

truth, the character of the student of medicine may be inferred. Appreciation of the laws of nature as a whole; nothing too large for study nor too small for inquiry in the domain of physics or in any organisms; just perception of the relation of literature to observation; subordination of everything to the end of healing or preventing or mitigating disease; may be stated as the cardinal lessons to be learnt from these men.

Yet some student may say, what men were these? What have their examples to do with me? Not so. It is a question only of how we use the talents we have; the five, the two, or the one; we all have the spirit of these men, or we have it not. Either we are students at heart, or the aim of the student is unknown.

May I venture on but a few words of direct advice to the younger learner; they relate still to the student's character rather than to the work on which he is engaged. All these men were at once self-reliant and modest. It is for you to be the same. For this end, Have faith in your own souls; that you will do your best with such as you have, and in such a lot as you may be cast in: Have faith in other men, especially in your teachers, who know your difficulties, which themselves have surmounted, and, by teaching, give earnest of their desire to help you through: Have faith in the eternal order of things; that order by which we students can alone grope our way along the intricate path of which we hardly see but the edge; that order which is evidence of Him who made it.

It is by such faith that you will succeed. You will succeed, not by seeking directly the learning of Haller, the grasp of Hunter, the comprehensive research of Boerhaave, the practical goodness of Alison; but by doing in trust that which is set before you to be done, and by keeping the student heart whole and pure to the end.

I have not consulted your committee whether it would be acceptable to them that you should separate to-day without any allusion on the part of the chairman to the loss which all students have, during this last session, sustained. But I know there is one feeling that thrills through the hearts of all earnest students that the chief and head of them in this empire is taken away. It was to us all no small thing that by the side of our Queen there lived a Scholar Nature, interested in all student work that was worth the name, and in a special manner in the work of the student of Nature. To us it was no small thing that every sign of progress in science, every advance in our struggle against disease, every improvement in the lot of mankind, was welcomed by him, was neither unobserved nor unappreciated. I say no more. The influence that high nature has brought has cheered you, will cheer you; do not think that though himself is gone, the light he kindled and the help he gave is to pass away. For many years to come, let us say it thankfully, he has made more precious in England the aim and character of the Student in every Science, and of the Worker in every Art.

GENERAL McLELLAN ON DRUNKENNESS IN THE ARMY. The General-in-Chief says, in returning the unsatisfactory finding of a court-martial in which drunkenness was made a palliation for breach of discipline:—"No one evil agent so much obstructs this army in its progress to that condition which will enable it to accomplish all that true soldiers can, as the degrading vice of drunkenness. It is the cause of by far the greater part of the disorders which are examined by courts-martial. It is impossible to estimate the benefits that would accrue to the service from the adoption of a resolution on the part of the officers to set their men an example of total abstinence from intoxicating drinks. It would be worth fifty-thousand men to the armies of the United States.

## SOME OBSERVATIONS ON APNŒA NEONATORUM.\*

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THE condition of the vital functions of the fœtus during labour, and of the newly-born child in the interval which often occurs between birth and the full establishment of respiration, has not hitherto, in this country at least, received the attention which, both in a theoretical and practical point of view, it appears to merit.

In the following remarks, an attempt will be made to reduce into a consistent theory the facts, bearing on this interesting subject, of which we are already in possession; to point out the true significance of some phenomena hitherto scarcely understood; and to deduce rules of practice more in accordance with the present state of knowledge of the physiology of gestation, than the too often traditional, and, in some respects, unscientific instructions contained in the standard treatises on midwifery.

The consideration of the subject will be most advantageously commenced by a reference to the state of infants apparently still-born.

The phenomena observed in children who do not respire immediately on birth are not invariably the same. In one class of instances, the surface of the body is pale, and, if uncovered, speedily becomes cool, the child lies motionless in any position in which it may have been placed, and it is so nearly lifeless that the pulsation of the funis has entirely ceased, and the beating of the heart can scarcely, if at all, be felt.

In another class, there are the same external phenomena; but the pulsation of the cord, although weak and very much slower than before the commencement of labour, or after respiration, is still quite perceptible.

In a third class, the pulsation of the cord, although sometimes, but by no means always, slow, is, at first, tolerably strong, and the surface is rather blue than pale, the face and neck especially are livid and swollen, and the eyes, instead of being closed, as in the two other classes, are often widely open.

In other words, the infant may be in a state of asthenia or syncope, in one of simple apnœa, or in a partially apoplectic or comatose condition.

