

ART. II.—*A Memoir on the Use of Auscultation in the Treatment of Labours.* By ALFRED H. M'CLINTOCK, M.D., F.R.C.S.I., Ex-Assistant of the Dublin Lying-in Hospital, Vice-President of the Dublin Obstetrical Society, and Lecturer on Midwifery, in the School of Medicine, Park-street.

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It may be laid down as a general rule, to which there are but some trifling exceptions, that the greatest strides of advancement in medical science have been the result of improvements in our means of diagnosis. In virtue of this principle it is that Laennec's grand discovery constitutes an epoch so remarkable in the history of medicine, and has gained for him a reputation of such wide extent and permanence. Now the discovery of the foetal heart's sounds by Major and Kergaradec was an event of analogous importance in the history of obstetric science; for though, strictly speaking, it must be regarded as the result of a special application of stethoscopy, and therefore a fact arising out of Laennec's previous disclosure, yet this should not diminish the credit due to these investigators, or detract from the honour to which they are so justly entitled for the immense advantages that have been conferred on midwifery through the exercise of their ingenuity and research.

An entirely new field was thus opened for auscultatory observation. At first it was supposed that the sole utility of this addition to our knowledge was the aid it renders us in detecting the existence of pregnancy, and distinguishing this state from the many real diseases and feigned conditions with which it may be, and unfortunately often is, confounded. If its advantages had extended no further, it would still have been a discovery of unquestionable value, and would justly have ranked amongst the most conspicuous modern improvements in obstetric science. But, happily, auscultation of the gravid uterus has not been restricted to this one object of the diagnosis of pregnancy; for later investigations have shewn that the

careful employment of the stethoscope is capable of affording many practical indications of great value in the treatment of labours, chiefly from the information which by its means we can obtain regarding the life or death of the foetus during parturition,—a question, I need hardly say, of considerable moment, and the decision of which very generally exercises great influence both upon the time for interference and the choice of instruments.

Here I cannot help expressing unfeigned surprise, that though the admirable works of Dr. Evory Kennedy and Dr. Collins have been now so many years before the profession, the importance of the stethoscope in the management of labour cases does not yet seem to be at all sufficiently appreciated; nor has the subject received from authors upon midwifery that share of attention which its intrinsic merits deserve, or which the recommendation of two such names should have entitled it to.

Dr. W. O'Brien Adams, indeed, has recorded his testimony in favour of the practice(*a*); and Professor Murphy, of London, has done the same in his recently published Lectures: but the writings of Ramsbotham, Rigby, Lee, and Burns, &c., though so full and comprehensive upon every other matter, and deservedly ranking amongst the standard obstetrical authorities of the day, give upon this subject scarcely any information. There can be no question but that to Dr. Collins and Dr. Kennedy belongs the merit of having, in these countries at least, first taken advantage of Maior's discovery, and brought it to bear successfully on the treatment of some of the most perplexing cases that we meet with in the course of midwifery practice(*b*). Indeed, so far as my researches go, they would

(*a*) *Dublin Journal of Medical Science*, vol. iii. p. 65.

(*b*) It is gratifying to know that the Dublin school of medicine took the lead in this very important matter, in these countries. Dr. John Ferguson first called the attention of the profession to the discoveries of Maior and Kergaradec. Dr. Evory Kennedy, who investigated this subject with great

incline me to believe that the physicians to the Dublin Lying-in Hospital were the first who extensively used the stethoscope in practical midwifery, or attached importance to its indications in the treatment of labours. It should, perhaps, be stated, that in the year 1831 M. Bodson brought a memoir upon this subject under the notice of the *Académie Royale de Médecine*, in which he endeavoured to prove that auscultation of the foetal heart furnishes us with very certain means of knowing whether the child's life be in any danger from the continuance of the labour; further adding, that if the result of our examination lead us to apprehend such a condition of the foetus, it is a sufficiently strong ground for the employment of the forceps. This paper was unfavourably reported on by M. Dubois(a), who considered it quite impossible that we could form any correct estimate of the child's strength by stethoscopic examination, and he, therefore, denied that such should be received as an adequate reason for using the forceps.

In writing the present memoir, my chief design has been to communicate faithfully and impartially the results of my observation of the use of auscultation in the management of labours, and thereby to contribute (even though it be but a fragment) towards the advance of our knowledge in this field of stethoscopic inquiry. I must here remark that the materials which form the substance of this paper were collected, almost exclusively, from what came under my own immediate notice in the wards of the Dublin Lying-in Hospital, during the period of my official connexion with that Institution, under the auspices of its present Master, Dr. Charles Johnson. To attest the importance of these facts, and to be the means of making them more generally known, is to me a sufficient re-

zeal and ingenuity, shewed its valuable influence not only on midwifery, but on medical jurisprudence; and Dr. Collins's laborious and most valuable Report upon his seven years' mastership completely established its utility and importance in practical midwifery.

