Introductory to the Course of Lectures on Midwifery and the Diseases of Women and Children, in the University of Edinburgh.

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GENTLEMEN,—I propose, by way of introduction to the study of midwifery, to read to you a chapter from the History of Obstetric Operations. You may gather from it that we have here to do with a branch of medicine venerable from its antiquity, wide-reaching in its human interest, great in its past achievements, and rich in promise of reward to any who will aid its progress in the future.

We were to trace the very beginning of midwifery, we should have to try to go back to the fountain-head of the race, and inquire, with the versatile Astruc, how Adam learned to secure and sever the umbilical cord of his first-born. But this is not our present aim; and we take our start at once far down the stream of time, although the date is still remote from us, when we take up the tale as it is found in the Hippocratic writings, and listen to what they have to tell us as to the methods adopted among the Greeks in cases of difficult delivery.

The special operation, to the history of which I ask your attention, is demanded in cases where nature and art are insufficient to complete a labour without the breaking up of the head of the child. The infant, in the language of Tertullian, is *matricida*; *ut moriturus*; and we ask: What methods have been employed in the past to procure the death and delivery of the child? What methods are being employed now? What betterment in these methods may we look for in the future?

In the Hippocratic treatise on *Diseases of Women*, we find a paragraph, giving instructions how to deal with a case where the child is dead, and the arm or leg protrudes below the head, and delivery is impossible, by turning or otherwise. First, the head is to be split or pierced with a knife, which may be straight, but is better curved; the point of it to be protected and guided with the index, for fear of wounding the maternal structures. Then, that the head may not cause difficulty, it is to be crushed with a compressor, and the bones drawn out with a bone-forceps. The infant is then to be dragged out with a crotchet fixed in the clavicle.

A perforator, a comminutor, and extractors, are thus found in the earliest obstetric bag; and we are to trace the evolution that has taken place in *μαχαίριον*, and *πίεστρον*, *δοτεόλογος* and *ἐλκυστήρ*. The

process of development was slow; and, for many a century, we find no advance in the use of obstetric implements. The Roman Celsus is more meagre in his description of the delivery of a difficult case than was the Greek writer, though he indicates that the crotchet should be in every part smooth, and with a sharp point, and to be fixed either in the eye, the ear, the mouth, or even in the forehead. It is not easy, from such brief statements, to gather a clear impression, either of the kinds of instruments that were employed, or of their mode of application. It is not even very evident what was the nature of the case in which recourse was had to them. The Hippocratic paragraph describes the mutilation and extraction of a foetus that was already dead. But it is certain that the living child was thus often destroyed to effect delivery; and, when philosophers took to inquiring, "An foetus in utero sit animal?" and stoics answered the question in the negative, we can readily comprehend with how much indifference the deed was often done. Curiously enough, it is in the writings of one of the Christian Fathers that we get the most vivid account of the process pursued by early accoucheurs in cases of this nature. The learned and philosophic Tertullian, whose expression I have already quoted, has a treatise on the Soul (*De Anima*), in the twenty-fifth chapter of which he refutes the idea that the soul is first imparted at birth, from a consideration of the phenomena of pregnancy. Clear evidence is given of the vitality of the foetus *in utero*, and of its liability to disease and death. "How could infants," asks this master of polemic, "be still-born, unless they had had life? for, how could any die who had not previously lived? And even sometimes," he adds, "by a cruel necessity, an infant is put to death when, by lying obliquely in the passages, he impedes the labour; and kills his mother, if he is not to die himself. Accordingly, among surgeon's tools, there is a certain instrument, which is formed with a nicely adjusted flexible frame, for opening the uterus first of all, and keeping it open. It is further furnished with an annular blade, by means of which the limbs within the womb are dissected with anxious but unflinching care; its last appendage being a blunted or covered hook, wherewith the entire foetus is extracted by violent delivery. There is also [another instrument in the shape of] a copper needle or spike, by which the actual death is managed in this furtive robbery of life; they give it, from its infanticide function, the name of *εμβρυοφάκτος*, the slayer of the infant (which was, of course, alive). Such apparatus was possessed both by Hippocrates, and Asclepiades, and Erasistratus, and Herophilus, that dissector of even adults, and the milder Soranus himself, who all knew well enough that a living being had been conceived, and pitied this most luckless infant's lot, which had first to be put to death to escape being tortured alive!"

In addition to the knives and hooks of the Hippocratic instrument-case, we find here a screwing apparatus for dilating (*tortile temperamentum*) the vagina, such as we find described more fully by later writers; but we miss the compressor.

