ON PROLAPSE OF THE ARM IN TRANSVERSE PRESENTATIONS.

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While it is my particular object in this paper to call attention to a certain method of managing the prolapsed arm, which may, as it seems to me, sometimes facilitate combined external and internal version; I am inclined, in view of the conflicting opinions which have been held in regard to prolapse of the arm, and the brevity with which the subject is treated of in the more familiar text-books, to think that a general review of the doctrines held and taught in regard to this complication of transverse presentations may be of service.

It has been suggested, that the term prolapse cannot properly be applied to the descent of the arm in shoulder presentations, since the member forms an integral portion of the presenting part, and that the word should be restricted to cases of such descent in conjunction with a cephalic or pelvic presentation. But, as the expression is in common use and well understood, I can see no good reason for discarding it.

Prolapse of the arm is of very frequent occurrence in shoulder presentations. According to Fritsch, it always takes place in protracted cases. The hand alone may be found in the vagina, or the forearm or the whole limb, with the elbow either flexed or extended, may be driven down into the vagina, or even beyond the vulva. As a matter of course, it is generally the lower arm which escapes from the uterus, but, in case the pains are powerful, the upper arm also may be pressed down to a certain extent, and, in presentations of the back or breast, or in cases of twins, we may find two arms lying wholly without the uterus. Indeed, Credé states that all four of the extremities may prolapse in a transverse presentation. Finally, according to

1 See Depaul's Leçons de Clinique Obstétricale. Paris, 1872-6, p. 625.
2 Klinik der alltäglichen geburtshülflichen Operationen. Halle, 1875, p. 162.
Fritsch, in cases of pendulous abdomen, with a dorso-anterior position, the presenting shoulder may be arrested by the symphysis pubis, the child's belly turn downwards, and the upper arm slip down posteriorly.

The older authors looked upon prolapse of the arm as a complication which necessarily rendered parturition very difficult, but it is now generally considered as, of itself, exerting little or no influence upon the progress of labor, although in some cases it is recognized as materially complicating the situation. On the other hand, it is held to present certain advantages, and, on the whole, is viewed as a favorable circumstance. Hodge¹ says: "In presentations of the shoulder, it is a matter of minor importance whether the arm be retained within the uterus, or whether it glides out of the os uteri, through the pelvis and os vaginae; yet, upon the whole, it is more favorable, as will be seen, that it should be retained within the uterus." In this opinion Hodge stands almost alone among modern authors. Many writers, as, for instance, Pinard,² state in general terms that they attach no importance whatever to the mere prolapse of an arm, but subsequently, when they come to speak of details, it is evident that they do regard it as of some consequence under certain circumstances. Denman³ says that "there is always less difficulty if both arms present, than if there should be but one arm." I presume he founds this statement on the fact that both shoulders are not as likely to be impacted in the pelvis as one alone is, and that consequently the child will be more readily movable.

As regards the advantages which have been supposed to attach to prolapse of the arm, none are more generally recognized than those which are turned to account in diagnosis.

In the first place, as to the presentation. Having made sure that the prolapsed limb is really the arm and not the leg (for which purpose, if the prolapse be only partial, it is not only justifiable but advisable to make it complete by drawing down the hand gently—even beyond the vulva, so as to allow of in-

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spection), the question arises, *is the child presenting transversely?* According to Kiwisch¹, any very decided prolapse of the arm establishes the diagnosis of shoulder presentation, but De Soyre² records a case in which the whole arm, with the elbow bent, lay within the vagina, and yet the head presented. Depaul' observes, that we should not hastily conclude that the shoulder presents, even when the prolapsed arm hangs out from the vulva, but should make a careful examination, to discover if it be not a case of true prolapse by the side of the head or breech. There can be no doubt that such an examination should always be made, upon the general principle that no source of corroborative or corrective information should be neglected, and the examination is doubtless facilitated, as remarked by Smellie,⁴ Burns,⁵ Hohl,⁶ von Siebold⁷, and others, by making gentle traction on the arm, which, being thus made tense, serves as a guide for the examining finger.

Having ascertained that the presentation is really transverse, we have next to inquire as to the *position* of the child. Here, too, we derive valuable information from an examination of the prolapsed member, as is amply set forth in all the text-books; by ascertaining which hand it is that is prolapsed, and in which direction the palm looks, the forearm being in a state of supination. It is generally stated that, in this position of the forearm, the palm corresponds to the child's abdomen and the thumb points in the direction of the head. Blundell⁸ advises that for this purpose the hand should be placed "intermediately between supination and pronation." It seems to me that we should not place such absolute trust in this test as the text-books inculcate. It is doubtless true, that in the usual dorso-anterior and dorso-posterior positions the palm, in a state of supination, looks in the same general direction with the abdomen;

¹ Die Geburtskunde. Erlangen, 1851, I. Abth., p. 403.
² Archives de Tocologie, vol. i. 1874, p. 571.
⁷ Lehrbuch der Geburtshülfe. 2te Aufl., Braunschweig, 1854, p. 194.
but, apart from the fact that there may be more or less rotation of the humerus, the prolapsed arm may belong to the upper shoulder, in which case the palm would look towards the child's back, or the presentation may be abdominal or dorsal, and then the palm would look towards the head or the breech. It is therefore manifestly necessary to make a careful digital examination of the shoulder and as much of the adjacent parts as can be reached; supplementing this, too, with external palpation and auscultation.