(a) *Archives Generales*, vol. xxvii.

ward; and should this article have the effect of directing closer and more earnest attention to the subject, I shall consider myself amply recompensed.

When seeking for the foetal heart at the commencement of labour, it is very generally found in one or other iliac fossa,—more commonly the left. The precise locality in which it is heard depends mainly upon the position of the foetus *in utero*, the maximum of its intensity almost always corresponding to the part of the uterus with which the child's thorax is most closely in contact. This, as a general rule, holds good, and its application to the purposes of diagnosis admits of ample illustration, as shall presently appear.

In ordinary vertex presentations the *back* of the thorax is the part most closely applied to the uterus, owing to the position which the child's body habitually holds in these cases,—the legs being doubled up on the abdomen, the chin depressed on the chest, and the whole body bent forwards, so as to present a considerable convexity on its posterior part. Hence it follows, that, in the first and second positions of the head (where the back of the child is anterior), we may expect to find the foetal pulsation most audible in the left and right inguinal regions respectively, whilst in the third and fourth positions it should be more posterior towards the woman's loins. Experience has convinced me that this is pretty uniformly correct; and the concurrent testimony of Kennedy, Nægèlé, Anderson, and others, tends to confirm it. The rotation of the head, even, from the third position into the second, and the fourth into the first, may be sometimes traced with tolerable accuracy by making successive stethoscopic examinations, and noting the changes in the situation of the foetal heart. In facial presentations, owing to the attitude of the child, the *front* of the chest is the part which lies most contiguous to the uterine parietes, and the situation of the foetal pulsations have been found to agree therewith, being audible anteriorly (in the iliac region) when the head holds the mento-pubic position,

and rather posteriorly when it is in the opposite or mento-sacral position.

As regards breech presentations, I have very frequently verified the observation of Dr. Collins, that, in such, the foetal heart is most distinctly heard near the umbilicus of the mother(*a*). The same remark equally applies to footling cases. I have practised auscultation in only two or three instances of arm presentation, and in these the foetal pulsations were not audible so high up as the umbilicus, though somewhat above the natural situation.

I have thought it well thus briefly to state the result of my experience of the use of the stethoscope in diagnosing the different presentations and positions of the child, because some continental writers seem to attach great weight to its indications in determining this question. I would beg leave, however, distinctly to state my conviction, that the information derivable from this source is much too uncertain and fallacious ever to be put in comparison with the touch, or to justify our relying upon it alone in a matter of such vital importance. At the same time I may consistently add, that, in dubious cases, it is well deserving of employment as an auxiliary. A question here presents itself for solution, namely, can we always succeed in discovering the foetal cardiac sounds during labour, supposing, of course, the child to be alive? To this I would answer, yes; but then the examination, to be adequate, must be made by one accustomed to obstetric auscultation, and who carefully explores every region of the abdomen, and repeats the investigation twice or thrice, if necessary, before coming to any conclusion. Professor Anderson, of Glasgow, states, that, out of 180 pregnant women at the full time, whom he auscultated, he only failed in twelve instances to detect the foetal pulse, and in these twelve alone the child was dead-born(*b*). And of the many hundreds of cases in which I exa-

(*a*) Practical Treatise, p. 39.

(*b*) Lond. and Edin. Monthly Jour. of Med. Science, Feb. 1844.

mined for the foetal heart, as a part of my duty when assistant in the Lying-in Hospital, I can conscientiously state that there were, at most, only two or three instances in which the child's vitality was not detected at some period before delivery, and, in each of these exceptional cases, it was mere curiosity, and not any prospect of advantage, that led to my using the stethoscope. I have said "at some period," because, in the first stage of labour, and whilst the membranes are yet unbroken, a failure may occasionally take place; but, after this event, the uterus contracts on the child, and the points of contact are so multiplied, that the probability of our succeeding is then greatly increased. No doubt some trouble and a little patience are occasionally required in the investigation, but such must always be the case where precision of diagnosis is the object to be attained. In support of this assertion I need only allude to the examination necessary for the accurate diagnosis of any disease of the chest,—even that most easy of recognition. But I feel persuaded no conscientious man would ever make this a rational objection to the employment of the stethoscope, or even give it a moment's consideration, where life and character are, in any degree, at stake.

