

Bond (Henry)

Bond on Obstetric Forceps.

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ture an easy occurrence from the contractions of labour, that attenuation might proceed to such a degree as to cause the evidences of such an accident to be but slight." No doubt this may be somewhat true; but, although such circumstance might materially lessen the hemorrhage consequent upon such an event, would it lessen the shock? Does not this arise more from the sudden intrusion of the ovum, a quasi foreign mass, into the peritoneal cavity, unprepared for, and as it were not expecting it, than from the mere laceration of the womb itself?

The pains of the 30th of March were uterine and parturient. The patient stated them to be but slight. No exacerbation occurred during my absence from her chamber. They wore off in a few hours, without any sensation in the patient requiring me to be called up, and no hemorrhage of an external character accompanied.

3d. I examined the uterus and its appendages, as carefully as my limited anatomical knowledge permitted, and found no attenuation, no rent, no cicatrix, or sanguineous effusion. The ventral or abdominal extra-uterine location of the ovum must have been established ab origine, and there does not exist the smallest evidence that it occurred consecutive to a rupture of the uterus, the tubes, or the ovary.

Writers seem anxious to explain away cases of ventral pregnancy. They admit the ovular and tubular varieties of extra-uterine fœtation; in which cases the cyst, which at first serves the ovum in loco uteri, is supposed sometimes to rupture and throw it forth from its first location into the abdominal cavity, to form placental attachment where it may. To support this supposition they tell us that the rent through which the ovum escaped may have been overlooked at the autopsy. Now, although this is to substitute conjecture for proof, throwing the *onus probandi* on those who might be disposed to dispute their explanation, it is still a conjecture at variance with the suggested doubts of my friend—it being far easier to believe that the product of conception can establish a placental attachment when a minute fœcundated germ, than that, somewhat developed, it could be detached from its first connections, and then go forth to form a new implantation. But have not doubts of the capacity of a serous tissue to support an ovum been already cleared away?

Blundell says, "I have myself seen a fœtus, on the whole not imperfectly formed, about the size of six or seven months, and which was taken from a boy, where it lay in a sac in communication with the child's duodenum, the boy being pregnant. I cannot accede to the opinion advanced by some that it is impossible that a fœtus should form within the peritoneal sac among the viscera."

Mason Good, also, refers to a case, published in the *Med. Chir. Trans.*, vol. i. page 241, by Mr. Young, "where the nucleus of fetal rudiments were found in the abdomen of a male infant about fifteen months old, well known, from personal inspection, to nearly all the medical practitioners of London;" probably the identical case mentioned by Blundell.

A number of cases of extra-uterine pregnancy, in which the placenta was found adherent to the peritoneum, are mentioned also in the work of Colombat de l'Isère, for the translation of, and additions to which, the American medical public stand under such enduring obligation to Professor C. D. Meigs, of Philadelphia.

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ART. VI.—*Remarks on Obstetrical Forceps, with an attempt at their Improvement.* BY HENRY BOND, M.D. (With three wood-cuts.)

AT an early period of my professional life it occurred to me that obstetrical cases are sometimes, although not very frequently, met with where the use of the forceps is clearly indicated, but where the instrument is found defective. I refer to those cases where, owing to the position or the form of the foetal head, and its relation to the pelvis, it is found impracticable to adapt the clamps to the head so as to lock the branches, or to do so without violent injury to the mother or child. There is probably no obstetrician of large experience who could not furnish ample illustrations of this opinion, if he would give a full and faithful detail of his observations.

Systematic writers tell us that "we must feel the ear," or otherwise determine the precise situation of the head, and then the blades "must be placed exactly upon the parallel* sides of the head, so that they may lock—if the handles do not readily join upon the introduction of the second blade—then we must, by *judicious management* of the one in fault, make it join its fellow." We are directed to withdraw the blade in fault and introduce it again, as if that would certainly accomplish that exact adaptation. When the head is above the brim of the pelvis, where the use of the forceps is sometimes clearly indicated and urgently demanded, it is an empty pretence that we can always determine the exact position of the head, and not less so, that "*judicious management*" will always enable us to adapt the blades exactly to symmetrical portions of the head so as to lock readily. Dr. Blundell says, "they (the long forceps in such cases) are more generally laid over the forehead and occiput." See also Velpeau, sect. 1061.