Of what value is the condition of the arm in assisting to establish a knowledge of the death of the child? "In brachial presentations," says Blundell, "the putrescency is known by the state of the arm." Rosshirt\(^1\) states, that, on the death of the child, the swollen arm becomes smaller and softer. Chiari, Braun, and Späth\(^2\) looked upon maceration of the prolapsed arm as justifying a resort to embryotomy in difficult cases. On the other hand, de La Motte\(^3\) gives a case in which a physician had pulled on the arm for more than six hours, until it was so swollen, black, hard, cold and insensible, that an ill-informed person would have thought it right to remove it; and yet de La Motte turned and extracted a living child, and the arm regained its natural condition in the course of two or three days. Osiander,\(^4\) too, observes, that "we often find the prolapsed arm swollen, hard, livid, and even blackish-blue, with the epidermis easily stripped off, without our being able to regard it as a sure sign that the child is dead." He refers these conditions to injury inflicted by the mother or the midwife, the swelling and dusky color being caused by compression of the veins by the os uteri tightly embracing the shoulder. In view of such statements as these, and of the many instances in which the arm has been amputated in the belief that the child was dead, but in which nevertheless it has been born living, we are not justified in concluding from the condition of the arm, in the absence of corroborative evidence, that the child is dead. But, if we can detect muscular movements of the hand or arm, we have sufficient proof that the child is still living, and, if there be no

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1 Lehrbuch der Geburtshülfe. Erlangen, 1851, p. 555.
2 Quoted in Scanzoni's Beiträge, I., 1854, p. 319.
4 Handbuch der Entbindungskunst. 2te Aufl. Tübingen, 1833, Bd. iii., p. 330.
spontaneous movements, there can be no objection to endeavoring to provoke them by simple measures calculated to stimulate reflex action, such as the application of ice and the like.

Among the advantages not connected with diagnosis, it is generally agreed that, in case version is to be followed by extraction, the prolapsed arm can be prevented from rising by the side of the head, whereby we avoid, at least as regards that one arm, the delay and difficulty which often occur at a critical juncture from the necessity of liberating the arms. This point will be more fully referred to in a subsequent portion of this paper, together with the advantages to be obtained by making use of the prolapsed arm in various operative proceedings.

The disadvantages which have been attributed to prolapse of the arm are, that it impedes version, and that it interferes with the introduction of the hand for other operations.

Cephalic Version.—It may naturally be supposed that the expulsion of an arm from the uterus diminishes the probability of spontaneous version by the head; and it may very likely be the case, that, in those instances of obliquity of the head at the commencement of labor in which an accident may either cause the head to engage or establish a frank transverse presentation, the prolapse of the arm may be the determining factor in producing the latter condition. Thus, Fritsch alludes to a case in which, "on account of obliquity of the head, an arm prolapsed, and a shoulder presentation resulted from the action of a few strong pains following each other in quick succession." But, on the other hand, Barnes, in mentioning the rarity of spontaneous cephalic version, says: "But some cases of head-first deliveries have been observed. Pezerat relates a case that seems free from ambiguity. The child was large, the shoulder presenting. Pezerat tried to push it up, but could not. A violent pain drove the head down. Fichet de Fléchy gives two cases. In both the midwife had pulled upon the arm. Balocchi relates a case. It was an eight-months' child. He says the case is unique rather than rare, but still regards it as a natural mode of delivery in shoulder-presentation. Lazzati thinks the descent of the head in these cases is always the result of traction upon the presenting arm. As the expelling power is

exerted mainly upon the breech, tending to drive the head away from the brim, it is indeed not easy to understand how spontaneous action can restore the head, if the shoulder is forced low down in the pelvis. Monteggia held the same opinion. He relates two cases, in both of which tractions had been made. I myself have seen an instance of the kind.” In a case recorded by the late Dr. Elliot, a second twin presented the arm, with the head in the left iliac fossa, spontaneous cephalic version occurred. “The head of the child was driven into the pelvis, and the elbow turned down so as to pass with it into the world.” There is no mention of traction having been made. Dr. Edmund Arnold, of Yonkers, gives a case of transverse presentation, with prolapse of arm and funis (the latter being traceable to the umbilicus), in which spontaneous cephalic version occurred, after several fruitless attempts to turn by the feet, apparently without any traction having been made on the arm.

As regards artificial cephalic version, Rosshurt includes prolapse of the arm among the conditions unfavorable to its performance, and Pinard quotes from Dubois to the effect that the operation is impracticable under such circumstances. Braxton Hicks' says, however: “If, in these malpresentations, the foetal hand protrude, it is even then quite possible to induce cephalic presentation, provided the thorax has not yet descended.”

Podalic Version.—Hodge states that spontaneous version by the feet is more apt to occur when the arm is retained within the uterus. On the contrary, Osiander saw five cases of spontaneous breech version—three of the children being mature, and two immature. In all of them the arm was markedly prolapsed [ragte der Arm weit hervor]. In one case the midwife was so astonished to see the breech born, after she had pulled long and hard on the prolapsed arm, as to exclaim, “Man könne an der Geburt die Allmacht Gottes erkennen.”

According to Credé, artificial version by the feet may be hindered in various ways by the prolapsed arm; by the space which it takes up in the os uteri and vagina, and by its interfering with the recession of the presenting part. Pinard says

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1 Obstetric Clinic, New York, 1873, p. 346.
3 Mém. de l'Acad. de Méd., 1833, t. iii. p. 476.
that total emergence of the limb from the vulva “can exist only in case of a profound engagement of nearly the whole trunk in the pelvic cavity. Its occurrence prohibits any attempt at version. Not only would it be very difficult to introduce the hand as far even as the os uteri, but the rotation of the child would probably not take place without rupture of either the vaginal or the uterine portion of the genital canal.” It will be seen that these remarks apply rather to impaction of the trunk than to the mere descent of the arm.

