ORIGINAL COMMUNICATION.

Notes on the Employment of the Inhalation of Sulphuric Ether in the Practice of Midwifery. By J. Y. SIMPSON, M.D., Professor of Midwifery in the University of Edinburgh.

ABUNDANT evidence has of late been adduced, and is daily accumulating, in proof of the inhalation of sulphuric ether being capable, in the generality of individuals, of producing a more or less perfect degree of insensibility to the pains of the most severe surgical operations. But whilst this agent has been used extensively, and by numerous hands, in the practice of surgery, I am not aware that any one has hitherto ventured to test its applicability to the practice of midwifery. I am induced, therefore, to hope that the few following hurried and imperfect notes, relative to its employment in obstetric cases, may not at the present time prove uninteresting to the profession.

Within the last month I have had opportunities of using the inhalation of ether in the operation of turning, in cases of the employment of the long and of the short forceps, as well as in several instances in which the labour was of a natural type, and consequently required no special form of artificial aid.

The first case in which I employed the ether vapour, occurred on the 19th of January. Some details of the result have been already published in the last number of this Journal (see p. 639). The pelvis of the mother was greatly contracted in its conjugate diameter from the projection forwards and downwards of the promontory of the sacrum; the lumbar portion of the spine was distorted; and she walked very lamely. The present was her second confinement. Her first labour had been long and difficult; she began to suffer on a Monday, and after a protracted trial of the long forceps, was at last delivered by craniotomy late on the subsequent Thursday night. Even after the cranium had been fully broken down, a considerable time and much traction had been required to drag the diminished and mutilated head of the infant through the contracted brim of the pelvis; and she was long in recovering. Contrary to the urgent advice of her medical attendant, Mr Figg, he was not made aware of her present or second pregnancy till she had arrived at nearly the end of the ninth month. It was thus too late to have recourse to the induction of premature labour, which had been strongly pressed upon her as the only means of saving her child, should she again fall in the family way. The pains of her second labour commenced in the forenoon of the 19th. I saw her with Mr Figg at five o'clock in the afternoon, and again at seven. The os uteri was pretty well dilated, the liquor anmii not evacuated, the presenting head very high, mobile, and difficult to touch; and a pulsating loop of the umbilical cord was felt floating

below it in the unruptured bag of membranes. From five to nine o'clock the pains seemed only to push the circle of the os uteri further downwards, without increasing its dilatation, or making the head in any degree enter into the pelvic brim. Assisted by Dr Zeigler, Dr Keith, and Mr Figg, I shortly after nine o'clock made the patient inhale the ether vapour. As she afterwards informed us, she almost immediately came under the anodyne influence of the ether. But in consequence of doubts upon this point, its use was continued for nearly twenty minutes before I proceeded to turn the infant (as I had previously predetermined to do). A knee was easily seized, and the child's extremities and trunk readily drawn down; but extreme exertion was required in order to extract the head. At length it passed the contracted brim with the anterior part of its right parietal bone deeply indented by pressure against the projecting promontory of the sacrum, and the whole cranium flattened and compressed laterally. The infant gasped several times, but full respiration could not be established. The transvere or biparietal measurement of its head, at the site of the indentation, was, in its compressed state, not more than $2\frac{1}{2}$ inches. Hence we judged the conjugate diameter of the pelvic brim not to exceed this. The infant was large, and rather above the usual size. It weighed 8 lbs. On afterwards examining the head and removing the scalp, no fracture could be found at the seat of the indentation. The thin parietal bone had merely bent inwards.

On questioning the patient after her delivery, she declared that she was quite unconscious of pain during the whole period of the turning and extracting of the infant, or indeed from the first minute or two after she first commenced to breathe the ether. The inhalation was discontinued towards the latter part of the process, and her first recollections on awaking were "hearing," but not "feeling," the head of the infant "jerk" from her (to use her own expressions), and subsequently she became more roused by the noise caused by the preparation of a bath for the child. She quickly regained full consciousness, and talked with gratitude and wonderment of her delivery, and her insensibility to the pains of it. Next day I found her very well in all respects. I looked in upon her on the 24th (the fifth day after delivery), and was astonished to find her up and dressed, and she informed me that on the previous day she had walked out of her room to visit her mother. Mr Figg informs me that her further convalescence has been interruptedly good and rapid.