I will here present, very briefly, a few illustrative cases. 1. In the early part of my practice, I was called to a patient who was attacked with very violent puerperal convulsions. I requested a friend to come to my aid, bring-

* This term *parallel*, as employed by some obstetrical writers, is not used correctly. There are no parallel sides of the head, but there are *symmetrical* sides or portions, using this term in its geometrical acceptation. The term *opposite* will not express their idea in this case, because the frons and occiput are opposite, but they are neither parallel nor symmetrical. The terms *similar* and *correspondent* may express the idea, but their import is more vague—less precise and technical than symmetrical.

ing a forceps with him. We made repeated attempts to apply the instrument, and with a similar result—we could not lock the branches. We then summoned to our aid a gentleman of much experience and repute as a teacher of obstetrics. He introduced the blades, and he found them no nearer to an apposition, that admitted of locking, than we had done. But, as a professor must not be thwarted in the exercise of his own art, and, moreover, as the case was very urgent, with a strong hand *he made them lock*, and soon delivered the child; but the temporal artery was wounded, the cranium was fractured, and the child was not a long time dead.

2. In a case where the use of the forceps seemed to be indicated, and where the head was above the upper strait, I called to my aid a gentleman of eminent skill and great experience. We both attempted to apply the instrument, and with equal want of success. We could not adjust it so that the branches would lock, or that we could obtain any command of the head. The vectis was also tried without success. The case was very urgent, and we were obliged to resort to *embryulcia*. This is the only instance in which this operation has been resorted to in a patient of mine, in a practice of thirty-three years. Owing to the disproportion between the dimensions of the head and the pelvis, it is, indeed, problematical whether the delivery could have been accomplished by means of the forceps, if it could have been adapted to the head, so as to lock; but it was very desirable to try the problem.

3. A few years ago I had a case, where, in consultation with a friend, it was deemed necessary to use the forceps. The head was above the upper strait, and I found it impossible to apply the instrument so as to lock the branches. I then made the female branch bear upon the pivot *without locking*, allowing the clams to be adapted to the head *obliquely* in their relation to each other; and using my hands as a lock, with much care to prevent slipping, I succeeded in safely delivering the child. If I had forced the branches to lock in this case, some violence must have been inflicted on the mother or child. This case, apparently so simple and devoid of striking incidents, was to me a very instructive one.

4. A case occurred recently in this city, as I have heard, where, owing to the difficulty or impossibility of properly adapting the forceps, the superciliary ridge was fractured and the eye destroyed. A similar case is mentioned in *Devees' Midwifery*. These belong to that too numerous class of cases, the details of which are seldom allowed to escape the confines of the darkly shaded nursery.

Dr. Blundell very justly observes, "Unless the blades be elastic, absolute adaptation can (I conceive) never be obtained; for while the form of the instrument remains unchanged, that of the head itself varies." "The lock should be loose, so as to admit of a junction of the blades, although they may not be brought into exact apposition with each other; for, in applying them to the head, this adaptation cannot always be obtained." For this reason, he says that Smellie's lock (made loose) is decidedly the best.

Dr. Meigs says, "If we fail to adjust the branches accurately in apposition, we either cannot make them lock, or we lock them in such a way that the edge of the instrument contuses, or even cuts the part of the scalp or cheek on which it rests, leaving a scar, or actually breaking the tender bones of the cranium, while the other edge cuts the womb or vagina by its free projecting edge. In fact, the forceps is designed for the sides of the head; and if, under the stress of circumstances, we are compelled to fix them in any other position, [an incident not very unfrequent], we shall always feel reluctant to do so, and look forward with painful anxiety to the birth, in order to learn whether we have done the mischief we feared, but which we could not avoid."*

The difficulty and the danger in such cases evidently arise, to a great extent, from the want of an accommodating, rocking motion of the branches of the forceps upon each other, such as will allow the depressed ("cutting and contusing") edge to rise, and the elevated edge to sink and come in contact and apposition with the head; that is, so that the blades may be adapted to the head by varying from their usual relation to each other.