Three centuries later, Aëtius simply embodies a fragment from Philumenos on the extraction and exsection of the foetus. It begins by telling the physician to see whether the woman be moribund or not; whether it be a case where the patient can be helped, or only pitied (*an servari possit, vel sit deplorata*). If it be a case for operation, she is to be placed on her back, with the limbs raised; and to be kept in position by sturdy skilful women holding her on each side. Where the head causes obstruction, turning is to be attempted; and, this failing, a traction-hook is to be fixed in the eye, or mouth, or chin; the instrument being held in the right hand, while the fingers of the left guide its application. Another hook is to be fixed in the same way on the other side of the head, to give more equal and safer power of extraction.

The Arabian writers give us little more insight into the methods of performing this embryulcia, or dragging out, of the foetus, as it had been called, until we come to Albucasis, in the end of the eleventh or beginning of the twelfth century. His description of the procedure is meagre enough; for he only speaks of opening the head with a scalpel, crushing it with an instrument which he calls *al Mishdach*, and extracting the bones with forceps. But the great interest of his work lies in the circumstance that he gives a list, with rough illustrations, of the instruments that every obstetrician should have at hand for perforating, and then crushing and extracting, the fetal head in cases of difficult labour. "Nimirum a necessitate ejus nulla est fuga Si" (so, in pious Arabian fashion, he ends many of his paragraphs) "voluerit Deus exelsus." First, there is a *cochlea*, which is the vertigo or torculum vulvens of Rhazes and the tortile temperamentum of Tertullian, for expanding the passages "ad quantitatem quâ vis os uteri aperire, adeo ut obstetrix faciat quod ipsa voluerit. Si voluerit Deus." Next is a kind of crutch for pushing back some protruding portion of the foetus; then the important *mishdach* (see Fig. 1), of two different sizes, with

which the head is to be crushed. This is sometimes made of this form (see Fig. 2), with teeth like those of a saw. "Cum illo," he says, "incidat vel contundat." In some editions, a third variety is figured. There follow the forms of the crotchets, with single or double hooks; and, lastly, the different kinds of scalpels, crooked or straight, for incising the head. Such were the implements with which for many an age our forerunners effected the extraction of the infant in the cases of difficulty to which they were summoned. It is to be borne in mind, that the trained physicians and surgeons had no opportunity of studying the phenomena of a natural labour. The ordinary practice of midwifery was carried on by women, who only sent for the surgeon's aid in cases of the last extremity. Hence Hippocrates, Albucasis, and others, expressly speak of the infant being already dead before recourse is had to the destructive processes. Often enough, however, the infant was still alive when the head was pierced; for, though they speak of trying turning, it is evident they had little experience of that operation as we know it now, and the pulling out of the foetus piecemeal was their only resource.

So it continued till far on in the sixteenth century. The first purely obstetrical volume that appeared was published at Worms, in 1513, by a German physician, Eucharius Roeslin (or Rhodion, as his name appears in the Latin editions of his book). It was composed for the guidance of the women who practised midwifery, was translated into various languages, and appeared in an English dress under the title of *The Birth of Mankynde*, by Thomas Raynalde, Phisition. The description of the methods to be employed in cases of impracticable labour is little better than a translation of the Philumenos fragment from the pages of Aëtius. Much space is taken up with fumigations, mixtures, plasters, potions, pessaries, beginning with "this Fumigation: Take cyther the hoove or doung of an asse, and put it on coles, and let the woman receive the fume underneath;" and ending with, "Item: Take the triacle which is called diatessarum, and give it to the woman to drink, and it will expell the dead byrth." Then it

Fig. 1.—*Mishdach* of Albucasis.

Fig. 2.—A second variety of coarctator from Albucasis.

Fig. 3.—*Rostrum Anatis* of Rueff.

Fig. 4.—Rueff's long smooth Pincers.

goes on to say: "But, if all these medicines profite not, then muste be used more severe and harde remedies, with instrumentes, as hokes, tongues, and such other thynges made for the nonce. And, fyrste, the woman muste be layde a long upright, the myddle part of her body lying hier than all the rest, companied of women assisting her about, to comforte her, and to kepe her downe, that, when the byrthe is plucked out, she rise not withall. Then let the mydwytte annoynt her lefts hande with the oyle of whyte lillies, or other that may make it soople and smothe; and, holding out her fingers, shitting together her hande, let her put it into the matrix to feele and perceyve after what fashion the dead byrth lyeth in the mother's wombe, so that she may the better put in hokes and such other instrumentes to plucke it out withall.....But, if it be so that it lye the head forward, then fasten a hooke eyther upon one of the eyes of it, or the roofe of the mouth, or under the chin, or one of the shoulders, which of these partes shall seeme most commodious and handsome to take it out by, and the hooke fastened, to drawe it out very tenderly for hurtyng of the woman.....If it be so that the chyldes head be so swollen by inflation, swelling, or resort of humours, that it will no conveniently issue out at narrow places, then let the mydwytte with sharpe penknife cut open the head, that the humours contayned in

it may issue and runne forth, and so the head to waxe lesse, able to be plucked out. But yf it be so, that not by any suche casualties the head be bygge, but only of a naturall growth, then must the head be broken in pieces, and the partes evermore taken forth with such instruments as the chirurgions have readye and necessarye for such purposes."