The existence of twins *in utero* may sometimes be very plainly and unequivocally demonstrated by the use of the stethoscope; in fact, this is the only way by which we can be assured of such being the case, before the birth of one of the children. To establish this diagnosis, it is not sufficient, however (as Nægèlé has stated), to hear foetal pulsations at two separate parts of the abdomen, for though this is certainly strong presumptive evidence, yet, to make it conclusive, there must be *a want of synchronism in the beats as heard at the two points.* The reason for laying down this rule is simply this:—that in uniparous females we may occasionally hear the foetal heart at two or more points very remote asunder, and separated even by an interval in which no pulsation is audible.

Now, in all the instances hitherto brought forward as illus-

trating the use of auscultation, the reader may perceive that its indications are uncertain, and liable to fallacy, and that the benefits arising from its employment have reference chiefly to the position, or presentation, of the child, points which can be ascertained sufficiently well by other and simpler means. Even the diagnosis of twins is more a matter of curiosity, and a proof of the auscultator's skill, than of any real or solid advantage, inasmuch as this information does not exert any influence upon the practice before the birth of the first child.

Let us now place this matter in another point of view, and see how far auscultation is capable of revealing the child's state, or condition, during parturition. This inquiry obviously has reference, not to the situation, but to the character of the foetal cardiac sounds, as to frequency, strength, regularity, &c., together with the alterations they may undergo during the progress of labour. At the very outset an important practical question presents itself for solution, viz.: does the child usually or ever perish in the course of a tedious labour, before the full development of those bad symptoms, which, taken together, would indicate the necessity for immediate interference? To this I would reply in the words of Dr. Collins, and, I believe, his opinion is amply borne out by the experience of all accurate observers. He writes: "I have no difficulty in stating, and that after the most anxious and minute attention to the point, that where a patient has been properly treated from the commencement of her labour; where strict attention has been paid to keep her cool; her mind easy; where stimulants of all kinds have been prohibited, and the necessary attention paid to the state of her bowels and bladder; that under such management, the *death of the child* takes place in laborious and difficult labour before the symptoms become so alarming as to cause any experienced physician to lessen the head."^(a) As regards my own personal experience, I can only say, that I have seen but one exception to the above statement, and in

(a) Dr. Collins's Practical Treatise, p. 16.

this instance the great delay was in the first stage of the labour. Of the reputed signs of the child's death it is unnecessary to say anything, their fallacy and great uncertainty being universally acknowledged.

Let us now, then, come to the main point, and put this query: "Under what circumstances can the absence of the fœtal pulsations be received as adequate proof of the extinction of life in the child?" In reply to this question, I would say: that if, in the course of a tedious labour, the fœtal pulsations, from having been distinct and normal, gradually become rapid and weak; and that, as labour advances, they undergo a further change of character, so that it is with extreme difficulty they can be recognised at all; and that, finally, if at a still later period the most careful examination, conducted with the same regard to accuracy, and made by the same auscultator, altogether fail to detect them;—then, under these circumstances, we may rest assured that they have ceased, and that, consequently, the death of the fœtus has taken place^(a). It cannot be too often reiterated, that the stethoscopic indications of the child's death derive their chief, if not their entire value from this *principle of comparison*. Thus, no matter how expert the auscultator may be, his finding the sounds absent, after making only one solitary examination, is not, by any means, a sufficient *datum* whereon to found an opinion. It is essential to the diagnosis that the chain of evidence be complete, and that a series of examinations shall have been made throughout the labour, in order to qualify this negative result, so that it can be received as positive information. I dwell particularly upon this point because it has been often urged, that as the proof of the child's death afforded by the stethoscope is of a negative kind, it is not deserving of confidence, and, therefore, should not be acted

(a) Before proceeding to examine for the fœtal heart, we should always be sure that there is no retention of urine, as this would materially interfere with our object, by obscuring the sounds, or rendering them wholly inaudible.

on; but it will be at once perceived that the whole force of this objection depends upon those accompanying circumstances, whose indispensable value and importance we have endeavoured to place in their true light. Again, I have heard it argued, that the child might, perhaps, retain vitality at a time when the sounds of its heart could not possibly be recognised by the ear. To this opinion, which is quite gratuitous, the whole tenor of our experience is completely opposed; nay more, I have good reason for believing that the child is reduced to a state past recovery before the pulsations of its heart have ceased to be audible. Previous to their final cessation we have generally observed the sounds to undergo certain changes in character, of which the most prominent, as well as the most constant, is a gradual failure of their strength and intensity. Some time after this alteration has occurred, they increase in frequency, and then begin to intermit, or become irregular, soon after which they cease to be heard. The lapse of time necessary for this progressive series of changes to take place varies considerably in different cases, but we have very rarely found it to occupy less than four or six hours. During the progress of these alterations, I have very constantly remarked the sounds to be most feeble and depressed immediately after the subsidence of a pain; but in the interval, and before the recurrence of another uterine contraction, they have nearly regained their strength and frequency. I may also mention here, that it is hardly ever possible in any instance to hear the foetal heart's pulsations during the presence of an active pain,—such is my experience, at least.