I have previously alluded to two cases of delivery by the forceps, in which the patients were under the action of ether at the time of the operation. The woman in the first of these cases was brought into the Royal Maternity Hospital, in strong labour, early on the morning of the 3d February. It was her second confinement. At her first accouchement (seven years before), she had been delivered by instruments, in Ireland, and had been informed by the attendant practitioner, that artificial delivery would be similarly required at her future labours. I saw her between ten and eleven o'clock A.M. The os uteri was well dilated, the membranes ruptured, and the pains

extremely strong and frequent; but the large head of the child seemed not to enter fully into the brim, and was little affected by the powerful uterine contractions under which the patient was suffering. By three o'clock her pulse had risen to above 125 beats a minute, and it appeared to the medical officers present, that it would be improper to allow the ineffectual and exhausting efforts of the patient to be longer continued. She was then, at my request, brought under the influence of ether. Dr Moir, with great skill, applied the long forceps upon the head of the child. He subsequently was obliged to use strong traction during the pains that followed, and becoming temporarily fatigued with his efforts, I supplied his place. After the head fully passed the brim, the forceps were laid aside, and one or two uterine contractions finished the delivery. The child was large and strong, and cried vigorously soon after it was expelled. During the whole of this severe operation the patient appeared quiet and passive. The cries of her child speedily roused her from her etherized state, and she subsequently assured Dr Moir that she had felt comparatively little or no pain during the whole operation and delivery.

On the evening of the 12th February, I saw another forceps case with my friend, Dr Graham Weir. The patient was advanced in life, and it was her first confinement. The waters had escaped early, and the anterior lip of the uterus had subsequently become forced down in a very swelled and œdematous state before the head of the infant. After this obstruction was overcome, the child's head speedily descended upon the floor of the pelvis; but it was there impeded in its further progress by the narrow transverse diameter of the outlet. Under the compression of the converging tuberosities of the ischia, the bones of the fœtal cranium soon began to overlap; but at last, no further progress being made, the patient becoming exhausted by a continuous labour of about twenty-four hours, and the soft parts being evidently well relaxed and prepared, Dr Weir applied the short forceps, and extracted a living infant. For a considerable time before this operation was adopted, I exhibited the vapour of ether to the patient; under it she speedily became quite narcotized. Its action was kept up, and the pains appeared to be so strong as almost to warrant the idea that nature would yet be sufficient; but ultimately, instrumental delivery was, as I have already stated, had recourse to. The mother did not fully recover from her state of etherization for ten or fifteen minutes after delivery, and then stated that she was quite unaware of anything that had been done, and of what had occurred.

As far as they go, the preceding cases point out one important result. In all of them, the uterine contractions continued as regular in their recurrence and duration after the state of etherization had been induced, as before the inhalation was begun.—The emotion of fear has appeared to me to suspend, in one or two nervous patients, the recurrence of the first pains, after the apparatus was adjusted and its employment commenced; but this effect speedily passed off; and as yet I have seen no instance in which the pains were sensibly diminished in intensity or frequency after the ether

had fairly begun to act.—Indeed, in some cases they have appeared to me to have become increased as the consciousness of the patient was diminished. This has more particularly occurred with one or two patients, who breathed ether, combined with tincture of ergot, or containing a solution of its oil. A woman was brought into the Maternity Hospital on the 28th February, after being in labour for 30 or 40 hours. It was her second child. Subsequently to her entering the hospital, at seven P.M., scarcely any decided uterine contraction could be said to take place. The os uteri was well opened, but the head was still high in the pelvis; and when I saw her at four A.M. of the following morning, nine hours after her entrance into the hospital, little or no advance whatever had been made, and the case was becoming an anxious one. She was then made to inhale equal parts of sulphuric ether and tincture of ergot. In the course of a few minutes a series of extremely powerful uterine contractions supervened, and the child was born within a quarter of an hour of the commencement of inhalation. The mother subsequently declared that she recollected nothing at all of her delivery, except the removal of the after-birth. In this case, was the re-excitement of strong pains the result of the action of the sulphuric ether, or of the ergot, or of both? Or was it a simple but very strange coincidence? More facts than I yet possess are necessary to decide such a question; but I have seen some cases which lead me to believe that other therapeutic agents besides those I have named may be readily introduced into the system by means of pulmonary inhalation.[1]