The next writer of note is James Rueff, of Zurich, a versatile character, who is said to have written works on astronomy, politics, history, and even some plays, amongst them a *William Tell*. His work on midwifery was also translated into English, under the title of *The Expert Midwife*, and has this special interest for us, that he gives figures of two varieties of forceps which might be used for the extraction of dead infants. "With one of these instruments," he says, "I meane that which is named in Latine *rostrum anatis*, the ducke or drakes-bill (see Fig. 3), let her take hold of the dead child, and let her draw him out with her right hand, having taken hold of him, but with her left hand let her drive forward both the ports, or gates, lest the ligaments or holders be broken, and the falling downe of the matrix doe ensue. In this case, if necessity shall require, you may adde to this instrument the paire of pinners with which teeth are pulled out, or else this instrument here pictured out (see Fig. 4), named in Latin *forceps longa et tersa*, the long and smooth pinners or tongs, the which let her use so conveniently that, if it be possible, she may easily pull out that which is to be drawne forth."

Scultetus, in his richly illustrated work on surgical instruments, shows us some of the implements used for the dissection and extraction of dead infants. There are straight and curved knives, that carry our thoughts back to the weapons of the Hippocratic school. There is an instrument called the griffin's claw (see Fig. 5), for seizing the head; and illustrations are seen of various kinds of hooks. Here is an instrument (see Fig. 6), "furnished with two hooks, for dragging the dead fetus from the uterus, either entire or cut in pieces;" and one of his figures shows how the fetus is extracted with these hooks applied to the orbits, in cases, he says within brackets, where the fetus cannot be expelled "testiculis equorum preparatis, quos nobis Horatius Augenas commendat, aut feminae alterius lacte."

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 5.—Griffin's Claw, from Scultetus.
Fig. 6.—Extraction Hooks, from Scultetus.
Fig. 7.—Smeltie's Perforator.
Fig. 8.—Simpson's Perforator.

With such weapons as we have been looking at, we can well believe that the infant was often extracted, still alive, though sorely mutilated. Even with the better constructed instruments of more modern times such tragedies have occurred. In 1853, Dr. Sidey showed to the Obstetrical Society a woman with a dint in the skull in the neighbourhood of the posterior fontanelle. We could feel the irregular margins of an old fracture, and the woman, who was then between 50 and 60 years of age, had often heard her mother say that she had had a hard time at her birth, and could not be delivered till the doctor brought the "deid instruments." The case had the additional interest that the operator was the celebrated African explorer, Mungo Park, who had met this case during the brief period of his practice in Peebles.

When on holiday, five and twenty years ago, among the English lakes, I fell in, at a remote corner, with an Edinburgh graduate, who told me that not long before he had a bad case of labour at that lake-head. He was at a great distance from his home; and having no forceps with him, to save the woman he perforated the foetal skull with his pocket bistoury, and extracted the head with an iron rod

that he had got forged into a kind of crotchet at a neighbouring smithy. To his surprise the child came out alive, and made a good recovery.

I have myself seen an infant gasp that had been abstracted after craniotomy by an Edinburgh lecturer; and just about two years before his death I was present, in the Paris Clinique, when M. Depaul, baffled in the extraction of a foetal head with the forceps, said "J'ai pris mon partie," asked for a perforator, with which he opened the skull, and then, with the forceps, extracted the somewhat diminished head. It was a ghastly sight to see the infant, with a gash behind the anterior fontanelle, breathing and making some convulsive movements before subsiding into stillness. Van Swieten, on the authority of Crantz, tells how an accoucheur, who had fixed a hook to the head of a child, tore out the brain, and in about an hour's time dragged out the child still alive, and in an access of horror pressed the child to death by putting his foot upon its neck.