How far, or in what way, the treatment should be affected by the knowledge of the child's death, it is not for me here to point out, as such inquiry would carry us beyond the scope of the present communication; but I may be permitted to say, that the considerations which prompt the use of the stethoscope in the treatment of tedious and difficult labours (of which I have been hitherto speaking), is a regard for

the safety of the mother,—a humane desire to save her hours, perhaps, of protracted suffering and danger, the most favourable issue of which can only be the birth of a lifeless child.

We next turn to a class of cases where auscultation has been advantageously employed with a view to saving the life of the foetus, by pointing out the exact time when delivery should be speedily effected by means of the forceps or vectis. The cases to which I allude are those in which the ergot of rye has been given to overcome that inertia of the uterus which proved a cause of delay in the second stage of labour.

There can be no possible doubt, but that ergot of rye administered to a patient in labour, is capable of acting deleteriously on the child. Dr. Beatty, whose experience in the use of this medicine is very considerable, strongly maintains this opinion (*a*), which is further borne out by the results of still more extended observation in the wards of the Lying-in Hospital. This injurious effect may be produced within a very short time after giving the ergot. Thus in two instances related by my former colleague, Dr. Hardy (*b*), the children were destroyed, although only twenty minutes in one case, and twenty-five in the other, elapsed from the time of giving the ergot until the foetus was born, and in each the foetal heart was loud and distinct at the time of administering the medicine. Dr. Beatty fixes the limit beyond which the child will rarely be born alive, after the exhibition of the ergot, at two hours, and to this rule I have seen but two or three exceptions. It is plain, however, that there is considerable latitude as to the time at which the ergot may commence to exert a deleterious influence upon the child, and that, therefore, so far as regards time, no limits of safety can be prescribed. Now in all these cases auscultation proves eminently serviceable from the information it affords us respecting the state of the foetus; for by making successive stethoscopic examinations at short intervals after giving the ergot, and

(*a*) *Dub. Med. Jour.* vol. xxii.

(*b*) *Dub. Med. Jour.* vol. xxvii.

closely watching any change that may take place in the character of the foetal heart's sounds, we shall have the earliest intimation of threatened danger to the child, and, by the timely intervention of art, be able to rescue it from a position which will inevitably prove fatal unless prompt delivery be effected. I have repeatedly witnessed the advantage of auscultation in these cases, and had the gratification of seeing children extracted alive, who I am satisfied would have perished, had there been no such unerring guide to indicate the precise moment at which to interfere, and beyond which delay was death. I shall relate the particulars of three cases to illustrate these observations.

CASE I.—On October 25th, 1845, I was brought to see a stout young woman who was in labour of her first child. Upon examination I found a large scalp tumour on the head, which was tolerably low down in the vagina, so that I could readily feel the ear; and I ascertained also that the head was in the fourth position of Nægèlé,—the face being directed towards the right foramen ovale. The mother's pulse was 100, and the foetal heart was distinctly heard at the right side, near the spine of the ilium. There was scarcely any uterine action, and the catheter had to be passed on account of retention of urine. I learned from the practitioner in attendance that matters had been precisely in the same state for twelve hours; so for this and other reasons which it is unnecessary here to mention, we resolved upon making trial of the ergot of rye, and accordingly gave fifteen grains of the fresh powder in the strained infusion of half a drachm. This, I may observe, is the ordinary mode of exhibiting it in the Dublin Lying-in Hospital. In twenty minutes the dose was repeated. It did not produce much uterine action, but in fifteen minutes after the last dose I found, by the stethoscope, that the foetal heart had fallen from 130 to 112, and had also become reduced in strength: seeing that there was no time to be lost, I passed up one blade of the forceps, and, using it as an extractor, speedily brought the

head through the vulva; but before this was effected I felt it revolving in the pelvis,—changing, in fact, from the fourth into the first position, in which manner it cleared the outlet. The child was still-born, but after some little trouble was perfectly resuscitated; it only survived a few days, however.

This case requires little or no comment. In thirty-five minutes from the first dose, although no active pains were produced, the stethoscopic indications shewed the imminent danger of the child; and the result proved that, had delivery been deferred for some minutes longer, its life would, in all probability, have been forfeited.