These various states have, of course, originated under different circumstances. That of syncope has been ascribed to anæmia arising from defective nutrition, or from a loss of a portion of the blood previously circulating in the child's body, in consequence of uterine hæmorrhage preceding or accompanying labour. It has also been referred to hæmorrhage from the infant into the placenta. The first of these alleged causes has, probably, sometimes been in operation; but, as for the second, it is manifestly impossible that, while the cord and the fetal portion of the placenta remain entire, any amount of uterine hæmorrhage which can occur during labour can affect the quantity of blood in the body of the child, although it may seriously influence its quality. Repeated observations have shown that, when the mother has had profuse and even fatal flooding, the heart and larger vessels of the infant are found forged with blood. (*Vide* Dr. Evory Kennedy *On Obstetric Auscultation*, pp. 94-96.) The third supposition will be shown to be equally untenable.

The two first named states, therefore, of asthenia or syncope, and of apnœa or delayed respiration, differ in degree only, and are essentially more or less complete degrees of asphyxia, using that word in its true signifi-

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cation of pulselessness; and, further, they depend on one cause; namely, the more or less prolonged interruption to that intercommunication between the organisms of the mother and the fœtus, which is the efficient agent in the maintenance of fetal life.

The third condition, that of congestive apoplexy, is essentially different. It is found only, I believe, in cases in which respiration, having been to some extent performed, has been suspended. Thus, if, after the birth of the head, some delay takes place in the delivery of the shoulders, the child makes futile efforts to expand the chest, while its walls are compressed by the parts of the mother. The same occurs in a breech-presentation, in which the head remains for two or three minutes in the vagina after the birth of the trunk, and in which position it is quite possible, during the intervals between the pains for a little air to reach the child's mouth. In both these instances, incompletely as breathing has been performed, it has yet been sufficiently so to give rise to the phenomena of genuine suffocation.

It is quite unnecessary, for the purposes of this paper, to enter at all minutely into the consideration of the conditions of fetal life, or the structure and functions of the placenta. It is sufficient to recal the fact that that organ has a double function; that by means of it the nutrient fluid is supplied by which the tissues of the fœtus are built up; and that, in its vessels, the blood of the fœtus is brought into such relations with the arterial blood of the mother as to undergo changes identical with those which, in the air-breathing animal, are performed by the atmosphere, and in the fish, by the water which bathes its gills. Hence, if the functions of the placenta, or its communication with the body of the fœtus, be more or less completely, or for a longer or shorter time suspended, the little being is, to the same extent, placed in the predicament of an animal deprived both of food and air.

We may dismiss from our thoughts, the effects of the privation of nutriment, and limit our attention to the consequences of the suspension of the breathing function of the placenta. This suspension may, while the child is still unborn, be effected in various ways.

1. If the blood of the mother be not duly arterialised it cannot produce the vitalising changes in that of her offspring; and, therefore, the latter must suffer in the course of those diseases which materially interfere with the respiration of the parent, and in a degree proportioned to their severity.

2. If, by any cause capable of producing syncope, such as great loss of blood, or severe accident causing a great shock to the nervous system, the force of the maternal circulation is greatly weakened, the blood is not sent to the uterine arteries in quantity sufficient to effect the necessary changes in the fetal blood. Early and extensive separation of the placenta, although attended with serious hæmorrhage, acts in a different way.

3. Another mode of production of the effect in question is by interruption to the circulation through the umbilical cord. This, of course, most frequently arises during labour; but as it is then complicated with other agencies, its effects, at that time, may, for the moment, be left out of consideration.

Before labour, however, at any time after the formation of the placenta, the communication between it and the body of the fœtus may be stopped by causes acting solely on the funis. A knot on the cord is one of these; such a knot sometimes includes a limb of the embryo; and, in a case which some years since occurred to myself, the funis was so tightly tied round the neck of the fœtus as to cause miscarriage in the sixth month. Excessive œdema of the funis is another cause occasionally fatal. I, some time since, exhibited to the section a fœtus, born dead at six months, which presented appearances hitherto, I believe, undescribed. The cord, in other respects normal, was at three points twisted upon itself so

tightly, as to diminish its circumference by four-fifths, and of course to close its vessels.

4. There is, lastly, a mode in which the breathing function of the placenta may be more or less impeded, different from any of these, and which has not, hitherto, received the attention it merits. The blood, sent from the heart of the mother, may be of good quality, fully charged with oxygen; the uterine vessels may receive their full share of it; the umbilical cord may be pervious throughout its whole extent; and yet the blood of the fœtus may cease to undergo the changes essential to the full activity of its life, and the force of its circulation may, in consequence, be much weakened, and its pulse sink to half its usual rate of frequency.

