Contributions to midwifery. No. v, On the influence of ergot and rye on the foetus in utero / [Thomas Edward Beatty].

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PART I.

ORIGINAL COMMUNICATIONS.

ART. VII.—*Contributions to Midwifery*, No. V.—*On the Influence of Ergot of Rye on the Fœtus in Utero.* By THOMAS EDWARD BEATTY, M.D., M.R.I.A., Fellow of, and Professor of Midwifery to the Royal College of Surgeons in Ireland; Physician to the City of Dublin Hospital; Consulting Accoucheur to the South Eastern Lying-in Hospital; Vice-President of the Dublin Obstetrical Society; and Honorary Member of the Obstetrical Society of Edinburgh.

[Read before the Dublin Obstetrical Society.]

IT is not my intention on the present occasion to occupy the time of the Society by any very lengthened observations on the use of the ergot of rye; but I wish to lay before the members an account of some effects of this drug, which during an extentensive employment of it I have observed, and of which I have not been able to find any notice in the authors who have treated of the medicine. Since the revival of the use of the secale cor-

nutum by Dr. Stearns of New York, up to the present time, a variety of conflicting opinions have been entertained respecting its value as an obstetrical agent. Some authors of the highest repute have declared its utter inutility and incompetence to excite uterine action, no matter how eligible the circumstances, or how carefully the dose has been apportioned. Another class, of equally high character, is found to attribute the most rapid and energetic effects to its employment; so much so, as to lead to its denouncement as too violent an agent for obstetrical purposes, appearing to be injurious to the child at all times; its impression being destructively transmitted from the mother to the infant; in some instances even involving both in the same sacrifice. A third and numerous class of high authorities is recorded as maintaining an opinion equally at variance with the truth as the two preceding, viz. that the ergot may be always given with advantage, the safety of the mother or of the child being never endangered. It would be tedious and misplaced to quote the authorities above alluded to on the present occasion; and moreover it is unnecessary to do so, inasmuch as they will be found in Mr. Wright's elaborate and valuable prize essay on Ergot of Rye in the fifty-third volume of the Edinburgh Medical and Surgical Journal.

Viewing this discrepancy of opinion among authors of acknowledged celebrity, it becomes an object, not only of theoretical, but of practical interest, to endeavour to search out the cause or causes which have been instrumental in producing such an effect.

When we find such names as Chaussier, La Chapelle, Desormeaux, Gardien, and Capuron in the list of those who maintain the inertness of the secale cornutum, if we had not practical experience to the contrary, we would be inclined to bow to such high authority, and agree with the latter, that "it is a drug which it is requisite speedily to expunge from the list of the Materia Medica." But when we have witnessed the efficacy of the medicine in numerous instances, and find its character sub-

stantiated by the united experience of its many successful employers, we are disposed to look for some reason for its failure in the hands of the practitioners above mentioned. Two causes of such a failure may be suggested: first, the administration of the drug in inadequate doses; second, the inferior quality of that which was employed. It is not improbable that the French authors, whose names have been just mentioned, were disposed to use the ergot with great caution, owing to the circumstance of the drug being at that time considered in France and Switzerland as a highly noxious substance, and capable of producing fatal effects in those to whom it was administered. This may have led them to employ it in quantities too small to produce the desired effect upon the uterine fibres. But it is more likely that the second cause just alluded to may have led to the failure, for it is owing to investigations conducted more recently that we have become aware of the perishable nature of the medicine, and the readiness with which its peculiar virtues are destroyed. Ignorance of this fact may have led to the administration of the ergot in an inert condition, owing to its having been deteriorated by keeping. There is scarcely any medicine that spoils more quickly, and requires more care in its preservation, than the one under consideration; and even in the present day, with all the knowledge of its properties which we possess, I have reason to know that it is at times employed in a state in which it is utterly devoid of its peculiar properties, and completely inert as an obstetrical agent.