Denman, Hohl, Schröder,¹ and others, consider that the prolapsed arm can never materially obstruct version, and Tarnier² and Saboin³ declare that it facilitates the operation. It is probable that the latter authors refer, not so much to version itself, as to its issue in the birth of a living child being aided by our being able to prevent the arm from rising by the side of the head during extraction.

There is great difference of opinion as to whether the arm may prevent the introduction of the hand for the purpose of version and other operations. Smellie, while making no positive statement upon this point, says, “if the arm that is come down be so much swelled that it is impracticable to introduce the hand,” etc. Hohl declares that “experience has shown beyond a doubt that a prolapsed arm may be so greatly swollen as to preclude the introduction of the obstetrician’s hand, as far as the elbow, through the vulva, or through the vagina and os uteri, with safety, whether for the purpose of turning, or for that of opening the child’s thorax.” Further on, he speaks of the impediment to the introduction of the hand through the vulva as causing pain to the woman and endangering the perineum, cramping the operations of the hand in the vagina, and interfering with the introduction of instruments.” As impeding the introduction of the hand into the uterus, he attaches importance to the arm being very much swollen, and occupying that side of the pelvis in which the hand is to be introduced.

De La Motte met with a case in which the arm was so swollen, and the vagina so dry and narrow, that, although strongly opposed to the practice, he was obliged to remove the arm.

Baudelocque\textsuperscript{1} maintains that the introduction of the hand is not prevented by the swollen arm, but by rigidity or spasm of the cervix uteri. Scanzoni\textsuperscript{2} denies that the swollen arm can prevent the introduction of the hand, and refers the trouble to impaction of the shoulder. He inculcates the practice of holding the arm close against the pubic arch, in which situation, according to him, it no longer encroaches upon the posterior portion of the pelvic cavity. Rosshirt and Fritsch also recommend this manoeuvre. Hohl says, however, "We have slung the arm and held it against the symphysis pubis, as taught by Scanzoni, without being able to overcome the obstacle which, in its swollen condition, it opposed to the introduction of the hand."

The truth of the matter seems to be, that, in a pelvis of normal dimensions, the prolapsed arm, if properly managed, cannot, by virtue of its encroachment upon the capacity of the pelvis, obstruct the introduction of the hand into the uterus; but that impaction of the shoulder or rigidity of the cervix uteri is the cause of the difficulty. But, on the other hand, there can be no doubt, I think, that an arm, whether swollen or not, protruding from the vulva, may seriously embarrass the introduction of the hand \textit{into the vagina}. By holding the arm snug up under the pubic symphysis, we undoubtedly secure room enough, as regards the bony canal, but we do not, thereby, enlarge in any degree the vaginal canal. Remembering, then, that, in many cases of turning, more difficulty is met with in introducing the hand into the vagina than in all the rest of the operation, it seems to me that we must admit, that this difficulty may be materially increased by an arm hanging out from the vulva.

As regards the whole matter of the part played by the prolapsed arm in favoring or impeding the satisfactory progress of cases in which version is indicated, I should say: (1) pro-

\textsuperscript{2} Lehrbuch der Geburtshülfe. 4te Aufl., Bd. iii., Wien, 1867, p. 61.
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lapse does not, of itself, contra-indicate, or seriously embarrass any form of version, except in so far as it may interfere with the introduction of the hand; (2) neither does it facilitate version as usually performed; but (3) it does facilitate extraction, thereby increasing the chances of the child being born alive, as will be more fully alluded to hereafter.

What remains to be said can, I think, be best arranged in connection with the various methods which have been proposed for managing the arm, or for assisting labor by manipulations of the member. Without discussing the different expedients which were formerly resorted to, with a view to provoke the automatic retraction of the prolapsed arm, and which have now fallen wholly into desuetude, I will pass at once to the consideration of the measures which are mentioned by contemporary writers.

Replacement.—The old obstetricians considered it highly necessary that the prolapsed arm should be replaced within the uterus, and carried over the child’s breast, in the direction of its belly. So thoroughly were they imbued with the notion that the prolapse was in itself a source of grave difficulty, that Mauriceau, following Paré, recommends amputation in case replacement should prove very difficult. According to Schröder, Portal never replaced the arm, and Deventer, in 1701, first showed that it was not always necessary to do so. Hoorn also considered that replacement was not always necessary, and de La Motte, Puzos, Levret, and others stoutly opposed it. Osiander speaks of it as now seen only in the rude practice of country midwives, and says that the arm when forced back into the uterus, at the risk of lacerating the vagina and os uteri, far from facilitating version, renders it much more difficult by getting in the way of the operator’s hand. Siebold says, that unskilful replacement is apt to make the presentation more unfavorable. Burns, Rosshirt, Clay, and Schröder teach, that it should never be attempted. Scanzoni includes forcible replacement among the “crude and horrible proceedings.”

1 Traité des Maladies des Femmes Grosses, et de celles qui sont Accouchées. 6me éd. Paris, 1721, tome I., p, 310.
which are now rejected as wholly superfluous. Leishman¹ states, that replacement should not be attempted in cases of impaction of the shoulder. Hodge, quoting from a paper on a method of rectifying shoulder presentations by correcting the obliquity of the uterus, published in 1850, by Dr. M. B. Wright, of Cincinnati, says: "Should the arm be prolapsed, it is advised to re-introduce it, and carry it, as far as practicable, toward the breast of the child." Credé observes, that by replacement the various difficulties in version, which are due to the prolapse, are overcome, but that it is possible only when the presenting part is still, to a certain extent, movable. De La Motte attempted, in a case occurring early in his practice, to carry out the teaching which he had received, but found it impossible to replace the arm.