The suspension of the respiratory office of the placenta in the three first of these modes, being continued, is usually fatal to the fœtus; but that produced in the last named mode, occurring, as it does, during labour, and being dependant on the contractions of the uterus, is, like its cause, intermittent, and does not usually go beyond a lowering of the vital activity, and a weakening and retardation of the pulse of the fœtus, while the cause is in operation.

A variation in the strength and frequency of the fetal circulation has been referred to by several writers. The earliest allusion to it which I have met with is in Dr. Evory Kennedy's treatise on *Obstetric Auscultation*, already quoted. At page 95, he mentions an instance in which, as the result of excessive uterine hæmorrhage, the fetal heart was ascertained, by the stethoscope, to be beating at the rate of 88 in the minute.

Independently of maternal hæmorrhage, he alludes at p. 91, and again at p. 249, to the same or a greater degree of slowness of the fetal pulse as the result of uterine action.

The most distinct references to the phenomenon in question which I have found in any published work, occur in the *Practical Observations on Midwifery*, by the late Dr. James Hamilton of Edinburgh.

The appendix to Part I contains a report by Dr. Moir, of experiments with the stethoscope, and otherwise, on the action of the fetal heart; and cases are cited, in which, by means of the hand, introduced for the purpose of turning, as well as by auscultation, its pulsations were ascertained to be, during the pains, from 70 to 90 in the minute.

"On the recurrence, and during the continuance of the pains," says the reporter, "the pulsations invariably diminished in frequency; but gradually accelerated as the pains went off, and continued so during the interval." (Part I, p. 310.)

Again, in the Appendix to Part II, a letter is given from Dr. Sidey, who had in four cases counted the pulsations of the cord with the hand in the uterus, and found them to be only 60 per minute.

The most interesting remarks are, however, those of Dr. Hamilton himself. They are made with the intention of disproving the statements of Dr. Evory Kennedy as to the utility of obstetric auscultation, which, it need not be said, they do not disprove.

"Almost half a century has elapsed since he" (Dr. Hamilton) "remarked that in infants who did not breathe upon birth, but in whom the pulsations of the cord continued, the action of the heart did not exceed sixty pulsations in the minute until breathing took place, when it became so frequent that it could not be counted. This led him to take every opportunity (when he had occasion to introduce his hand into the uterus to extract the fœtus) to endeavour to ascertain the action of the fetal heart before the birth, and he has in no instance ever discovered it to be more frequent than in the still-born infant whose cord beats; and it has been confirmed in these fifteen years incidentally by several foreign authors."

Dr. Hamilton then refers to three or four instances

in which protrusion of the funis took place before delivery, and in each of which he found its pulsations not to exceed 60. Commenting on these observations, he remarks:

"There is such a discrepancy between the experience of those who have applied the stethoscope to ascertain the state of the gravid uterus, and that of the author, respecting the action of the heart of the fœtus *in utero*, that he cannot divest himself of the impression that there is some fallacy on that point." (Pp. 155, *et seq.*)

A fallacy undoubtedly there was, and a gross one; but it was on the part of the learned and ingenious, but very prejudiced professor himself. It consisted in confounding the state of the placental and fetal circulation during labour, or immediately after delivery, with that existing before the commencement of uterine contractions. Dr. Moir, on whose experiments Dr. Hamilton in part relies, correctly attributes the retardation of the fœtal circulation to the contractions of the uterus; but incorrectly (as I hope to prove) refers the phenomenon to the pressure on the child's brain.

One of the foreign authors to whom Dr. Hamilton referred was probably the late M. Moreau. In his *Practical Treatise on Midwifery* (American edition, p. 104), Moreau refers to the modifications which the uterine and fetal circulation undergo during labour, but without giving them their true significance. Dr. Edward Rigby, at page 98 of his *System of Midwifery*, quotes from *Die Geburtshülftliche Exploration* of Dr. A. T. Hohl some interesting observations on the variations of the *tone* of the uterine sounds during labour; but, although Hohl says that the sounds at the height of the pains become dull and even inaudible, he does not appear to have noticed any diminution in frequency of the pulsations of the fœtal heart.

Dr. F. Ramsbotham, in the fourth edition of his *Obstetric Medicine and Surgery* (p. 81), tells us that the rate of circulation in the fœtus "differs much in different individuals, and in the same individual at different times"; and that it "is greatly influenced not only by causes existing within its own system, but by accidental circumstances affecting the mother, and external agencies to which her person may be exposed". He does not, however, specially refer to the uterine contractions as among the causes of the variations alluded to.