Some time ago I was in attendance on a lady at a short distance from this city, in whose case I wished to administer the ergot. Having recently used the dose, which I habitually carry about me, I sent a messenger to a very respectable apothecary living in the adjoining suburb, to whom I wrote a note, requesting that if he had any good and fresh ergot he would send me some, and if not that he would send on the messenger to my own house for it. In a short time the man returned with a paper from the apothecary, on opening which I found a black,

damp mass, more like wet turf-mould than any thing else. If I had used this in ignorance of its being spoiled, of course disappointment would have been the consequence, and my faith in the power of the drug would have been shaken.

The second objection, viz. that the ergot is at all times destructive to the life of the child, has probably arisen from the employment of the medicine at improper times. Thus recourse has been frequently had to its aid in cases of difficult labour arising from mechanical opposition to the exit of the child. In such a case the destruction of the infant is almost sure to follow, for the delay which necessarily occurs between the administration of the dose and the expulsion of the head is almost certain to produce fatal results.

In a former communication* I have stated that I consider a delay of two hours after the ergot has been taken, as sufficient to cause the death of the child. I will revert to this subject in a subsequent page, at present I will only observe, that persons who employed the drug under circumstances like these must have been led to form the opinion that it was highly dangerous to the life of the infant.

The third class of authors above alluded to have formed far too sweeping an opinion of the merits of this medicine, when they state that it may be always given with advantage; the safety of the mother or of the child being never endangered. This is a kind of praise most likely to do mischief, and damage the reputation of a valuable remedy, by inducing others to employ it under circumstances in which it is quite inadmissible.

From a very extensive use of the ergot I am quite prepared to maintain that none of the three opinions is correct, but that the truth lies between them. The medicine, when fresh, and carefully preserved, is in fact one of great energy, and influences not only the mother but also the infant. It requires to be used with great discretion, for while it will in one case effect the de-

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* Dublin Medical Journal, vol. xxi. p. 361.

livery of a living child, it will in another destroy the life of the child before birth, or operate so injuriously upon it as to cause its death shortly after it is born; or produce a peculiar effect on its nervous system which I have observed, and will presently describe, but which I do not find described in any work that I have perused.

The difference of effect upon the infant depends upon the length of time that intervenes between the administration of the dose to the mother and the conclusion of the labour. If this takes place quickly no mischief is done to the child; if it be alive when the medicine is taken, it will be born so; but if a delay of even two hours should occur, the probability is the child will be still-born. It is, I believe, generally imagined (and I entertained the opinion myself until lately) that the death of the child is owing to the kind of action excited in the uterus by the ergot, differing from the natural labour pain in this, that after the contraction of the uterus has been excited, no complete relaxation of its fibres takes place; there is an occasional increase in the strength of the effort, but it never relaxes so long as the influence of the ergot continues. It is, as it were, one continued pain, at times greater, but never entirely ceasing. The effect of this continued contraction of the fibres of the uterus upon the great blood-vessels which traverse its walls to reach the surface of the placenta, must be to intercept the circulation to a certain degree. Now although this cause contributes, no doubt, in some cases to produce unfavourable effects upon the child, I am disposed to think that it is not the only cause of fatal mischief in all, but that in some there is a noxious influence exerted on the nervous system of the infant, producing results of different degrees of intensity, and that these effects vary from the death of the infant, to certain spasmodic affections of the muscular system after birth. A few cases from my note book will serve to illustrate the position I have here taken up. I will first read some in which the medicine was given with advantage to the mother and safety to the child.

Case I.—Mrs. C., fifth pregnancy. Her former labours had been natural and easy, occupying on the first occasion fifteen hours, on the second, nine hours, on the third, six hours, and on the fourth, five hours. On this occasion the pains were from the beginning weak, and slow in returning, and after the head had come down to rest on the perineum they became more faint, and appeared insufficient to expel it. The soft parts were well relaxed, and a little more energy in the uterine action was all that seemed requisite to insure a speedy delivery. Nineteen hours had elapsed since the labour commenced, and finding the pains diminishing, rather than increasing in strength, I gave my patient half a drachm of the ergot, and in ten minutes after she had swallowed the dose, a strong pain came on, which completed the delivery of a live child.