CASE II.—It was this woman's fourth child. She was of a delicate, spare habit; and had been in labour for nearly fifty hours; but for the last eight before my seeing her there was a complete suspension of uterine action. Except being very weak and enfeebled, there was no other unfavourable symptom present. The head was low down in a very capacious pelvis, and the foetal heart was loud and distinct. After trying the effect of change of position, stimulating enemata, &c., for a couple of hours, without deriving any benefit, I determined upon giving her the ergot of rye. She got two doses of the medicine, of the same strength as in the former case, at an interval of forty minutes. The second one produced some slight pains; and in twenty minutes after its administration (i. e. exactly an hour from the first dose) I found the foetal pulsations beginning to fail in frequency, and to get feeble; so, as no advance whatever had been made, I at once passed up the pubic blade of the forceps, and with ease extracted the head of a living female child.

In this instance, delivery was effected upon the first indication of any injurious influence being produced by the ergot on the child.

CASE III.—A woman, aged 30, came into the Lying-in Hospital, December 18th, 1843, to be confined of her third child. Her labour progressed favourably, though slowly, until

the head began to press on the perinæum, when the pains became inefficient, and during several hours no advance whatever was made. A dose of ergot was now given; the foetal heart then beating 160, and very distinctly. In thirty minutes after the dose, the heart's sounds had lost much of their clearness, and as the uterine action was not at all increased, a second dose of the medicine was exhibited. Within ten minutes after this (and forty from the time of the first dose) we found the foetal heart still further reduced in strength and frequency. Under these circumstances it was deemed advisable to accomplish delivery as speedily as possible, there being no prospect of this being effected by the pains. The forceps, therefore, was applied, and a female child extracted in a state bordering on asphyxia, out of which it was recovered after some little exertion.

Were it necessary I could greatly multiply the number of instances of this kind, in which, after the exhibition of *secale cornutum*, the stethoscope was employed as an exponent of the degree of danger to the child. It will be perceived from the above cases that the changes in the foetal heart's sounds, which may be regarded as indicating the child's danger, are, a failure in strength, and a diminution in rapidity; and at a more advanced period, irregularity or intermission. Dr. Hardy thinks "that in those cases where the number of the pulsations have been steadily reduced below 110, and, at the same time, with intermissions, the child will be rarely, if ever, saved, although its delivery should be effected with the greatest possible speed."^(a)

I would here digress a moment to observe, that the contemplation of such cases as the above has led Dr. Johnson to form an aphorism respecting the employment of ergot, viz.: that since it is always apt to exert a poisonous influence upon the child, and this too within a short period after its administration, it is most desirable that the employment of the forceps be

(a) Dublin Med. Jour. vol. xxvii. p. 227.

practicable at the time of resorting to the use of the medicine. There can be no possible doubt but that this condition is one whose presence is much to be wished for in those cases of tedious labour where ergot is had recourse to: at the same time be it remarked, that there are other cases of this class in which the remedy may be advantageously used, as I have had many opportunities of seeing, in the practice of the Lying-in Hospital. If we compare the effects produced by ergot of rye, and by difficult labour, on the foetal heart, I think that this difference will generally be found to exist,—that the latter occasions a rise in the frequency of its pulsations, whilst, under the influence of ergot, an opposite effect is almost invariably observed, as was noticed in each of the foregoing cases. It is a remarkable coincidence that the same depressing effect is very constantly produced by this medicine on the maternal circulation.

Let us now turn to another class of cases where the use of the stethoscope may be rendered available in making a diagnosis, and, consequently, influence the prognosis and practice. It is a well-established fact that in ruptures of the uterus the child almost invariably perishes, and this too within a very limited space of time after the occurrence of the accident. I am aware that Dr. Burns has stated an opposite opinion, but upon what grounds I cannot say, as he has given no case where a living child was extracted by the forceps after laceration of the uterus. I only know of two well-authenticated instances(*a*) where a foetus was born alive after this accident

(*a*) Since writing the above, I have seen the following very brief notice of a case where the child was born alive after a tear of the cervix. “Dr. Thompson mentioned the case of a woman whose labour was brought on by a fall in the eighth month of her first pregnancy. When he saw her the waters had been away thirty-six hours; the pains were very strong; the os dilated to the size of a shilling, very rigid, and the breech presenting. While he was making an examination he felt the cervix tear under his fingers, the fissure running to the left side. The child was alive within twenty minutes.”—*Ed. Monthly Jour. of Med. Science*, April, 1847. To be complete, this case re-