One other notice of this interesting but hitherto too much neglected subject I have met with in the number for November 1861 of the *Monatschrift für Geburtskunde und Frauenkrankheiten*. It is in the report of a discussion which followed the reading of a paper on the increased frequency of the fetal pulse accompanying various febrile affections of the mother. The question arose incidentally, whether, during tedious labour, the pulse of the fœtus is retarded or accelerated. One speaker correctly maintained that it is retarded, while others asserted the contrary. All admitted the uncertainty which invests the question, from the difficulty of counting the pulse by means of the stethoscope during the pains; but it does not appear to have occurred to any of them to avoid this difficulty by counting with the hand introduced into the uterus for the purpose of correcting the position of the child.

That the facts have been accurately stated by Drs. Kennedy, Hamilton, Moir, and Sidey, there can, however, be no doubt; and I am happy in being able to confirm their statements by living authority. Dr. Charles Clay, of this city, author of many valuable contributions to obstetric science, in a letter with which he has favoured me, says that, having been a pupil of Dr. Hamilton, his attention was early called to the subject of the lowering of the fetal pulse during labour. He adds that, in the course of his experience, he has frequently observed a reduction of its frequency during the pains by at least a third of its normal rate. Dr. Clay further tells me that, in the manuscript notes which he

possesses of the lectures of the late Mr. Kinder Wood of this city, he finds "the same statement".

I may add, that I have myself also observed the phenomenon. It is by no means easy with the stethoscope to count the pulsations of the fetal heart during labour; but, in a case recently attended, I distinctly heard the pulsations, during the pains, sink from 140 to 95, rising again as the pains went off.

The diminution of the frequency of the fetal pulse during the pains of labour, to the extent of a third or even of one-half, may therefore, I presume, be accepted as an ascertained fact. Taken in connexion with its cause, it will be found to throw light on some hitherto ill-understood phenomena. But what is that cause? It will at once be admitted that it is a cause which, operating with more than ordinary force, must be the chief agent in producing still birth. That event, when not manifestly dependent on immaturity or disease in the fœtus, has usually been ascribed to the pressure which the fœtus undergoes during labour. As to the exact mode of action of that pressure, various opinions have been held. It has been assumed that its action was on the chest or on the head. But it is difficult to believe that the heart and larger vessels, protected as they are by the bony walls of the thorax, can, except in cases of transverse presentation, receive such pressure as seriously to impede the flow of blood through them. Still less can we believe that the head, however it may be compressed while passing through the pelvis, can sustain any injurious pressure while still above the brim.

Compression of the placenta between the uterus and the body of the child, to an extent capable of arresting the circulation of the blood through the placental vessels and the funis, has also been supposed to be a cause of the phenomenon in question. It may probably occasionally conduce to the result, but only as subsidiary to another cause which I believe to be the main agent in producing the temporary lowering of the vital activity of the fœtus occurring in every labour, and capable, if too long or too unremittingly applied, of producing death of the fœtus *in utero*. That cause is the obstruction, by even the earliest contractions of the uterine fibres, of the flow of blood through the ultimate ramifications of the uterine blood-vessels—the "curling arteries" of Hunter. I am not aware that the temporary closure of these arteries by the uterine contractions has been specially noticed by any writer; but it is difficult not to believe, not only that it must occur, but also that their peculiar spiral arrangement has been given to make them more susceptible of the influence of the contractions of the tissues which they permeate. These vessels furnish the fresh supplies of vital fluid by which the blood contained in the sinuses of the maternal placenta is maintained of a normal degree of purity, and capable of effecting the due changes in the fetal blood contained in the placental tufts, which are bathed in it as the gills of the fish in water. If the blood in the sinuses becomes venous, that in the placental tufts remains unchanged. Like the blood in the pulmonary capillaries when the air is not admitted into the air-cells, the fetal blood, under the circumstances supposed, at first moves more slowly through the placental capillaries, and then stagnates altogether. The current through the umbilical arteries is in consequence arrested. The blood, which through them ought to leave the circulating system of the fœtus, is thrown back on the descending aorta, on its arch, and ultimately on the ventricles of the heart, from both of which it arises, and which, in consequence, become congested. At the same time, the current through the umbilical vein having, in like manner, ceased to flow, the inferior vena cava no longer brings the fresh supplies of arterial blood into the left ventricle, which, losing the stimulus of pure blood, has its powers for work weakened at the same time that the work to be

done has been enormously increased. As a consequence, its contractions become weaker and less frequent, and, unless the obstruction to the placental circulation be removed, finally cease altogether. Under the ordinary circumstances of the earlier stages of labour, the obstruction is removed by the cessation of the pain. The uterine arteries, having again become pervious, convey fresh blood to the sinuses. That contained in the placental tufts again undergoes the changes essential to vital activity; the capillaries forming the tufts recover their power of contractility; and the stream of life again flows freely through the arteries of the cord, to return by the vein. The heart, thus relieved of the load which oppressed it, and stimulated to increased efforts, acts with greater force and frequency, and the balance of circulation is restored. If, however, as in some very rapid labours, from the incessant, unresting character of the pains, the intervals of rest are not afforded, during which the equilibrium of circulation may be for a time restored, the child is born apparently or really inanimate.