Case II.—Mrs. T., of a pale, delicate habit, and lax fibre, was thirteen hours in labour of her first child. The head was easily passed through the brim and into the cavity of the pelvis, although the pains had not been strong during any part of the process. When the head distended the perineum, the pains subsided in strength and frequency, and although no mechanical obstacle to delivery existed in the soft parts, the labour was arrested by a deficiency of energy in the expelling power. The ergot was given in the same dose as in the former case, and a living child was born in fifteen minutes after its administration.

Case III.—Hon. Mrs. A. This lady was confined two years previously of her first child, at which time her labour was only ten hours in duration, but she had very profuse hæmorrhage after the birth of the child. On this occasion labour began at six o'clock, P. M., by discharge of liquor amnii, soon followed by pains. I saw her at eight, P. M., when the pains were trifling, but recurred with regularity every quarter of an hour. They increased until ten o'clock, at which time the os uteri was nearly dilated and soft. Some hæmorrhage now appeared, which continued (although at no time profuse) through the remainder of labour. At eleven o'clock about one-third of the head had

passed through the brim of the pelvis, but the strength of the pains diminished so as to have no effect in its advancement. The patient now complained of a constant pain in the back without any remission, but with an occasional increase in severity. She soon began to experience great exhaustion and sinking; complained of want of air, and cried out to have the doors and windows of the room opened. The pulse continued natural and steady. Some cordials were administered, which had the effect of restoring her. In this state she remained until one o'clock, A. M., when finding no return of true uterine action, the os uteri and external parts being perfectly relaxed, I gave half a drachm of ergot; this was followed in the space of a quarter of an hour by one good pain. I now repeated the dose, which quickly produced energetic action of the uterus. Three pains expelled the child, alive, just twenty minutes after the first dose had been given. The placenta was found lying in the vagina, from whence it was readily removed, without the loss of an ounce of blood. The cord in this case was only fourteen inches long.

CASE IV.—This lady, Mrs. K., was pregnant of her fourth child; all her previous labours had been natural and easy. On this occasion the pains were unusually few and feeble, and she was thirty-four hours in slow labour before I was called to her. The membranes had ruptured early, and continued to drain away. I found her walking about her chamber without any pain. On making an examination I perceived the os uteri dilated, and the head nearly resting on the perineum. The pains were now suspended for five hours, at the end of which time I gave her the usual dose of secale cornutum. In five minutes after she had taken the medicine the pains returned, at first feebly, but gradually increasing in strength; the child was expelled alive in half an hour.

CASE V.—Mrs. M. This lady was very near dying from uterine hæmorrhage after her first confinement, which took place in the country. This caused her to come to town, and place

herself under my care on the present occasion. Labour pains set in at four o'clock, A. M., and continued with regularity until seven o'clock, when they diminished a good deal in strength. A slight draining of blood now appeared, which having rather increased at eight o'clock, made me uneasy about the delivery of the patient, who was of a very thin and feeble frame, and weak constitution. I prepared the ergot in the usual way, by infusing a drachm of the powder in four ounces of boiling water, and adding some sugar. Of this I now gave her the half, which soon restored the uterine contractions, and in half an hour the head was born. I then gave the remaining portion of the medicine before the shoulders were expelled. The uterus contracted firmly, excluding the child alive, and leaving the placenta in the vagina, from whence it was removed without any further loss of blood.

CASE VI.—Mrs. A.; fifth pregnancy. Her former labours had been easy and natural, and sometimes very rapid. This was the case at her last confinement, on which occasion the child was born before I could reach her house. At the present time the labour was very slow, and protracted. The soft parts were well relaxed, and the head was quite moveable in the pelvis. The only obstacle to delivery seemed to be an inert and sluggish uterus. To rouse the dormant powers of this organ the ergot was given in two doses, at an interval of twenty minutes between them. Labour pains were excited in a short time after the last portion had been swallowed, and a living girl was born in one hour from the administration of the first dose.