Hicks, in describing his method of combined external and internal version, says: "Where the arm has not descended so low as I have supposed above, but yet has fairly come into the vagina, it will be advisable always to endeavor to return it on to the chest of the child." In one of Elliot's cases (No. 100) the House Physician (Dr. Mead) replaced the prolapsed arm, and then performed bi-manual cephalic version. In another case (No. 88) Dr. Elliot performed external cephalic version, after "having carried the arm within the uterus above the chin of the child." Mr. J. Henderson,² in a case of double arm presentation, returned both arms and brought down the feet.

As regards the manner in which replacement should be effected, Credé says: "We accomplish it by means of either an immediate or a mediate manoeuvre. In the immediate method we bend the elbow, grasp the limb with the fingers, and, pressing on the hand or the elbow, endeavor to carry it over the child's breast, holding it there a short time, and then carrying the hand further into the uterus, for the purpose of performing version. In the mediate method we introduce the hand past the arm, grasp the presenting part with the whole hand, lifting it gently aside in the direction of its dorsal aspect, and then return to the arm, which we treat as in the immediate method. The mediate method should be tried, even if the presenting part has descended low, and it has the advantage

¹ A System of Midwifery. Glasgow, 1873, p. 380.
that at the same time it prepares the way for version, by raising the presenting part."

I can imagine that some advantage might be gained by gently replacing the arm in cases which are seen early, and in which there seems to be a prospect of inducing a head presentation. As regards the "mediate method" of Credé, the preliminary step—the elevation of the shoulder—is of such overshadowing importance, that the operation can scarcely be considered as forming a part of the treatment applicable to prolapse of the arm.

Retropulsion.—Depaul employs this term to express the replacement of an arm prolapsed by the side of the head. I have ventured to apply it, as regards transverse presentations, to a sort of maneouvre which I made use of in the following case:

Mrs. F., about 29 years old, was taken in labor with her third child, at term, towards midnight, April 12th, 1875. She had had vague pains for two days; but on the evening in question she had gone to bed and fallen asleep as usual. About midnight she was suddenly awakened by a copious gush of amniotic fluid, and by severe pain in the back. I arrived at about 1 a.m. of the 13th. On making an examination, I at once encountered the child's hand, lying low in the vagina. It was the left hand, the forearm in a state of pronation, the palm looking towards the mother's right hip, with the thumb directed forwards. External examination showed the abdomen to be somewhat smaller than usual, the long axis of the swelling being nearly transverse. The child's head was resting upon the right ilium, and the breech was situated somewhat higher up on the left side, the back being directed forwards. Muscular movements of the arm in the vagina bore witness that the child was living.

The uterus was acting but moderately, and the presenting part was freely movable. I decided to attempt combined external and internal version. Having introduced my right hand into the vagina (the patient lying on her back), I seized the arm, with the intention of effecting replacement by Credé's immediate method, having placed my left hand on the abdomen, above and to the right of the child's head, for the purpose of cephalic version. Somewhat to my surprise, this left
hand informed me that every little movement which I impressed upon the child's arm caused a corresponding movement of its head. I soon found that, by gently pushing the arm upwards, and somewhat towards the mother's right side, taking care that the direction of the force should coincide with the axis of the arm, I could raise the head sufficiently to enable me to get my left hand fairly under it. I now abandoned all intention of attempting cephalic version, but continued to urge the head upward with my left hand, until the shoulder rose beyond the reach of my right hand, when, upon introducing my right forefinger into the os uteri, I found the child's left tuber ischii within reach. With the point of my finger I gently urged this along towards the mother's right side, and soon encountered the left foot, which, without any difficulty, I hooked down into the vagina. I immediately brought the foot down through the vulva, rotating it slightly, so that the toes looked backwards.

The whole operation was so quickly and easily performed, that the mother (who was not anaesthetized) supposed that I had simply made an examination. The uterus remained almost quiescent for about six hours, at the end of which time efficient pains came on, and the child was soon born. The arms did not require liberation. The child (a good-sized girl) was moderately asphyxiated, but was readily revived. Both mother and child did well.

Now, I have no doubt that in this case it would have been perfectly easy to turn the child without the manipulation of the arm which I have described, and I do not draw any inference from the facility with which the operation as a whole was accomplished; but, when I say that the elevation of the cephalic pole, including the presenting shoulder, was by far the easiest and shortest part of the proceeding, it will be conceded, I think, that the retropulsion of the arm was the chief factor in effecting the child's revolution. I believe that it would prove of service in more difficult cases. Doubtless, like any other manipulation, it should be performed gently and carefully; but, when we consider that the force exerted acts in a line with the humerus, pressing the head of that bone directly against the glenoid cavity, it would seem that, with ordinary caution, there should be no danger of injuring the shoulder.
It seems to me that it would be perfectly safe to use as much force in this way as would be justifiable in any other way, in an attempt to raise an impacted shoulder; at all events, it is well known that the greatest difficulty in version is, often, to get the shoulder to rise, and it can scarcely be doubted that cases will occur in which, by making use of some such manipulation as that which I have described, a resort to the old operation of podalic version, by groping with the hand within the uterus, may be avoided. If we can once raise the shoulder, a point will be gained, even if we subsequently have to introduce the hand into the uterus to search for a foot, for, the shoulder being free, it will be a matter of indifference which foot we bring down.