None of the French forceps, or their numerous modifications, so far as I know, are intended to admit of such a motion. When locked, they are truly locked; and whatever be the form of the head, or whatever the parts of the head to which the instrument is applied, the head must conform to the forceps and not the forceps to the head. Smellie's joint (which can hardly be called a lock) will admit of some motion, if made loose, as recommended by Dr. Blundell; but this motion is very limited and unregulated. Dr. Davis, of London, has adopted Smellie's joint, but without observing Dr. Blundell's precaution as to its looseness. The lock of Dr. Siebold's forceps, when the pivot is partly unscrewed, will admit of the lateral motion of one branch upon the other, to a very considerable extent. The branches of forceps are two levers of the first kind, the pivot being the common fulcrum of each. It is to be observed in Siebold's forceps, that the branches are so much curved—make so wide a sweep—that the fulcrum is far removed from the direct line between the power (the hand) and the weight (the head); and it will be seen on examination that this circumstance will render their lateral or rocking motion nearly useless, if not dangerous. Indeed, I should infer, from the structure of the joint and the form of the blades, that the use of this motion was never contemplated by the inventor.

A forceps was exhibited to the profession in this city, several years ago, devised with a view to supply a rocking, accommodating motion. It was constructed with a *swivel joint in each shank*, allowing motion to a limited extent. The objections to it were, 1st. That this joint rendered the blade very weak, and that it would almost unavoidably become corroded with rust. 2d. That the operator had no control over the motion of it; it would rock or wobble

* See "*Obstetrics; the Science and the Art*," chap. xv., for much information and excellent lessons on the use of the forceps. I commend attention to the author's emphatic inculcation of the idea, that *the forceps is the child's instrument*.

always, whereas the rocking motion is not commonly requisite. This unrestricted motion, together with the form of the blades, would render this instrument very liable to slipping or displacement. I have forgotten the name of the inventor, and I am not aware that there is a specimen of the invention in this city.

In the instrument,* which is illustrated in Figs. 1, 2, 3, I have attempted

Fig. 1.



Fig. 2.

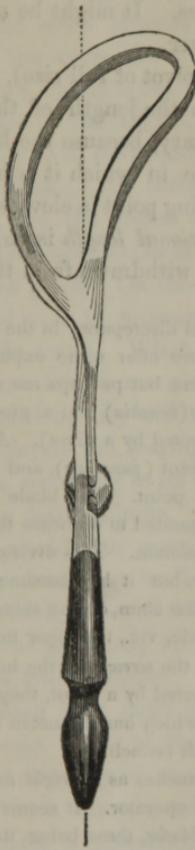
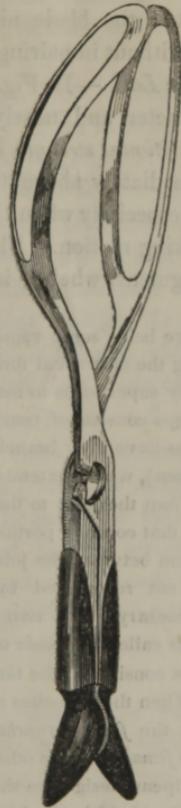


Fig. 3.



to supply what has seemed to me an obvious *desideratum*, viz., to give the branches of the forceps an accommodating rocking motion upon each other, the extent of which can be regulated at will, and which shall in no respect lessen the power of the instrument. The mechanism devised to obtain this motion is very simple, not liable to derangement, and it may be adopted in the construction of forceps of other forms than that here presented; provided that

* The instrument, from the manufactory of Messrs. John Rorer & Sons, of Philadelphia, is made of German steel, and spring-tempered

the pelvic* curvature of the branches does not take such a wide sweep, as to throw the pivot far out of the direct line between the handle and the centre of the fenestræ.