It may easily be conceived that all along there was a constant effort on the part of accoucheurs to escape from the hideous necessity of effecting delivery after such a gruesome fashion. In the earliest writings, we noted that it was only to be had recourse to after a previous attempt at turning. But such attempts seem to have been for the most part futile; and one is left with the impression that the turning referred to, only implied an effort at the rectification of the presentation of the head. The conservative operation of Turning, as we now possess it, we owe to the genius of the great French surgeon, Ambroise Paré. It was probably practised by others before or around him. But it was he who first clearly described the process of introducing the hand into the cavity of the uterus to lay hold of the lower limbs of the fetus and change a head into a footling presentation, and placed this operation of version in the forefront of the measures to be adopted in cases of difficult labour. As this operation began to be appreciated and practised more widely, the field for embryuleia must have distinctly diminished. As yet, however, we trace no change in the old embryotomic procedures.

The next and greatest restriction of the field was effected by the introduction of an instrument, which we also owe to one gifted with the hereditary genius of a Frenchman, though the inventor was reared on English soil. On the night of St. Bartholomew, 1572, Paré was saved from the fate of his fellow Huguenots by the grace of his king, Charles IX, who hid him in his own closet, saying, "Qu'il n'était raisonnable qu'un qui pouvait servir à tout un petit monde, fût ainsi massacré." Among the many who exiled themselves from France, there was a surgeon, less known to fame than Ambroise Paré, of the name of Guillaume Chamberlin. He fled to Southampton, carrying with him a young son, who was to grow up and follow his father's profession in London, and to become the inventor of an instrument which has, perhaps, saved more lives than all the other instruments of surgery combined. For the researches of Dr. Aveling leave us little doubt that Peter Chamberlin, eldest son of the Huguenot refugee, was the inventor of the midwifery forceps. Other operative procedures, such as the modifications of the Cæsarean operation, induction of premature labour, and such like, have also had a mighty influence in narrowing the area within which the obstetrician feels himself cruelly compelled to comminute the head of a child to save its mother's life. But it was the forceps that most directly ousted the destructive implements, that gradually gave women confidence in the help of surgeons and physicians, who were learning to rescue the mothers from danger without sacrificing their infants, and thus aided in the transference of the practice of midwifery to the male from the female sex.

From the time that the trained masculine intellect was brought to bear habitually on the problems of midwifery, we begin to trace not only a diminution in the number of cases calling for the death of the child, but also attempts at improvements in the methods for securing its extraction with greater speed and with greater safety to the mother. The improvements were not brought about at once, however, and, in the middle of last century, when the transition from feminine to masculine midwifery was in progress, it was still possible for a London medical man to publish a tirade against male practitioners of midwifery, under the form of a *Petition of the Unborn Babies to the Censors of the Royal College of Physicians*, in which the babes lay this charge, *inter alia*, against Drs. Pocus, Maulus, and others, "That, if we cannot leave our Dwellings and make our Appearance as soon as is expected, either from the Unwieldiness of our Gates, or by means of any other Obstacle requiring Time for its Removal, or if through Fear of the Cruelties commonly exercised by the said Pocus, Maulus, and their Confederates, your Petitioners are unwilling to leave their Habitations, the said Pocus, Maulus, and their Confederates, being present, charge your Petitioners with a Riot tending to the Murder of our Mothers: for which Crime we are forthwith drag'd out of our

Habitations by Hooks, Pincers, and other bloody Instruments, whereby we are sometimes most miserably torn and bruised, and at other times our Heads are so squeezed that we are ever after subject to Fits and Convulsions, unless (as by God's goodness it often happens), we die under the Operation. And in case of any the least Resistance, whether on our part, or from the Nature and Situation of our Habitations, we are sentenced to Death as guilty of Rebellion, and, in consequence of such Sentence, we are sometimes beheaded, and at other times our Brains are torn out by Instruments wickedly contrived for that purpose. Or, if your Petitioners happen to put an Arm out of Doors, whether in our own Defence, or to feel our way, the said Pocus, Maulus, and their Confederates, immediately cut off such Arm as high as they can reach, by which means your Petitioners bleed to Death in great Misery and Torture."

The prevailing use of the forceps has all but removed every occasion for such outcry on the part of unborn babes; and the men who were best able to appreciate the value of the forceps, and to suggest improvements in their construction—such men as Levret and Smellie—were also the men to seek to perfect the methods of head-reduction in the cases where necessity still called for this procedure.