Braxton Hicks,¹ in his first article on combined external and internal version, says: "The motor force is employed almost entirely from the outside, and ... the fingers within are used more as an indicator than as a propeller." Manifestly, then, the motor force is to a certain extent wasted—the child's pelvic pole is first made to descend, not as a part of any motion of the child as a whole, but at the expense of more or less bending of its spinal column; if now, the force continuing to act, the head rises, well and good; but if it do not rise, it is only driven against the ilium and rendered still less obedient to any effort on the part of the internal hand. In this state of things we may, as Hicks suggests in his longer article, supplement the force at work by pushing on the elbow, and in ordinary cases doubtless we shall usually succeed; but it seems to me that, by so directing the force as to raise the cephalic pole at the outset, we shall be able to turn without introducing the hand into the uterus in some cases in which we should otherwise fail, thus widening the scope of the exceedingly valuable operation for which we are indebted to Hicks.

Schröder,² in a case of combined external and internal version, did indeed act primarily upon the cephalic pole, making the external part of the operation consist in pushing up the head; but, as the membranes were entire, it is not likely that any use was made of the arm. In one of Elliot's cases (No. 93) a second twin presented a foot, a hand, and the

¹ The Lancet, Feb. 9, 1861.
Foster: *On Prolapse of the Arm in funis.* He "readily delivered a good-sized, still-born male child by pushing up the arm and drawing on the foot." It is not stated that the cephalic pole was pushed up by means of the arm. "When the shoulder presents," says Smellie, "and the arm lies double in the vagina, let him push them both up." It is evident from the context that Smellie intends this to be done, not to initiate a movement of revolution in the child, for indeed a head-first rotation would be contrary to the genius of the old operation, but simply to enable the hand to be introduced within the uterus.

Although, then, I have been unable to find in literature any account of version having been effected by moving the child through the medium of the arm, I am inclined to think it must occasionally have been done by accident during attempts at replacement.

Possibly, in cases of arrest of the shoulder over the symphysis pubis, with prolapse of the upper arm, such as I have already referred to as having been mentioned by Fritsch and supposed by him to be connected with a pendulous condition of the abdomen, it might be found serviceable to bring retropulsion to bear upon the prolapsed arm, thus maintaining, the dorso-anterior position until the dislodgment of the shoulder could be effected and perhaps the other arm brought down, thus converting the case into a frank shoulder presentation of the most favorable kind.

*Traction.*—From time immemorial midwives seem to have been possessed with a blind impulse to pull upon any part of the child's body upon which they could lay their hands; hence a case of protracted transverse presentation, in which traction was not applied to the prolapsed arm, is something of a rarity in literature. Much damage has doubtless been done in that way, both to the mother and to the child, but, as we have seen, nature is often able to effect a favorable change in the child's position in spite of such rude interference. Nevertheless, traction upon the arm is a recognized expedient, and, under certain circumstances and when properly managed, very serviceable.

As a matter of course, traction properly so called, *i.e.* of such a sort as to produce any effect upon the child's body, should not be thought of until the diagnosis has been made perfectly clear. The mere drawing down of the arm for the
purpose of examination, or simply holding it somewhat tense, to serve as a guide to the examining finger, is an entirely different matter.

Barnes' observations, already quoted, would seem to show, that traction has sometimes aided in bringing about cephalic version, but they are not, in my opinion, sufficient to justify an attempt to turn by the head by means of traction in the ordinary sense of the term; nor do I suppose that Barnes meant to give that impression. It might serve the purpose better, if we were to first replace the arm within the uterus, and then make traction upon it in a lateral direction—away from the head, at the same time pressing upon the latter with the other hand applied externally.

We have seen also, that traction does not necessarily prevent spontaneous version by the pelvic pole, but it must have a tendency to do so under ordinary circumstances, although perhaps in the case of an immature child it might favor it.

Baudelocque's brother easily completed the spontaneous expulsion of a small child (a second twin) by traction on the arm. Schröder teaches, that in case the shoulder is so wedged in the pelvis that version is become impossible, we may, provided the pelvis is capacious, at least in its transverse diameter, the child small, and the mother's condition not such as to call for the speedy termination of labor, await spontaneous evolution, or endeavor to make the child engage by traction on the arm or the pelvic extremity. Under such circumstances, "we may," says Pinard, "as recommended by Velpeau, draw upon the arm after the manner of Fabricius Hildanus or of Fichet de Fléchy, a method which has been several times employed by P. Dubois." On the other hand, Hohl considers the practice in the highest degree objectionable.

Scanzoni, in advocating the application of a fillet to the prolapsed arm, to prevent its rising by the side of the head during extraction, says, "at the same time we have in the arm thus secured with a noose a hold by means of which we may assist those rotations of the trunk upon its long axis which are often necessary." It is to be supposed that traction cannot produce any such result unless the shoulder from which the arm springs is more or less above the superior strait. Mention has already been made of such a proceeding in cases
of prolapse of the upper arm. It is not easy to understand how traction upon an arm attached to a shoulder already deeply engaged in the pelvis can cause the child to turn on its long axis, and yet, in a case recorded by Depaul, in which disarticulation at the shoulder-joint was performed, it is stated that the tractions made upon the arm caused the child to revolve in such a manner that the other arm could be seized. In cases of moderate impaction a manipulation of this sort may render the child movable, and thus allow of version.

Traction upon the arm for the purpose of rendering the neck more accessible, and thus facilitating decapitation, is so universally approved, that it need not be discussed. The same may be said in regard to traction upon the arm after decapitation, for the purpose of extracting the trunk.