The instrument will be seen to differ, as a whole, from any now in use; although no one of its modifications, except the lock, has any claim to novelty. The handles are Dr. Siebold's, with unimportant modifications. The blades are Dr. Davis's a little modified. Its whole length is about fifteen inches, and its weight about fifteen ounces. The length of the handle is six inches, and that of the blade nine inches. It might be made somewhat shorter and lighter without impairing its power.

Of the Lock.—In Fig. 1 (the pivot of full size), the *screw* is of about double the diameter and nearly double the length of those in other instruments. This *additional strength* is necessary, because the bearing point of the pivot is not immediately above the blade in which it is inserted (as in other instruments), especially when this bearing point is elevated so as to give the blades a free rocking motion. The *additional length* is required to give the screw a firm lodgment, when it is partly withdrawn from the blade. The *thumb-piece*

* There being some vagueness and discrepancy in the use of the terms employed in describing the obstetrical forceps, I here offer some explanatory remarks. These may be entirely superfluous to many readers, but perhaps not so to all.

A forceps consists of two *branches* (*brachia*) and a *pivot* or *fulcrum* (that is, in such forceps as have their branches connected by a pivot). A branch consists of the *handle* (*manubrium*), which extends to the joint (*junctura*), and of the *blade* (*cochleare*), which extends from the joint to the remote point. The blade consists of the *clam* (*cochlea*), which is that concave portion of it intended to embrace the head, and the *shank* (*femur*), that portion between the joint and the clam. This division of the blade into shank and clam is not recognized by Mulder, but it has become very convenient if not absolutely necessary. The two parts of the clam, on the sides of the opening or *fenestra*, are sometimes called the *limbs* of the blade, viz., the *upper limb*, and the *under* or *outer limb*. The pivot consists of the *thumb piece*, the *screw*, and the intermediate *bearing point* or *fulcrum*. When the branches are connected by a pivot, they are usually designated as the *male* and the *female branches*; that which has the notch for the reception of the pivot, being the *female* and the other the *male* branch.

Dr. Velpeau designates the two branches as *the right and the left*, from the *position of the handles* as held in the hand of the operator. It seems to me more appropriate to designate them from *the position of the blades*, these being the more essential parts of the instrument, and the attention, in an operation, being directed more to the position of the blades than to that of the handles. Otherwise the blades seem to be playing at cross-purposes—the right blade being on the left, and the left on the right. I am aware that it may be said, in support of that usage, that the branches are named right and left, in reference to the pelvis of the patient. For the same reason, when riding backwards in a coach, a man's right hand becomes his left.

As one curve of the forceps is made in reference to the form of the head, and the other to that of the pelvis, it seems to me more distinctive and suggestive to name them respectively *the cranial* and *the pelvic curvatures*, than the *old* and the *new* curvatures. This was *new* in the time of Levret, but it has ceased to be so; and we do not derogate from the credit of the inventor of that important improvement by giving it an expressive term.

is made to fit so close upon the female blade, but without resting upon it, and is so thick and rounded, that there may be no risk of injury should it ever happen to be brought into contact with the patient. The screw, when well made, will turn so easily that the thumb-piece may be made much less prominent than it is here represented. When the forceps is used, the thumb-piece should be placed *parallel with the blades*; otherwise it may interfere with the rocking motion. Between the thumb-piece and the screw, the pivot is of the form of two *frusta* of cones of equal dimensions, united together at their smaller diameters, forming an obtuse angle or groove at their junction. The base of that cone joined to the screw projects a little, forming a shoulder, intended to limit the motion of the screw into the blade.

The notch in the female blade, made to receive the pivot, is so deep that the pivot, in relation to the edges of the branch, is nearly in the middle; yet the width of this branch, opposite to it, is swelled out, so as to give it adequate firmness. The width and the form of the *sides* of the notch are accurately adapted to those of the pivot, and the *bottom* of the notch terminates in an edge, like the knife-edge of a balance, which is intended to rest in, and bear upon, the angle or groove in the pivot. On the under side of the male blade is seen a protuberance, finished so as to present no salient points. It is a shield for the extra length of the screw. When the pivot is screwed entirely down, the branches have no more lateral or rocking motion than those of any other forceps, and, in this condition, they will very generally be used. But by turning the screw, so as to elevate the bearing point, more or less freedom is given to the rocking motion, according to its elevation; and this motion is effectually restricted within any desired limits. When, by means of this free motion, the operator has been enabled to grasp the head, he may sometimes change its position, so that the clams may be then adapted to the head, without the obliquity at first necessarily allowed to them by the elevation of the pivot; and then, if desirable, the pivot may be screwed down, and the blades will become as fixed as those of other forceps.