had occurred. These are recorded by Dr. Collins(a), and I think they may almost be regarded as the exceptions which prove the rule: for in one of them the uterus burst during the delivery of a child by the feet, on account of placenta prævia; and in the other there was merely a small portion of the muscular structure of the organ rubbed away by the attrition of the child's head in a tedious labour, and no unfavourable symptom shewed itself until the fifth day. In the first of these instances there could only have been an interval of one or two minutes from the moment of the laceration till the birth of the child; whilst the second case is scarcely deserving of the name of rupture, as the bare possibility of such existing was not suspected, and no untoward symptom whatever manifested itself till after the fourth day. We cannot fairly, then, regard these cases as militating against the rule already stated, "that the child dies within a very short period after the occurrence of the accident." A knowledge of this fact at once suggests the employment of the stethoscope as a source of diagnostic information in doubtful cases of ruptured uterus; but it is more particularly valuable in distinguishing some other accidents and complications from this graver one, with which they may be confounded from their possessing many symptoms in common. To explain this more clearly, I shall briefly narrate the particulars of three of these cases, each of which occurred in the Lying-in Hospital, under the observation of many witnesses. For permission to cite these cases I must here express the sense of obligation I am under to Dr. Johnson, under whose immediate observation the facts of each of them passed.

CASE IV.—A woman, aged 34, was admitted in labour of her seventh child, December 9th, 1844. Two of her children had been dead-born at the full time. Matters progressed slowly, so that six or seven hours were consumed in the first stage of

quires to have the result stated, and the extent of the laceration more minutely described.

(a) Op. cit.

her labour. Two hours after this she began to vomit in large quantities a dark-coloured fluid, precisely resembling coffee-grounds; and the pains, from having been strong and regular, became weak and transient, and then ceased altogether. Her other symptoms at this time were the following: the pulse was feeble, and rather accelerated; the foetal head was high up, just at the pelvic brim, and she herself was desponding and full of gloomy apprehensions as to the result of her illness. I need hardly say that such a group of symptoms, occurring in a seventh labour, was sufficiently formidable, and well calculated to create the impression that some of the structures of the uterus had given way. Upon exploring with the stethoscope, however, we were much gratified at finding the foetal heart pulsating with its usual strength and frequency, and, in fact, possessing its normal characters. Relying in a great measure upon the correctness of this indication (of the non-existence of rupture), no active interference was had recourse to, and after eighteen hours of nearly complete suspension of uterine action, the pains recommenced, and she gave birth to a strong and healthy female child. This patient recovered slowly, but perfectly, and was discharged from the hospital on the fourteenth day.

In this instance the great practical question was, whether any laceration had taken place or not, as, if it had, every moment's delay in delivering her took so much from the chance of her recovery. I have mentioned that on this question a negative conclusion was come to, chiefly from the fact of the foetal heart's pulsations continuing unaltered, and the sequel of the case fully confirmed the diagnosis.

CASE V.—In this case the labour was rendered difficult, in consequence of the existence of a firm band at the upper part of the vaginal canal, the result of inflammation and sloughing in her previous confinement. Some time after the full dilatation of the os uteri, the pains, which had been exceedingly violent, abruptly ceased, a discharge of blood took place from the va-

gina, the pulse fell, and the woman became weak, and vomited. On examination it was found, that not only had the band given way, but also that the head (which was presenting) had perceptibly receded. This combination of symptoms excited strong fears that some laceration of the cervix uteri had taken place, a complication, I may remark, much to be apprehended in such cases as this, and of which Dr. Collins' fourth case furnishes a good example(a). Upon making an auscultatory examination, however, the foetal cardiac sounds were distinctly audible, and possessed their ordinary characters; and from this circumstance mainly it was inferred that the uterus was not implicated in the laceration, which opinion was verified by the result. The foetal heart subsequently ceased, though not for several hours, and then apparently in consequence of the duration of the labour. She was ultimately delivered with the perforator and crotchet; when it was discovered that the tear extended completely through the vagina into the rectum, but did not engage the os or cervix uteri. This woman recovered, and bore children afterwards.

No comment is necessary upon this case, as it speaks for itself, and shews, in a strong light, the value of the diagnostic at present under consideration. I would beg leave to draw attention to the interesting fact of the foetal heart being unaffected by an extra-uterine laceration so great as to rend a strong cicatrix, and throw the cavities of the rectum and vagina into one. These cases, which might be multiplied if our space permitted, will, I trust, be sufficient to shew the nature and extent of the diagnostic information derivable from auscultation in all instances of a similar kind.