Posta gives the following directions for managing the arm in such a manner as to facilitate evisceration of the chest: a noose is to be attached to the prolapsed hand, and confided to an assistant. If it be the right hand, the assistant should raise the child’s arm almost perpendicularly against the mother’s pubes, inclining it a little towards her right groin, so as to draw the axilla as far down as possible. Schröder advises, that if, after evisceration, the shoulder is fixed in the pelvis, spontaneous evolution should be imitated, by drawing the shoulder well down and towards the side opposite to that in which the breech is found, extracting by the pelvic extremity, which we cause to pass in advance of the chest. Veit lays stress upon the value of traction upon the arm after evisceration, in his method of delivery conduplicato corpore.

In a case of spondylotomy, reported by Affleck and Macdonald, the operation seems to have been facilitated by traction on the arm.

Application of a Fillet.—As a matter of course, the arm may be noosed to facilitate traction for any of the purposes

1 Archives de Tocologie, III., Fév., 1876, p. 111.
2 Il Filatre Sebazio, March and April, 1857, quoted by Pinard, op. cit., p. 84.
3 Monatsschrift für Geburtshunde, 1861, p. 457, quoted by Pinard, op. cit., p. 85.
which have already been considered, but the fillet is thought essential by so many authors, for the special purpose of enabling us to make traction after podalic version has been performed and the arm has retreated within the uterus, with a view to prevent the arm from rising by the side of the head during the process of extraction, thus imperilling the child's life at the critical moment when the placenta has nearly or quite ceased its function as a respiratory organ, and yet there is no opportunity for air to enter the child's lungs—that it demands separate consideration.

Those authors who mention the matter at all (including Osiander, Rosshirt, Hohl, Scanzoni, Hatin, Hodge, 1 Schröder, Tarnier, Fritsch, Pinard and Saboia), almost without exception, urge its importance with more or less enthusiasm. Crede advises that the application of the fillet should be followed by replacement. Scanzoni advocates its use if only the elbow be prolapsed. Depaul would have it applied to a hand brought down by mistake for a foot. Levret 2 says that the arm should be gently drawn out from the vulva, in order that the noose may be applied easily and without pain to the mother.

Osiander and Saboia even recommend that the arm should be noosed within the uterus, the latter employing a porte-lacs for the purpose. Fritsch, however, while bewailing the frequent neglect of the fillet, advises against its application within the uterus, particularly by inexperienced practitioners, and Chiari, Braun, and Späth, 3 who (in a series of 21 cases of arm presentation and another of 45 cases of "secondary" transverse presentation [the membranes having ruptured and the liquor amnii escaped]) did not noose the arm in a single instance, consider Trefurt's porte-lacs as dangerous and difficult to use, and all such instruments as superfluous.

Crede advises that both arms should be noosed, in case they can both be readily reached before turning; while, curiously enough, Osiander, who is said to have noosed every arm he could feel, expressly declares that both arms should never be slung.

The fillet is easily applied, and, if the hand can readily be

2 Quoted by Scanzoni, op. cit.
3 Quoted in Scanzoni's Beiträge, i. 1854, pp. 309 and 319.
brought outside the vulva, can do no harm, except, perhaps, by introducing some deleterious substance within the uterus. It should be applied to the wrist. Its use would oftenest be of service in the hands of those who are in the habit of performing the old operation of podalic version, following it with extraction. As extraction may become necessary in any case of that sort, doubtless the more frequent use of the fillet would be of advantage. It can rarely if ever be required in a case of combined external and internal version.

Scarification.—Hohl scarified the swollen arm in one instance, on the recommendation of Plenk and Scanzoni, for the purpose of so reducing its bulk as to allow of the introduction of the hand, but found it useless.

Brachiotomy.—This term is applied to the removal of a portion or the whole of the arm, with or without the clavicle and scapula. Nearly all systematic writers, even those who admit the occasional necessity of the operation, speak of it with a feeling of horror—and yet it is frequently done.

Denman, the younger Ramsbotham, Tarnier, Clay, Fritsch, and, according to Hohl, von Siebold, condemn the operation in unqualified terms. Scanzoni opposes it in his Lehrbuch, but seems afterwards to have met with a case which Hohl considers as supporting the views of those who advise removal of the arm under some circumstances. Among those who speak less positively, but who still oppose the operation, except in the very rarest cases, are Rosshirt, Credé, Pinard, Schröder, and many others.

All admit, that it is unjustifiable if the child be living, and that it should be done only in case of necessity. In several instances it has been done in the belief that the child was dead, and yet it has been born living. De La Motte gives a case in which, after both this operation and craniotomy, the child was born alive.

Among the specific objections to amputation of the arm, in addition to the repugnance which it excites, are the facts that it

2 Geburtshülflichen Operationen, quoted by Hohl, op. cit.
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deprives us of a valuable means of traction, and that it tends to produce a confusion of the foetal and the maternal parts.

According to Hohl, the younger Nägele regarded the removal of the arm as sometimes necessary, and Oehler and Michaelis were decidedly in favor of the proceeding. Hohl himself, in speaking of the obstacle which the swollen arm may offer to the introduction of the hand, uses the following forcible language: "We have no dynamic measure against this state of things; expectant treatment adds more and more to the difficulties of subsequent operative procedures, and is trifling with the mother's life, while the material advantage and necessity of brachiotomy are before us. Empty phrases, to the effect that such a state of things cannot occur, lose their force in the presence of a case."

Pinard considers that brachiotomy is admissible only when the arm is the sole accessible part of the child, and there is urgent need of delivery. Hodge advocates the removal of the arm, together with the clavicle and scapula, to favor version by the pelvic pole, by facilitating the ascent of the head and thorax, especially in cases of deformity of the pelvis or great rigidity of the os uteri; in cases of cephalic version, to prevent the simultaneous engagement of the head and arm; in cases of evolution; and, as recommended by Robert Lee,¹ as a preliminary to evisceration.