A more extensive and careful series of investigations than I have yet been able to institute, may perhaps show that in some constitutions, and under some circumstances or *degrees* of intensity, the process of etherization may possibly interfere with the uterine contractility, particularly in the earlier stages of the labour. At the same time, various analogies would lead us to expect that, as I have hitherto found, the action of the uterus would go on uninterruptedly, when the psychical influence of the mind and purely cerebral functions was suspended, as in the more complete states of etherization. At all events, if we may judge from the analogous

[1] Dr Richard Pearson, who, in 1795, was, I believe, the first person that recommended the inhalation of sulphuric ether as a therapeutic agent (see his Account of the Nature and Properties of different kinds of Airs, p. 24) suggested also the use of it impregnated with opium, squill, cicuta, &c.; and he speaks of the effect of "an emetic given in this manner." He employed the simple sulphuric ether vapour in some cases of phthisis, asthma, hooping cough, croup, and catarrh, recommending it to be inhaled, after being rectified and washed, from a cup, through an inverted funnel, or, with children, by "wetting a handkerchief with it, and holding it near the nose and mouth." See Fort Simmons' Medical Facts and Observations, vol. vii. p. 96. In the 13th volume of the Dictionnaire des Sciences Medicales (1816) p. 385, Nysten has described a particular apparatus, like some of our modern forms, for the inhalation of sulphuric ether. See also vol. xvii. p. 134. Vaporizable substances, when introduced into the system in this manner, probably pass undigested and unchanged into the circulation, and "seem (observes Wagner) to make their way into the blood through the unbroken vascular membrane [of the bronchial cells] with the *same* certainty and ease as when they are injected *directly* into the veins" (Elements of Physiology, 1842, p. 443.) Will this not explain both the rapidity and intensity of their action when thus used?

experiments of Vollkmann, Bidder, Kölliker, and others, upon the simple contractions and rhythmic actions of the heart, intestines, &c., the motory nervous powers of the uterus belong to the ganglionic and to the spinal systems, and are not in any necessary dependence upon the brain or mind. Indeed, Ollivier and Nasse have published cases of perfect paraplegia, notwithstanding which the act of parturition in the human female proceeded regularly in its course, and without conscious pain. In the one case (Ollivier's), the cord was compressed and destroyed from the first to the fourth dorsal vertebra by a collection of acephalo cysts;[1] and, in the other instance (Nasse's), complete paralysis had followed a fracture of the third and fourth cervical vertebræ.[2] Of course such lesions necessarily prevented the brain exerting any influence upon the uterus, or its contractions.

Long ago, in discussing this subject, Haller adduced the authority of Harvey, Smellie, Lamotte, &c., to prove that uterine contractions and labour may go on with the mother, "ignara, stupida et sopita, et immobili, et apoplectica, et epileptica, et convulsionibus agitata,[3] et ad summum debili."[4] Deneux mentions a fact still more in point, because in it the analogy with the operation of ether is still stronger, or indeed identical. "A woman," says he,[5] "was brought to the Hotel Dieu at Amiens in a comatose state, in consequence of her taking spirituous liquors since the commencement of labour. She was delivered in the natural manner in this state; the sleep continued for some time after delivery. The woman, on awaking, much surprised at finding her delivery completed, congratulated herself on having made so happy a discovery, and declared she would make use of it if she had again occasion."[6]

In obstetric as in surgical practice, the degree of insensibility produced by etherization, and its accompanying phenomena, differ much in different instances. In some, a state of total apathy and

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[1] Traité de la Moelle Epiniere, p. 784.

[2] Untersuchungen zur Physiologie, &c. — Dr Cheyne reports a case of fatal hemorrhagic apoplexy and hemiplegia, in which, without any apparent pains, "the uterus (observes Dr Kellie) appears, as an involuntary muscle, to have acted in the most perfect manner in expelling the fœtus and secundines," the day before death. The child was born alive. Cases of Apoplexy and Lethargy, p. 91 and 161.

[3] "During the continuance of puerperal convulsions, uterine action is *not* suspended, although no signs of pain are manifested by the woman, if she remain comatose." Dr F. Ramsbotham's Obstetric Medicine (1844) p. 455.

[4] Elementa Physiologiæ, tom. viii. p. 420.

[5] Receuil Periodique de la Societé de Medicine, April 1818.