CASE VI.—The subject of this case was a healthy young woman, who was admitted into the Lying-in Hospital, September 29th, 1845, in labour of her second child. At five o'clock, P. M., the os uteri was fully dilated, the membranes ruptured, and the pains moderate. At eight o'clock I examined

(a) Op. cit., p. 297.

her with the stethoscope, and heard the foetal heart in the left iliac region; at this time she was going on most favourably in every respect. At ten o'clock Dr. Hardy, my coadjutor, and I were hastily summoned to the ward in consequence of a sudden alteration in her appearance. We found her extremely faint; the pulse feeble and rapid; the pains very slight; and the child's head seemed to have somewhat receded. The most careful exploration with the stethoscope now utterly failed to detect the sounds of the foetal heart. From this combination of symptoms it was concluded that the uterus had given way, and the treatment was regulated accordingly. This poor woman died in thirty-one hours after delivery, and dissection revealed an extensive rent on the left side of the cervix uteri, involving all its textures, but not implicating the vagina. I have adduced this case chiefly to shew how soon the child may be destroyed by rupture of the uterus, as there was no great difficulty in the diagnosis. In Dr. Collins' thirty-first case (p. 267) the same fact was proved in a manner equally demonstrative, for the foetal heart had ceased to be audible within ten minutes after the occurrence of the laceration.

In the histories of the three cases just related I have been as brief as possible, and have almost solely confined myself to those points which had reference to our present subject.

In the management of labours complicated with convulsions it is often of importance to know whether the child be alive or dead, and the stethoscope may occasionally be of service in deciding this point. The principles of diagnosis here are, of course, the same as in tedious labours, but I must confess that the jactitation and restlessness so common with these patients generally proves a very great or insuperable obstacle to making any satisfactory auricular examination. When a woman is seized with convulsions at the seventh or eighth month of pregnancy, and that the attack is subdued without the immediate supervention of labour, we shall be anxiously asked by the patient and her friends, whether the child has

been destroyed, and whether gestation is likely to proceed undisturbed. Now these, to a certain extent, are important questions, and the latter of them cannot well be answered without knowing the solution of the former; for if the child be alive, there is every probability that she will go to the full term (unless, indeed, the convulsions should recur), whereas, if the child be dead, we may pretty confidently expect labour to come on within ten days or a fortnight^(a).

I have now mentioned the chief occasions on which we have found auscultation of the foetal heart to be of service in the treatment of labours; it yet remains for me to make a few practical observations regarding the placental soufflet, and the use of the stethoscope with still-born children.

It has been asserted that, after the death of the foetus, the placental soufflet either ceases altogether, or undergoes a change of character recognisable by the ear of a practised auscultator. It is very much to be wished that such were the case, as then we should be in possession of a *positive* sign of the child's death. But candour obliges me to confess, that after making innumerable trials, and having bestowed considerable attention on the point, I have never yet been able to detect any peculiarity in the *bruit placentaire*, by which I could be led, in the remotest manner, to suspect that the child was dead. Nægèlé, in his treatise upon "Obstetric Auscultation" (translated by West), has also expressed himself to the same effect. So far as my experience enables me to judge, the only useful information it is capable of affording (independent of its evidence of the existence of pregnancy), is in those cases of flooding before delivery, in which we cannot ascertain by the

(a) There seems to be a curious law of the animal economy by which it is ordained that, after the death of the foetus, the uterus should not take on expulsive action for ten or twelve days, or sometimes a fortnight. How to explain this I am quite at a loss; but, from very extensive observation, I am satisfied of its general correctness. It was first remarked to me by Dr. Johnson, and I am not aware that any author has taken notice of it.

usual means the exact nature of the hæmorrhage: in other words, whether it be accidental or unavoidable. Under these circumstances, the use of the stethoscope, by acquainting us with the site of the placental attachment, may, as Nægèlé says, dispel all the obscurity of the case. Examples of this doubtful kind are certainly not common, but, on a few such occasions, I have seen the stethoscope advantageously employed; and Dr. Churchill informs me, that, under similar circumstances, he has used it with a like satisfactory result. This decisive evidence is not always to be expected, however, for the placental murmur may not be heard at all, though this is extremely rare; or it may be heard in such a locality as would still leave it uncertain whether the placenta was presenting or not; nevertheless, in all doubtful instances, its careful employment should never be omitted.

M. Stoltz (of Strasburgh) has described a uterine sound, which he only observed when the child was dead, and which he attributes to the decomposition of the liquor amnii. He characterizes it as "*un bruissement sourd et irregulier, comme un bruit,*" &c.(b) This sound, or any thing approaching to it, I have never heard.

Nægèlé noticed, in some few cases of hæmorrhage from presentation of the placenta, a singular peculiarity in the character of the soufflet. "The sound," he says, "was of ordinary intensity in the inguinal regions, but extended thence over the whole uterus, and even the smaller ramifications seemed to concur in its production."(c) This I never observed, though on several occasions I auscultated the uterus during, as well as before and after attacks of hæmorrhage depending on the implantation of the placenta over the os uteri.