The various views which have been held in regard to the propriety of brachiotomy for the purpose of facilitating the introduction of the hand rest upon the discrepant opinions which have prevailed as to whether or not the arm itself ever constitutes a serious impediment. This question has already been discussed, and no further reference will be made to it at present.

Pinard, who adduces the experience of Oehler, Depaul, Blot, Pajot, and Stoltz, in rendering version possible in difficult cases by means of brachiotomy, is of the opinion, that both this proceeding and evisceration, allowing of version forcée, should remain rare operations—operations of necessity. "Why," he says, "does this simple operation suffice in these cases? Is it because the vaginal canal is relieved of the prolapsed member? Assuredly not. It is because, the shoulder being cut, we thus obtain

the result which Burton vainly sought to effect with his crutch. The shoulder, or rather the axillary region, rises, reascends to the superior strait, and the lower extremity of the child's trunk is then enabled to descend; whereas, if the scapular prominence be entire, the upper border of the shoulder becomes fixed at the lower edge or posterior face of the symphysis."

Pajot\(^1\) concludes that amputation of the arm facilitates version, not only by favoring the introduction of the hand through a contracted pelvis, or into a constricted uterus, but also by enabling the head to rise and the pelvic pole to descend; but he expressly limits the application of this statement to cases in which the pelvis is so considerably contracted that the shoulder cannot engage.

Osiander (who, it will be remembered, saw five cases of spontaneous version after traction on the prolapsed arm) mentions amputation as among the resources left when all hope of spontaneous version is at an end. Pinard quotes cases in which amputation enabled Blot and Depaul to turn and extract by the feet in cases in which it was otherwise impracticable to do so. In Milroy's case of impaction with prolapse of both arms, in which two practitioners had failed in their attempts to turn, he gave chloroform, and then tried to turn, "but it was quite impossible to introduce the hand, and still impossible to put back the arms. There was no alternative now but to amputate one of the arms, which we did. After this was done, it was with the greatest difficulty I managed to turn." In De La Motte's case, in which he removed the arm, "en deux coups de main," to enable him to introduce his hand, he finally succeeded in turning and extracting, but the amount of assistance which he derived from the removal of the arm may be inferred from the following words, with which he concludes his account of the case: "Je crus très-certainement que je mourrois après cet accouchement, où j'épuisai et ma science et mes forces, et après lequel je restai sans respiration; en sorte qu'il me fallut mettre sur un matelas devant un grand feu, et me frotter avec des linges chauls pendant plus d'une heure, de même que si je fusse sorti de jouer à la paume."

\(^1\) Arch. Gén. de Méd., Sept. 1865, p. 257
Pajot, in speaking of impaction in a contracted pelvis, says: "The child being mature, and version recognized as impossible, amputation of the arm will certainly favor the evolution of the foetus." In a case of this sort Pajot and Danyau unsuccessfully attempted to turn by the feet, after which the arm was amputated, and Danyau undertook to decapitate, but could not finish the operation. He then succeeded in bringing down the pelvic extremity. Delivery was completed by perforation through the vault of the palate.

Boëns removed the prolapsed arm, together with the scapula, in order to reach the neck, for the purpose of decapitation. In one case he removed both arms, but, failing in decapitation, eviscerated the thorax. Rosshirt states, that in cases of decapitation, "doubtless it often happens that the clavicle becomes separated from the sternum in the course of the operation, so that the arm, the shoulder-blade, and the clavicle, especially if the muscles chance to be ruptured, remain attached to the trunk by the skin only; but this is not intentional, and cannot be called a necessary removal of the arm."

Hohl thinks, that in cases requiring embryotomy it is sometimes necessary to violate the rule against disarticulating at the shoulder. Hodge, in speaking of cases in which evisceration becomes necessary, says: "The first step in the operation of embryotomy, in these cases, should be the complete removal of the arm and shoulder, including the whole scapula, and perhaps even the clavicle ... there will be then no obstacle to the ascent of the side of the thorax behind the pubes." Again, he quotes Robert Lee as "always recommending that the shoulder be removed before evisceration and the crotchet be resorted to." Schröder says, that, in these cases, if the prolapsed arm were so swollen as to render the operation specially difficult, it would have to be removed, but that it should be preserved if possible, since its removal would deprive us of a valuable means of extraction. Oehler considers that the arm should not be removed for the purpose of facilitating evisceration, but only to make room for the introduction of the hand in turning.

1 Jour. de Méd. et de Chir. de Bruxelles, t. xxxi. 1860, p. 259, quoted by Pinard.
Pinard quotes a case of Pétrens', in which, after version had been attempted in vain, the arm and scapula were removed, and evisceration performed. Boëns also teaches that this should be done. Pinard mentions a case in which Dubois found brachiotomy necessary, as the first step in evisceration of the thorax. Doleris\(^1\) reports a case in which Depaul removed the limb, and then eviscerated the thorax. Depaul\(^2\), in a case of labor occurring apparently after the completion of the tenth month of gestation, with cancer of the cervix and lower portion of the body of the uterus, and physisometra, the right shoulder presenting, and the arm protruding beyond the vulva, first disarticulated the prolapsed arm with large scissors, and withdrew it by means of a fillet. The tractions made upon the arm caused the child to revolve in such a manner that the other arm could be seized. This, in turn, was partly disarticulated, and then an attempt was made to sever the vertebral column. Failing to extract by these manipulations, the operator finally performed forced version by the feet.