Here we find that the duration of labour after the administration of the medicine varied from a quarter of an hour to two hours, and that in all the child was born without any unpleasant effects.

I will now read a few cases in which a longer period than two hours elapsed after the dose was given, and in which the peculiar effects to which I wish to direct the attention of the

Society were observed. These effects are certain spasmodic conditions of the muscles of the whole body, alternating with relaxation or palsy, and accompanied by evidences of derangement of the functions of the cerebro-spinal system. It will be perceived that there is in these cases a difference in the intensity of the affection, in some appearing slighter than in others, but the *kind* of affection will be recognized in all. In an interesting paper by Dr. Catlett* he notices the tendency of ergot to produce hydrocephalus in the early stage of infantile life, and having detailed five cases in which the death of the infant from this disease took place at different intervals after delivery, he says: "It will be seen, that of the above there are none connected with a first delivery, or any in which the child was subjected to any lengthened or forcible impaction. Is there any warrant from this fact to infer that the ergot had here exerted any specific influence upon the fœtal constitution, as alluded to by Dr. F. H. Ramsbotham, independent of the extra-mechanical pressure induced by its action? It becomes indeed a very interesting question, if it be admitted that ergot has an agency in the cerebral disturbance thus set up in the infant economy, to determine in what manner it is effected: whether, as above hinted, it be a purely mechanical effect, or occurring through the medium of direct absorption into the fœtal system."

It appears to me that the cases I am about to relate will go a great way towards the solution of this question, by the evidence they afford of a direct poisonous effect produced on the infant before delivery.

Case VII.—Mrs. N., was eighteen hours in labour of her first child. The pains were weak and ineffective, and at the end of sixteen hours they seemed to diminish in strength and frequency. The os uteri was well dilated, and the child's head nearly rested on the perineum, which was pliable and cool. A dose of ergot was given, and was followed by a second in twenty

* Edin. Med. Surg. Jour., vol. lvii. p. 83.

minutes, the first not having produced any uterine action. From this period the pains became more active, but at no time were they violent, and at the expiration of two hours from the administration of the medicine the child was expelled to all appearance dead. The surface of the whole body, as well as the face, was of a deep blue colour, resembling the appearance presented by a child in whom the foramen ovale is open. All the muscles were in a state of rigid contraction; so much so, that the limbs remained straight, and could be with difficulty bent. The fingers were straight, with the exception of the last phalanges, these were bent, and crooked downwards, being firmly fixed in that position. No effort was made at inspiration. The cord was now divided, and blood was allowed to flow from the cut extremity, which it did slowly. A warm bath was provided, and pulmonary insufflation was employed, and at the end of fully half an hour my exertions to restore animation were successful. The child breathed, but the rigidity of the muscles continued for a long time after it showed signs of life, and when the tonic spasm relaxed it was only for a short period, and was quickly succeeded by general convulsions. This condition of alternate convulsion and relaxation continued without intermission for three days. During this time leeches were applied to the temples, and the head was extensively blistered. The spine was also blistered from the occiput to the middle of the back, and the usual antispasmodic medicines were given by the mouth and rectum. By degrees the intensity of the convulsion appeared to subside, and the interval of relaxation became longer, the strabismus, which had been very great, now disappeared, and the child finally recovered.

Case VIII.—Mrs. P. This was a case of placenta presentation, to which I was called by Mr. Murphy of Rathgar. The hæmorrhage had ceased when I saw the lady, but I found her very much exhausted, complaining of noise in her ears, with a small, thready pulse at 120. On examination I found the os uteri dilated to the size of a half-crown piece, with an edge of

the placenta encroaching on its area towards the left side. There was no pain at this time, although there had been some in the course of the morning. The examination reproduced hæmorrhage; I immediately plugged the vagina, and gave her half a drachm of ergot, which was repeated in a quarter of an hour. Pains soon came on, weak at first, but regular; they increased so much in an hour after the medicine had been given, that I removed the plug, and found, as I expected, the os uteri more dilated, and the membranes tense, and protruding at each pain. I now ruptured the membranes, and from that moment all hæmorrhage ceased. A warm cordial draught of wine and water was administered to the patient. The pains increased in power, and at the expiration of two hours and a half from the time the ergot was given, a girl, apparently still-born, was delivered. This child presented precisely the same appearances as those described in the last case, but it required a perseverance of two hours' duration before it could be considered safe to relinquish our attention to it. At length it was quite restored, the spasmodic state of the muscles relaxed, and no convulsions followed.