Dr. Kennedy has attached a high value to the use of the stethoscope, for the certainty with which it enables us to pronounce upon the actual condition of still-born children; and we entirely concur in the truth and importance of his remarks

(b) Cazeaux, *Traité de l'Art des Accouchements.* (c) Op. cit.

upon this subject; for we have seen many children resuscitated, with whom *the pulsations of the heart, as detected by mediate auscultation*, had been the only proof of lingering vitality at the time of delivery. What the effect of such evidence should be on the physician's conduct I need not say; but it would undoubtedly prove a source of much encouragement under circumstances otherwise apparently hopeless, and at a time when he must be oppressed with the consciousness that the result of his endeavours is looked forward to with the most intense anxiety and solicitude. In thus viewing the heart's sounds as furnishing the latest proof of the existence of the vital principle, it forcibly reminds us of Harvey's celebrated dictum respecting the circulation, "*primum vivens, ultimum moriens.*"

We have seen many infants restored to animation, in whom respiration was for a long time suspended, yet we never saw a single instance where the slightest symptom of vitality could be produced, if the heart's pulsations had ceased to be audible when the child was born, which is only what might have been expected. I think it may be safely asserted, that, had the stethoscope been used, no such accident could ever have happened, as a doctor ordering a child to be removed as dead, which afterwards reanimated without any assistance.

In some still-born children the pulse was so low as 55, but by prompt and judicious means animation was restored, whilst in other instances I have seen the pulse rise from this low rate to upwards of 100, under the employment of artificial respiration, &c., but as soon as this was stopped, the velocity of the circulation would quickly diminish, again to become accelerated on inflating the lungs; and thus I have seen matters go on alternating for two hours and upwards, and yet the great object of our exertions not be ultimately attained. Such cases as these (of which I have witnessed many) are but repetitions of the celebrated experiments of Vesalius, Hooke, and Brodie, by which they demonstrated that artificial respiration

could keep up the circulation for a long period after animal life had been completely destroyed.

I shall now briefly sum up, in the form of aphorisms, the chief points of practical interest contained in the preceding memoir, first reminding the reader that upon each point I only speak with that degree of confidence which my personal experience and observation warrant.

1. Where the foetus is alive, the sounds of its heart may be always detected at some period of the labour, by any one of ordinary proficiency in obstetric auscultation.

2. The precise region of the abdomen in which the foetal heart is heard, affords auxiliary evidence of the position of the child *in utero*, but can never be relied on alone for determining this point, or supersede the necessity for vaginal examination.

3. In presentations of the lower extremities, whether it be breech, foot, or knee, the foetal heart is usually heard most distinctly in the vicinity of the umbilicus of the mother.

4. Conclusive auricular evidence of the existence of twins *in utero* is only to be drawn from the inequality in the number of the beats of the two foetal hearts, and not merely from any difference as to their respective positions.

5. If, in the course of a tedious or difficult labour, the foetal cardiac sounds, from having been distinct and clear, gradually become feeble and obscure, and ultimately inaudible, even with every precaution against deception; under these circumstances, their absence is entitled to rank as positive evidence of the child's death; but without the previous successive examinations this conclusion would be destitute of any positive character.

6. In cases where ergot of rye has been given to hasten delivery, auscultation of the foetal heart is the only certain way by which we can know when the medicine is commencing to exert an injurious influence upon the child; consequently the stethoscopic indications are alone entitled to confidence for

determining the exact time when the state of the foetus calls for and justifies interference.

7. In cases simulating rupture of the uterus, the persistence of the foetal heart's sound is a strong proof against the occurrence of the accident, and the more advanced the period at which they are audible after the setting in of bad symptoms, the more conclusive is the evidence that rupture has not taken place; whilst, on the other hand, the sudden cessation of the foetal pulsations, where they had been distinctly audible a short time previously, would strongly corroborate other existing symptoms of laceration of the uterus.

8. After an attack of puerperal convulsions in the seventh or eighth month of pregnancy, where labour has not immediately supervened, the prognosis should be very much regulated by the state of the foetus; for if it be proved by the stethoscope that the child is alive, we may venture to hope that gestation will go on undisturbed (unless the convulsions recur); whereas, if the child has been destroyed, its expulsion will take place, most probably, in ten or fourteen days from the date of the convulsive attack.

9. No certain conclusion regarding the state of the foetus can be drawn from the characters of the placental soufflet.

10. In cases of flooding before delivery, observation of the placental bruit may supply useful diagnostic information, by pointing out the part of the uterus to which the after-birth is attached, and thereby shewing whether the hæmorrhage be accidental or unavoidable.

11. Auscultation of the heart in still-born children more accurately acquaints us with the state of the child's vital powers, than any other source of information, and is, therefore, well deserving of employment in all such cases.