Pinard cites a case in which Depaul amputated, first the prolapsed arm, and then the other one, and afterwards performed craniotomy and cephalotripsy. Hohl says, that if it should be thought necessary to remove both arms, as Dubois\(^3\) was obliged to do, on account of an unskilful operator having brought them down with a foot, we should remove that one first which offers the greatest impediment, and thus perhaps do away with the necessity of removing the other one.

As to the way in which the arm is to be removed, Mauriceau recommends that it be done by torsion. Smellie says: "If the limb be much mortified, it may be twisted off; otherwise, it may be snipt and separated with the scissars." Hohl says: "If the head lie to the mother's left side, the right hand is to be introduced into the vagina, and if it lie to her right side, the left hand is to be introduced. If the forearm should impede the entrance of the hand through the vulva, we may disarticulate at the elbow-joint. We seize the upper arm with

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1 Arch. de Tocologie, t. i. 1874, p. 632.
2 Arch. de Tocologie, t. iii. 1876, p. 111.
3 Quoted by Hohl, who refers to an article by Dubois in the Gaz. Méd. de Paris, 1845, pp. 337, 346. That article, however, although by Dubois, is on the subject of hare-lip. I have not been able to find the original account of Dubois' case.
the thumb and the ring and little fingers, and draw it down as far as we can, keeping the index and middle fingers free for the purpose of encircling the shoulder-joint and guarding the points of the scissors. We slip the latter between our hand and the child's arm up to the axilla, enter their points, and cut through the soft parts of the joint, keeping up the traction on the upper arm, and not allowing the points of the scissors to come out through the skin. Having cut through the joint, we draw the disarticulated arm downwards, grasp the joint with the hand, and cut the remaining attachments with the scissors in the hollow of the hand."

I have thus taken pains to record, with some detail, the teachings and practice of various authors in regard to brachiotomy, in order to show clearly the contrast between the doctrine which is held by most of them, that the operation should rarely if ever be resorted to; and, on the other hand, the frequency with which, in clinical reports, particularly, as it seems to me, those of the French, we find it stated that the arm was removed, and that too, without any special reason being given for its having been done.

It is not certain that a prolapsed arm ever prevents cephalic version. If it did so in any case, I should think that replacement would be possible, unless there were other conditions present which would of themselves obstruct the version. I cannot see that the prolapse constitutes in itself any obstacle to podalic version, except by interfering with the introduction of the hand. Under such circumstances amputation may sometimes be necessary, but I should consider that the cases requiring it must be very rare. I do not understand how the removal of the arm can facilitate decapitation, evisceration, or spondylotomy, except by getting rid of an impediment to the introduction of the hand. As a matter of course, it should never be done until it is certain, either that the child is dead, or that some mode of delivery necessarily involving its sacrifice is demanded.

In conclusion, I should thus sum up the doctrines which I consider to be tenable in regard to prolapse of the arm in transverse presentations:

1. Mere prolapse of an arm does not of itself indicate, with certainty, that the presentation is transverse.
2. Inspection of the prolapsed hand will, in ordinary cases, roughly indicate the child’s position, but should be supplemented by other means of diagnosis, and may, in presentations of the back or abdomen, or if the upper arm alone be prolapsed, give faulty indications, if conclusions be drawn in accordance with the rules commonly laid down.

3. Death of the child cannot be positively known from the condition of the arm, but muscular movements in the limb show that the child is still living.

4. Prolapse of the arm may cause the presentation to become transverse in cases which might otherwise end in a head presentation.

5. A prolapsed arm constitutes more or less of an impediment to cephalic version, spontaneous or artificial; but yet

6. Traction on the prolapsed arm may, in certain cases, favor cephalic version, but is not to be recommended for that purpose, unless preceded by replacement.

7. The prolapsed arm does not always, even when pulled upon, materially hinder spontaneous version by the feet.

8. Prolapse of an arm does not facilitate the old operation of podalic version; but

9. It offers the means of avoiding the necessity of liberation of the arms, or at least of one arm, during extraction, and thus, by hastening delivery, increases the chances of the child being born alive.

10. The arm may materially interfere with the introduction of the hand into the vagina and through the os uteri.

11. On the whole, prolapse of the arm is of advantage in transverse presentations.

12. The arm should be replaced within the uterus, by the “immediate” method of Credé, provided it can be done easily, in cases in which cephalic version is to be attempted, or in which there is reason to believe that a transverse position of the child is not yet thoroughly established.

13. Replacement is not called for under other circumstances, and should never be done by force.

14. Retropulsion, as described in this paper, may prove to be of service in combined external and internal podalic version.

15. By retropulsion, in cases in which the upper arm alone
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is prolapsed, we may be able to prevent the child from assuming a dorso-posterior position.

16. Traction should not be made upon the arm until the diagnosis is established.

17. Lateral traction *in utero*, after the arm has been replaced, may assist in performing cephalic version.

18. Traction may be used to complete spontaneous evolution.

19. Traction, particularly if the shoulder be not deeply engaged, or if the force be applied to the upper arm, may cause the child to rotate to a certain extent on its long axis, and perhaps render it sufficiently movable to allow of version.

20. Traction is of manifest advantage in rendering the neck or trunk accessible, and thus facilitating decapitation, evisceration, or spondylotomy; and, after either of these operations, it materially assists in delivery.

21. A fillet should be applied to the wrist, provided it can be done easily, in case the old operation of podalic version is determined upon. This affords a means of preventing the arm from rising by the side of the head during extraction, by making traction on the arm after its retreat within the uterus.

22. The fillet should not be applied within the uterus.

23. Amputation should never be performed, unless the child is clearly dead, or embryotomy be necessary; and even then it should be avoided if possible, as it deprives us of a valuable means of traction, and may lead to confusion of the fetal and the maternal parts.