In a more advanced stage of labour, when a part of the liquor amnii has been discharged, and the cavity of the uterus is in consequence much contracted, another cause comes into operation. The maternal surface of the placenta, being unable to adapt itself to the lessened superficies of the uterine cavity, becomes to a greater or less extent detached; and thus the communication between the uterine arteries and the placenta is to the same extent not merely suspended, but permanently broken. In one class of cases—those, viz., of placenta prævia—the same event occurs at the very commencement of labour; and the child is consequently, in a large proportion of such cases, born dead.

[To be continued.]

**COMPULSORY VACCINATION.** The New York Sanitary Association has had under discussion the subject of compulsory vaccination. The results of its deliberations are embodied in the following resolutions. This Association, after mature deliberation, has become convinced that vaccination, and revaccination as often as every seven years, is necessary to protect this community against small-pox, therefore, resolved, That in the judgment of this Association, further legislation is imperatively required to secure a more general and effective vaccination, but so framed as to avoid offensive compulsion if possible. That, in the opinion of this Association, the Board of Education, or the Legislature, or whatever body is necessary, ought to pass and enforce an ordinance prohibiting the attendance in all the schools receiving any part of the public moneys of any children who have not been well vaccinated, or variolated within seven years, or who cannot show a valid certificate to that effect, giving the date of the vaccination or variolation. That, in the opinion of this Association, the Metropolitan Police Commission should cause all policemen, or others under their employ, to be vaccinated, or show a valid certificate or proof of vaccination or variolation within seven years. That measures should be taken for the passage of a law compelling the vaccination of every prisoner shortly before discharge. That, in the opinion of this Association, the Commissioners of Charities and Correction, as well as all other bodies having the care of the poor, should comply with the above rule in all institutions under them, and withhold all in or out door relief of any kind until vaccination is performed, or the dates of previous vaccination ascertained; and that the legislature should make the same a feature of all chartered institutions. That it should be made necessary that every person affected by the above ordinances shall be required to procure and preserve a vaccine certificate, properly filled out and dated. (*American Med. Times.*)

## British Medical Journal.

SATURDAY, JULY 5TH, 1862.

### FEMALE DOCTORS IN MEDICINE.

THE city of Edinburgh has been in a state of agitation during the last few weeks, in consequence of a spinster lady (as announced in the *JOURNAL*) having demanded admission to examination by the Royal College of Physicians of Edinburgh. The propriety and the impropriety of an Institution of Female Physicians have been warmly discussed by the good people of that city, if we may judge from the letters which appear in its daily press on the subject.

As is usual in such controversies, there are strong "reasons" offered on both sides of the question. Many advanced persons see in the fact of female doctors the perfection of our social system in its medical aspects. The existence of feminine Hippocrates is, in their eyes, just the article wanted to fill up a great deficiency experienced amongst certain representatives of our sick population. Modesty, real, honest female modesty, we are told, will often suffer deeply under the torture of disease rather than proclaim its sufferings to the ear of masculine medicine; whereas into the congenial bosom of a female doctor said modesty would have unhesitatingly poured out its tale of suffering, and have thus found early relief to its woes.

"Surely all must feel that it is only necessity and custom that at all reconcile us to the idea of females, young and unmarried, as well as others, consulting men-physicians in some cases."

Besides, why should there not be free trade in doctors, as in other articles of primary necessity?

"As things are now, ladies are compelled either to accept the services of male doctors, or to forego medical attendance altogether. But is this right and fair? Surely the choice should at least be free. No one should be forced to employ a woman; but, on the other hand, no one who prefers female attendance should be forced to resort to a man."

Inasmuch, therefore, as there is a demand—a positive want of female doctors—ought there not, on ordinary commercial principles, to be an adequate supply?

Then, again, it is argued or suggested, that the profession of maternity and domesticity at present assigned to woman is over-stocked, and that, therefore, the weaker sex—and especially the more strongly-minded of them—require a fresh field wherein to display, or rather exercise, their faculties. "Professions, as a means of livelihood, are greatly needed by educated women; at present, they can only be governesses or artists." And, as women have a natural