Case IX.—Lady N. This was the third time I was called to attend this lady; her two former labours had been natural, On this occasion, after labour had been well established for four hours, the pains ceased entirely, and did not return until after waiting eight hours, during which time stimulating injections and frictions to the belly, &c. were employed. Finding there was no sign of the return of uterine action, I gave a drachm of the ergot in divided doses. The uterus was soon thrown into action, and in three hours the child was born, blue and stiff, and insensible. After great exertions respiration was established, but the child had severe convulsions, which lasted for forty-eight hours after its birth. These subsided, but left the child in a state resembling paralysis, with occasionally a convulsive motion of the muscles of the face and limbs, and fixed strabismus. No treatment seemed to have any effect upon

this condition. Twenty days after its birth the following report was taken: "This child has remained in a state of insensibility up to the present time; the strabismus has lately disappeared, but it seldom opens its eyes. The limbs are apparently powerless. It makes no effort to suck, but it swallows breast-milk with difficulty when put into its mouth. The difficulty is increasing. The bowels act naturally." In this state the child lingered on until the twenty-fifth day, when it died.

Case X.—Mrs. M. This lady was in labour of her third child. Her previous labours had been very slow. I saw her after she had been ten hours ill on the present occasion. The waters had been discharged, the os uteri was quite dilated, but the head had not entered the pelvis. No pain having occurred for an hour after my arrival, I gave her the ergot as usual. Its operation was very tardy, it did however excite the uterus to act, and in two hours and a half after its administration the child was born livid, rigid, and dead. No resuscitation could be effected in this child.

Case XI.—Mrs. K. This lady's labour began at midnight, by rupture of the membranes, without pain. It was her eighth pregnancy. On my arrival I found the os uteri dilated to the size of a shilling, and the head presenting. Matters remained in this state for nine hours, when a sudden and copious hæmorrhage took place, and flowed with great rapidity. I immediately gave the ergot, and plugged the vagina. Pains did not come on for near an hour, and then were weak, but continuous. The child was born in three hours after the medicine was given. It was dead, livid, and rigid; the hands were firmly clenched. No success attended our efforts at resuscitation.

Case XII.—Some time ago I was called in consultation with Sir Philip Crampton to see a child, then three years old, and labouring under a very remarkable spasmodic disease. When the child was carried into the room by its mother it appeared as if every muscular fibre in its body was in a state of paralysis. The limbs all hung loose and powerless; the head

fell about by its own gravity, unsupported by the muscles of the neck. The countenance was idiotic. While we looked at the child, this state of utter flaccidity was slowly changed into one of spasm of every muscle of the body. The limbs were contracted into the most grotesque forms, the back was forcibly bent backwards, and the head was extended and flexed, and rotated, and all these motions were performed slowly and in succession. After this paroxysm of muscular action the whole child relapsed into its former state of flaccidity and helplessness, and this scene was repeated several times while it remained in the room. We were told that this condition had continued since its birth. I was so much struck by the resemblance this condition bore to that in which I had seen the children above described, that I inquired from the lady what was the nature of her labour when this child was born, and I learned that it had been long and tedious, and that she had got ergot of rye to quicken the pains. The child was still-born, great difficulty was experienced in resuscitating it, and it had never been free from the alternate spasm and palsy since its birth.