[6] The celebrated case of the Countess de St Geran is sufficiently remarkable in relation to the present subject. See full and long details of it in Gayot's Causes Celebres, tom. i. p. 142 to 266. After the Countess had been nine hours in labour with her first child, the midwife in attendance exhibited to her a potion (*breuvage*), which rendered her insensible till the following morning. When the Countess then awoke to consciousness, she found herself bathed in blood, the abdominal tumour fallen, and all the signs of recent delivery present; but the child born during her state of insensibility had been removed, and its existence was even denied to her. It was years afterwards proved, to the satisfaction of the French law courts, that the Countess had been delivered of a male child during an induced lethargic condition, and that the infant had been surreptitiously conveyed away to a distance, and brought up as the son of a poor man. The child's claims were, after much litigation, fully acknowledged, he was restored to his parents, and ultimately succeeded to his father's title. What Nepenthean "breuvage" could possibly produce the alleged effect?

insensibility seems to be produced; others move about and complain more or less loudly during the uterine contractions, though afterwards, when restored to their state of common consciousness, they have no recollection of any suffering whatever, or, indeed, of any thing that had occurred during the inhalation and action of the ether; others again, remain quite aware and conscious of what is going on around them, and watch the recurrence of the uterine contractions, but feel indifferent to their effects, and not in any degree distressed by their presence; and in another class again, the attendant suffering is merely more or less diminished and obtunded, without being perfectly cancelled and annulled.

On the evening of the 13th inst, in two cases that rapidly followed each other, I witnessed, in the above respect, two very different conditions induced by the use of the ether. The patients (who each had borne several children previously) were both placed under the influence of it just as the os uteri became fully opened, and in neither did the full expulsion of the infant through the pelvic passages require above twelve or fifteen minutes. My first patient (the wife of a clergyman) subsequently stated, that she knew all that was said and done about her, was aware of the pains being present, but felt no distress from any of them till the supervention of the last strong contraction which drove the head out of the vulva, and the feeling then seemed to partake of the character of strong pressure, rather than of actual pain. Subsequently she told me, she could only look back with regret to the apparently unnecessary suffering she had endured in the birth of her former infants. The second patient, a lady of a timid temperament, and very apprehensive about the result of her present confinement, was induced with difficulty to inhale the ether vapour; but it speedily affected her when once she did begin. In two or three minutes she pushed the apparatus from her mouth, talked excitedly to a female relative present, but was immediately induced to recommence the inhalation; and subsequently, according to her own statement, "wakened out of a dream, and unexpectedly found her child born." Like many others, she thought hours instead of minutes had elapsed, from the commencement of the inhalation to the period of the complete restoration of consciousness. Making apparently an effort of memory, she afterwards inquired if she had not once awakened out of her dreamy state, and spoken some nonsense to her friend.

A careful collection of cautious and accurate observations will no doubt be required, before the inhalation of sulphuric ether is adopted to any great extent in the practice of midwifery. It will be necessary to ascertain its precise effects, both upon the action of the uterus, and of the assistant abdominal muscles; its influence, if any, upon the child; whether it gives a tendency to hemorrhage or other complications; the contra-indications peculiar to its use; the most certain modes of exhibiting it; the length of time it may be employed, &c.[1] In no case have I observed any harm whatever

[1] I have, during labour, kept patients under its influence for upwards of half an hour. In exhibiting it, the first, or exhilarating stage of its effects should be passed

to either mother or infant, follow upon its employment. And, on the other hand, I have the strongest assurance and conviction, that I have already seen no small amount of maternal suffering and agony saved by its application. The cases I have detailed sufficiently show its value and safety in cases of operative midwifery. And here, as in surgery, its utility is certainly not confined to the mere suspension and abrogation of conscious pain, great as, by itself, such a boon would doubtlessly be. But in modifying and obliterating the state of conscious pain, the nervous *shock* otherwise liable to be produced by such pain, particularly whenever it is extreme, and intensely waited for and endured, is saved to the constitution; and thus an escape gained from many evil consequences that are too apt to follow in its train.[1] Granting that experience will yet be able to prove its safety and efficacy in modifying and annulling the pains of labour, will (I have repeatedly heard the question asked) the state of etherization ever come to be generally employed with the simple object of assuaging the pains of *natural* parturition? Or (as the problem has not unfrequently been put to me) would we be "justified" in using it for such a purpose? In conclusion, let us consider this point for a moment.