Now in such cases there are usually three quite distinct stages of operative interference—1, perforation; 2, comminution; 3, extraction of the head. Sometimes it is enough to perforate the head at the exposed part, and a sufficient diminution results to allow its expulsion by the uterine efforts, or by these aided by what is usually the

the mother and to the operator. It was a distinct improvement when Smellie showed the advantages of a scissor-like perforator (see Fig. 7); and it was a farther step in advance when Orme and others began to use a scissor-like instrument with the cutting edge turned outwards. A further stage was effected in the evolution of this instrument under the hands of Naegele and others, who had them constructed with the two blades not crossing each other, but simply jointed near the middle, so that compression of the handles secured the separation of the points, and so the wide dilaceration of the bones at the perforated spot. The instrument of Sir James Simpson, constructed on this principle (see Fig. 8), is perhaps the most frequently employed perforator at the present time in Britain. The instrument most frequently employed in Paris is Blot's Perforator (see Fig. 9), which has the piercing blade attached to a straight, strong, easily manipulated handle, while the shorter blade can be thrown out for farther fissuring of the bones by compressing its proximal extremity.

German accoucheurs, following the lead of Assalini and Joerg, have for the greater part of this century made use of trephines of varying construction. One of these trephines is seen in this illustration (see Fig. 10). The trepan is alleged to have the advantage of producing an opening with clean-cut edges, and so of diminishing the dangers that arise from the presence of protruding fragments and loose spicula of bone. But this advantage is counterbalanced by the greater difficulty of their employment, and it is entirely lost whenever the operator proceeds, as he almost always does, to the further fracturing of the cranial bones.

Besides knives, scissors, and trepans, a fourth variety of perforator has been employed, which has distinct advantages over all the others. I refer to the perforator with a screw-constructed point. The earliest of these of which I find a notice is the *Terebellum* of Professor Dugès, of Montpellier. He describes its contrivance in his edition of his aunt, Madame Lachapelle's *Pratique des Accouchements*, in 1825, and again with a figure in his own *Manuel d'Obstétrique*. It was a steel rod with faceted handle, having at the point a cone an inch and a half in length, and having the same diameter at its base. This cone was formed into a screw with deep furrows, and was intended for screwing into the base of the skull, whether for fracturing of it, or to obtain purchase for traction; but it could also be used as a perforator for the vault. This instrument is referred to by Velpeau and other accoucheurs, but the "*craniotomie térébrante*" does not seem to have been put in practice, and I confess I took notice of it for the first time when preparing this address. An instrument somewhat similar was proposed by Professor Hubert, of Louvain, which also, as we shall see, serves for sapping the base of the skull (see Fig. 11). Now there can

Fig. 9.—Blot's Perforator.

Fig. 10.

Fig. 10.—Guyon's Apparatus for Intracranial Cephalotripsy; D Stilette of c Trephines; B Cephalotribe.

third stage of extraction, without the necessity of the second stage of comminution. Or perforation supplemented with a sufficient comminution, will so lessen and soften the head as to allow it to descend under parturient pressure, and the third stage of extraction is rendered unnecessary. Sometimes the first stage of perforation has been left in abeyance, and the operator has proceeded to crush and comminute the unopened head. And then, again, the head might be left to the expulsion of the natural powers, or might be extracted with the instrument used for compression. In making this statement, however, I ought to add that now-a-days no man who knows his business would attempt such cephalotripsy without an antecedent perforation.

Perforators.—The knife or spike, as we have seen, either straight or curved, was the weapon that was commonly employed for the perforation of the cranial vault up till the time of Paré, and indeed till the first half of last century. Such knives, variously constructed, sometimes with special sheaths, are found in great variety illustrated in Kilian's plates and other works. But the opening made was all too often quite inadequate, and the use of the instruments dangerous both to

Fig. 11.—Hubert's Transforator.

be no doubt that such instruments afford the means of most easily perforating the vault, and at the same time of leaving an opening with smooth edges, like that made by the trepan. Their drawbacks are that they have nothing to prevent them being screwed further in than may be desirable, and that the opening they leave is not large enough to allow of the rapid escape of the cranial contents, and the complete collapse of the cranial bones. But these two drawbacks are done away with in the basilyst which I proposed for use in such cases nearly five years ago (see Fig. 12). It has the form of Blot's perfo-

Fig. 12.—Basilyst.

erator, but instead of the lance-shaped head it has a screw at the point. The depth to which it can be screwed in is determined by the shoulder, which projects all round the base of the screw, and in a case where a small trepan-like opening is desired, all that the operator has to do is to screw it in up to the shoulder and then withdraw it. Ordinarily, however, a wider gap is required, and then the operator will compress the handles so as to separate the points, and expand the aperture to the requisite extent.

(To be continued.)

MEDICAL MAGISTRATE.—Mr. Alexander Dalziel Keith, M.B., of Aboyne, has been placed on the Commission of the Peace for the County of Aberdeen.