In the cases just recorded, the condition of the infants was very unlike that of still-born children delivered under ordinary circumstances, and when no ergot had been administered to the mother. *The distinguishing characteristics are, the general lividity of the surface, the universal rigidity of the muscular system, producing the stiffened limbs and clenched hands in those infants in whom life was extinguished; and the remarkable kind of alternating spasm and palsy which supervened in those that were resuscitated.* The nearest approach to this state in new-born children, and that which most resembles it is, the condition in which children are born dead, with symptoms of congestion of the cerebral vessels, in whom, it is true, we find the countenance suffused and livid, but the peculiar affection of the muscular and nervous systems is wanting. Children presenting this appearance of congestion are usually born after

difficult labour; but in the instances above detailed this was not the case, some of them were tedious, but none of them difficult.

That the *fœtus in utero* is capable of being influenced by the circulating fluids of the mother, is proved by the well-known fact, of the communication of syphylis, small-pox, &c. to the unborn child; and that substances taken into the stomach of the mother can affect the infant, is shown by the experiments of Majendie,* who found in the fœtus of animals the odour of camphor, and the colour of madder, with which he had fed the mothers. It is still further established by the case reported by M. D'Outrepont,† of a fœtus poisoned by opium taken by the mother.

Admitting this point to be established, it remains to be seen whether the effects described above, and imputed to the direct agency of the ergot of rye, bear any resemblance to the effects produced by the introduction of this drug into the circulation. Upon this point we have very satisfactory information in the elaborate essay of Mr. Wright, already alluded to. Before proceeding to recount the results of his experiments, he takes notice of some of the epidemics of *spasmodic ergotism*, caused by eating bread made of rye containing a large portion of ergot, which visited different parts of the Continent during the last century. This disease almost devastated Freybourg, and overran many of the Cantons of Lusatia, Saxony, and Sweden. According to Videlius, the patients were attacked with spasms and convulsions, accompanied with violent pains, which were said to equal those of luxation, and to be similar in their type. In some instances the patients became lethargic, and when recovering from such state gave respectively signs of stupidity, intoxication, and extreme lassitude, after which the fit subsided for a time. But there generally remained vertigo, *tinnitus au-*

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* Velpeau de l'art des accoucemens, p. 196.

† Revue Medicale, t. iv. p. 121.

rium, nebulæ oculorum, rigidity of the members, and excessive feebleness.

In 1722 Silesia, in 1723 the environs of Berlin, and in 1736 Wirtemburg, in Bohemia, sustained the disastrous effects of ergotism. The disease commenced with a disagreeable sensation of tingling or itching in the feet; a violent cardialgia then came on, and the disease ascended to the hands and the head. The pains in a short time subsided, the head became heavy, and vertigo prevailed, the eyes appearing to have a thick mist before them. The fingers and hands were so spasmodically contracted that no force could straighten them, and the pain was described as equalling that of luxation. Some of the patients became totally blind, and others had double vision. The memory also failed, the conversation was wild and unintelligible, and the movements staggering and awkward. Some became maniacal, some melancholic, and others comatose. The disease was usually accompanied with opisthotonos. Of 500 patients, 300 infants perished, considering as such all under five years of age

Burghard gives an account of a convulsive epidemic which raged in the Canton of Silesia. The patients were the subjects of excessive spasms, which convulsed the extremities, and the head, eyes, and lips in particular, attended with an aberration of reason which no medicine could restore. Those who died showed, previously to dissolution, a sort of paralysis, which degenerated into apoplexy. Such as were fortunate enough to recover laboured for some time under excessive debility, particularly of the joints, stiffness, and even immobility of the limbs, enfeebled intellect, &c.

This short abstract shows the convulsive character of the disease induced by the use of ergot as a matter of food, and points out the brain and spinal marrow as the organs principally under its influence.

Let us now inquire into the effects of this drug when introduced directly into the circulation; and here I may remark that

the *fœtus in utero,* with respect to the introduction of noxious matters into its system, is circumstanced similarly to animals on whom we experiment by injecting fluids into their veins, for if the poisonous material does reach the fœtus, it can only do so by the route of the umbilical vein.