Custom and prejudice, and, perhaps, the idea of its inevitable necessity, make both the profession and our patients look upon the amount and intensity of pain encountered in common cases of natural labour, as far less worthy of consideration than in reality it is. Viewed apart, and in an isolated light, the degree of actual pain usually endured during common labour is as great, if not greater, than that attendant upon most surgical operations. I allude particularly to the excessive pain and anguish, which in nine out of ten cases accompany the passage of the child's head through the outlet of the pelvis and external parts. Speaking of common or natural labour in its last stages, Dr Merriman observes, the pulse gradually "increases in quickness and force; the skin grows hot; the face becomes intensely red; drops of sweat stand upon the forehead; and a perspiration, sometimes profuse, breaks out all over the body; frequently violent tremblings accompany the last pain, and at the moment that the head passes into the world, *the extremity of suffering seems to be beyond endurance.*"[2]

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through as rapidly as possible, and the patient never allowed to be excited or irritated by the nurse or others. I have heard its use strenuously denounced on the ground that its effects, though good, are still of an intoxicating character. But on the same ground, the use of opium, &c. &c., in medicine, to relieve pain, and procure sleep, should be equally reprobated and discarded.

[1] On what division or divisions of the nervous system does the nervous shock operate—the cerebral, spinal, or ganglionic? If on the former, it should be kept in abeyance by due etherization. I once saw Dr Robertson amputate, at the shoulder joint, an arm sadly shattered an hour or so before by a railway injury. The man received the injury, during the operation, and for several hours afterwards, when he was in a state of insensibility from deep intoxication; and at last wakened up, not knowing what had happened. His recovery was rapid and uninterrupted. Would it have been so if his nervous system had been sufficiently alive to the double shock of the operation and injury? Out of eighteen cases of primary amputation, mentioned in Dr Peacock's Report, and performed during four years in the Edinburgh Hospital, this man and another patient were the only two that survived.

[2] Synopsis of Parturition, p. 15.

Or, take the picture of the suffering of the mother in the last stage of natural labour, as pourtrayed by the most faithful of living observers—Professor Naegele of Heidelberg—"The pains (he observes) of this stage are still more severe, painful, and enduring; return after a short interval, and take a far greater effect upon the patient, than those of the previous stage. Their severity increases so much the more from the additional suffering arising from the continually increasing distention of the external parts. They convulse the whole frame, and have hence been called the *dolores conquassantes*. The bearing down becomes more continued, and there is not unfrequently vomiting. The patient quivers and trembles all over. Her face is flushed, and with the rest of the body, is bathed in perspiration. Her looks are staring and wild; the features alter so much that they can scarcely be recognised. Her impatience rises to its maximum with loud crying and wailing, and frequently expressions which, even with sensible, high principled women, border close upon insanity. Everything denotes the violent manner in which both body and mind are affected."[1]

I have stated that the question which I have been repeatedly asked is this—will we ever be "justified" in using the vapour of ether to assuage the pains of natural labour? Now, if experience betimes goes fully to prove to us the safety with which ether may, under proper precautions and management, be employed in the course of parturition, then, looking to the facts of the case, and considering the actual amount of pain usually endured (as shown in the above descriptions of Merriman, Naegele, and others),[2] I believe that the question will require to be quite changed in its character. For, instead of determining in relation to it whether we shall be "justified" in using this agent under the circumstances named, it will become, on the other hand, necessary to determine whether on any grounds, moral or medical, a professional man could deem himself "justified" in withholding, and *not* using any such safe means (as we at present pre-suppose this to be), provided he had the power by it of assuaging the agonies of the last stage of natural labour, and thus counteracting what Velpeau describes as "those piercing cries, that agitation so lively, those excessive efforts, those inexpressible agonies, and those pains apparently intolerable,"[3] which accompany the termination of natural parturition in the human mother.

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[1] Lehrbuch der Geburtshülfe, p. 104. See British and Foreign Medical Review, vol. xix. p. 64.

[2] Dr Rigby in his System of Midwifery, p. 103, observes, "This is the moment of greatest pain, and the patient is quite wild and frantic with suffering; it approaches to a species of insanity," &c.

[3] Traité des Accouchemens, vol. i. p. 449. "Ces cris percans, cette agitation si vive, ces efforts excessifs, ces angoisses inexprimables, ces douleurs qui parassaient intolerables," &c.