Two objects seem to have been kept more or less in view by the various modelers of the obstetrical forceps. One of these objects has been *efficiency*, having reference chiefly to the certainty of accomplishing the delivery. Of this sort is the long heavy French forceps, and to some extent its several modifications. It is undoubtedly a powerful, but dangerous, instrument. The narrowness of the blades allows them to be introduced with comparative ease to the operator, and then (with such powerful levers, as their long handles) also to be locked with apparent ease, without being adapted to the head. They must be efficient in the hands of a bold operator in effecting "a triumph of the art," but, like other victories, too often attended with havoc.* The other of these objects has been *safety*, especially for the child. Dr. Davis, of London, seems to me to have had this object especially in view in model-

* See Blundell's "Obstetric Medicine," part ii., chap. viii., sec. 3, last paragraph.

ing his forceps, and to have been so engrossed with it that he has not had a due regard to efficiency. Such blades as his, in awkward, inexperienced hands, and indeed in any hands, are probably less easily introduced so as to be locked than the French forceps; because, for the purpose of locking, they require a more exact adaptation; but when applied they are much safer—there will be much less probability of injuring the child. The French forceps have received several successive modifications in this country, which add much to their safety and convenience. Indeed some accoucheurs extol some of these modifications as the *ne plus ultra* and almost the *sine quâ non* of obstetrical instrumentality.

It will be seen that the *blades* of those here presented (Figs. 2 and 3), resemble nearly those of Dr. Davis. The shanks are considerably longer; the clams are not quite so long; the radius of their pelvic curvature is a little less, especially that of the outer limbs, so that it will be less liable to be obstructed by the promontory of the sacrum, in passing the instrument above the superior strait. The fenestræ are wider in their middle and posterior part than those in most other forceps now in use. When the pivot is elevated, so as to allow the blades their rocking motion, this width becomes especially requisite in order to secure a firm hold on the head, and to avoid the risk of their slipping sideways. The space between the blades is such, that, when applied to the head, the handles shall not be at a distance from each other, awkward and inconvenient to the operator. From the pivot, the upper line of the shank continues forward, without any elevation or depression to the beginning of the pelvic curvature; and the form and the relation of the shank to the clam are intended to be such as to interfere the least with the perineum.

While a form has been selected, which, it is believed, will admit of application easy and safe for the mother and child, and grasp the head above the superior strait, it will be seen (Fig. 2) that the pivot is in a direct line between the handles and the centre of the fenestræ. This is a *point of importance* in those cases where the rocking motion of the blade may be required, as it will cause each limb of the clams to press with nearly equal force, thus avoiding undue pressure upon any one part of the head, and the liability to slipping or displacement.

The *handles* are made partly of ebony, and they resemble those of Siebold, although considerably lighter. The precise model, of those represented in the illustration, is not important; for it may be varied to suit the grip or the taste of different operators. The objects aimed at in their construction should be, *first*, such a length, compared with that of the whole instrument, as to give a sufficiently firm hold and pressure upon the head, without inflicting a dangerous compression; and, *secondly*, such a form as to allow them to be easily grasped in the hand of the operator, with the full assurance that he has the best command of the instrument, without the danger of slipping, and without the necessity of a napkin envelop. These qualities do not belong to

the long polished steel handles, which are heavy, upon which the wet, oiled hand of the operator must slip, and which, even when encumbered with a napkin, must convey an uncomfortable sensation of misgiving. Ask the lithotomist or amputator how he would like to have his instruments finished with such handles that he would be obliged to grasp them wrapped in a napkin? One prominent objection, if not the chief one, to Dr. Davis's forceps, is the shortness of the handles and their uncomfortable grip, except in a hand inconveniently large for an accoucheur. They cannot, however, slip in the hand, like those of polished steel.