Exp. 1.—Mr. Wright injected a strong infusion of ergot into the jugular vein of a dog, who cried and struggled violently on receiving it, the urine flowing in a full stream, the pupil dilating immediately, the pulsations of the heart being too rapid to be counted. In four minutes its action was much diminished in force and frequency, and general muscular flaccidity prevailed, with slight quivering of the whole frame. In another minute the heart beat with singular rapidity and force, during which complete opisthotonos came on. After the lapse of another minute and a half the dog cried in a plaintive tone, the heart beat slowly and laboriously, the breathing was remarkably slow and profound, and under these circumstances the animal died, in exactly nine minutes from the period of injection.

Exp. 2.—Another dog was treated in a similar way, but when only half the quantity was injected excessive spasmodic action ensued, with dilatation of the pupil and discharge of fæces. In three quarters of a minute the convulsions had ceased, and there were only to be observed the most perfect helplessness and flaccidity of the limbs, with a quick and feeble pulse. This state continued through the further space of half a minute, when very slight tremor of the muscles of the hind and fore legs succeeded, accompanied with a drawing down of the lower jaw and perfect emprosthotonos. The motion of the heart was now very slow and intermittent. The emprosthotonos, with an occasional convulsive sigh, continued until four minutes and a half from the commencement, when all signs of life were gone.

Several other experiments were made by Mr. Wright, with different quantities of the infusion, and all produced results differing in intensity, but similar in kind.

The question now arises, does the blood of the mother be-

came impregnated with the noxious properties of the ergot? This point has been also settled by Mr. Wright, who has proved that the oil of ergot (upon which the peculiar action of the drug seems to depend) is present in the blood of animals who have taken the medicine by the mouth. He detected the oil in the blood of a dog to whom he had given the powdered ergot; and he gives an account of the method pursued, which it is not necessary to mention here, but he has established the fact by his investigations, and we are thus enabled to comprehend how the influence of the drug can be extended from the mother to the unborn child.

It might appear strange at first sight, and difficult to understand, how a medicine taken in the usual medicinal doses, and with apparent impunity, by the mother, shall nevertheless act injuriously on the *fœtus in utero*. But the difficulty is, in a great degree, removed, when we consider, first, that the system of the mother is very generally acted on by the ergot, though not to any injurious extent; and secondly, the great susceptibility of infants to the action of narcotics. That the maternal system is more or less influenced by the ordinary doses of the ergot, is shown by the remarkable depression in the pulse, which so constantly follows the administration of the drug; the rate of the pulse often falling twenty beats in the minute; and in some instances dangerous comatose symptoms have ensued. This, coupled with the fact above alluded to, that infants are peculiarly liable to be dangerously affected by very minute doses of narcotic medicines, enables us to comprehend how the fœtus may be injured by a poisonous matter circulating with the blood of the mother.

It is plain that the longer the time that elapses after the medicine has been taken into the stomach of the mother, the more certainly will its noxious principles be absorbed and mixed with her blood, the more certainly also will these principles be transmitted to the fœtus by the constantly arriving current of blood

through the umbilical vein, and the more likely will the fœtus be to suffer from their effects.

From these observations I think we are justified in coming to the conclusion, that the administration of ergot of rye to a woman in labour is attended with danger to the child, whenever a time sufficient for the absorption and transmission of its noxious properties elapses before the child is born; and from the cases above stated I am inclined to place two hours as the limit of safety, and to consider a prolongation of labour beyond that period as perilous to the infant.

It would appear that the *degree* of effect produced differs with the time that elapses between the exhibition of the dose and the birth of the child. In some we find spasm and lividity, with a capability of being perfectly restored to life; in others resuscitation was followed by convulsions terminating in idiotcy, with alternate spasm and palsy. In others the convulsions were followed by death at a remote period; and in others the life of the child was completely extinguished before birth.

Two practical deductions may be drawn from these observations,—first, that the ergot should never be given in any case where there is a likelihood of the labour lasting more than two hours after its administration, except when it may be employed to secure the life of the mother, as in the cases of placenta presentation and accidental hæmorrhage above quoted—(Cases VIII. and XI.); and secondly, that if we find delivery is delayed to two hours, we should resort to artificial assistance to save the life of the child.