The attempts to combine several other instruments in the handles of the forceps, I regard as, generally, worse than useless. With the long polished steel handle may be combined an efficient blunt hook. But with such a heavy, mis-shapen handle, the operator would be much more liable to injure the mother or child than with a well-constructed blunt hook. I refrain from any criticism upon such useless perforators and dangerous crotchets as I have seen combined with forceps. It is sufficient for an instrument, so important as the forceps, that it is exactly fitted for the performance of its appropriate uses. In skilful hands it will preclude the demand for the perforator or the crotchet, except in very rare cases; and in these terrible cases, truly of life and death, the operator ought not to be satisfied with instruments which are but ill-contrived *succedanea*.

I am aware that the first impression of some persons, upon looking at the illustrations, will be, that the instrument is too straight, that the pelvic curvature ought to be continued into the shanks. If the whole operation, or the most difficult and important part of it, consisted in passing the blades above the superior strait, narrow blades, with a curve of a wider sweep, like those of Professor Siebold, slipping in probably with rather more facility, would be preferable. But as those here represented can be passed above the superior strait with facility, it seems to me that what I have already said upon the importance, in many cases, of having the pivot in nearly a direct line between the handles and the fenestra, furnishes a valid reason for adopting a model not differing essentially from that here presented.

Others may object, that unskilful and incautious persons will be tempted to carelessness in applying such a forceps, and to avail themselves of the free motion of its lock unnecessarily. Professors of obstetrics, if they deign to notice it, ought to give their pupils the proper directions and precautions in the use of this instrument, as they do in that of others. Some persons are, indeed, so unhandy in the use of any instrument or tool, that all the professors in the land cannot give them such tact and dexterity, that they ought to be allowed to approach the puerperal bed. Should this instrument happen to fall into such hands, the danger to either mother or child would probably be much less than from the use of powerful, unaccommodating forceps, misapplied by such hands.

Others may object that it is an innovation, a gim-crack novelty—for they

are *the conservatives*, scrupulously maintaining the ancient landmarks. It differs from the one extolled by their venerated preceptor, the one to which they have been accustomed, and in the use of which experience has given them expertness. Long companionship produces partiality, and perhaps some little modification of their own may have given them the feelings of paternity. It has answered their purpose, for with it they have accomplished delivery safely; and if, in some instances, they have wounded the integuments or fractured the cranium; or if they have been compelled to resort to the perforator, in cases where the forceps was indicated, they will console themselves with the reflection that it was an inevitable destiny—a fault of nature, and not a defect of art.

In conclusion, I must observe that I am by no means pertinacious for the precise model of the instrument presented in the illustration; for it is not improbable that experience may suggest modifications of it, which will improve its adaptability, and yet retain its essential principles. All I ask is, a careful and candid examination of those principles.

ART. VII.—*Histological Researches on the Development, Nature, and Function of Epithelial Structures*. By W. J. BURNETT, M. D. (Read before the Boston Society for Natural History, Aug. 1, 1849.)

THE study of epithelial and epidermic structures was pursued most faithfully and successfully in the years 1835–36, by Purkinje, Valentin, and Henle. To these investigators and able physiologists belong the refinement of the quite crude notions of these structures entertained by the earlier anatomists. This portion of general and minute anatomy received at that time, both by these men and their coadjutors, such a thorough analysis, that later inquirers have been content to follow in their paths without entering upon the many portions of this field of inquiry hitherto unexplored.

It is for this reason that we find in the general works and text-books of anatomy and physiology a succinct account of these tissues taken for the most part from the writings of these men. Their higher relations, however, to all or nearly all the more important functions of life have been, although the most interesting, but lightly discussed; and the paucity of thorough observations in this direction must have been felt by every student of minute anatomy.

From continual microscopical examinations and investigations of the various tissues of the economy, the importance of this structure has been repeatedly impressed upon my mind. In common circumstances, the difficulties of such investigations are not easily met; and it was from the fine opportunity afforded me by the presence in this city of epidemic cholera, that I was induced to follow out these inquiries.

