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CHLOROFORM

IN

THE PRACTICE OF MIDWIFERY.

BY

EDWARD W. MURPHY, A.M., M.D.,

PROFESSOR OF MIDWIFERY, UNIVERSITY COLLEGE, LONDON.

"Take thou this phial, being then in bed,
And this distilled liquor drink thou off:
When, presently, through all thy veins shall run
A cold and drowsy humour, which shall seize
Each vital spirit
And then awake as from a pleasant sleep."

ROMEO AND JULIET.

Read at the Harbeian Society,

FEBRUARY 5TH, 1848.

LONDON:

TAYLOR AND WALTON, 28, UPPER GOWER STREET.

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1848.

LONDON:
PRINTED BY J. WERTHEIMER & CO.,
CIRCUS PLACE, FINSBURY CIRCUS.

CHLOROFORM IN THE PRACTICE OF MIDWIFERY.

VERY soon after Professor Simpson communicated to the profession the anæsthetic power of chloroform, the writer had occasion to deliver a patient whose pelvis was greatly contracted, who had given birth to several still-born children, and always had severe and protracted labours. He took this opportunity of having her submitted to the influence of chloroform previous to the operation. She was delivered without pain, and had a most favorable recovery. A second case of a similar description followed; this anodyne was again had recourse to with similar results. Surprized at the decisive success of chloroform in these cases, the writer was naturally anxious to observe further the effects of this agent in parturition, so as to ascertain as nearly as possible its influence on the action of the uterus, and to determine its value in the practice of midwifery. The extremely encouraging results of Professor Simpson's investigations, and the singularly remarkable power of chloroform in arresting pain without interrupting the action of the uterus, open to us views of obstetric practice, that if confirmed by repeated and careful observation, must greatly modify, if not completely alter, our previous notions of the subject.

Every experienced practitioner is conscious of the mental anxiety he is often obliged to endure, as a passive observer of the sufferings of his patient while going through the stages of a severe and protracted labour. How frequently do the solicitations of anxious friends, their apprehensions and their doubts, urge him to interfere? His firmest resolution is sometimes shaken, and his anxiety greatly increased, by the desire to terminate at all hazards so distressing a scene, although the attempt may be surrounded

by the most ominous difficulties: but if these agonies can be alleviated or removed, such embarrassments are removed along with them. The practitioner requires no very great effort of fortitude to follow out his convictions in the fulfilment of his duties, when he is not by delay prolonging the misery of his patient. The accoucheur is also aware of the shock which the constitution receives from long continued and severe pain; he knows the risk to which his patient is exposed of receiving such a shock, when these sufferings are increased by the very means that is adopted for her relief. Many, from the nervous exhaustion that follows a severe labour and a painful operation, have been struck down by attacks of fever and of inflammation that otherwise they would have escaped. Patients have even died from the shock of an operation. But when there is no nervous shock—when the operation is not felt—when the patient is delivered without pain in a case that otherwise she would have to endure the greatest agonies, what must be the value of an agent that can accomplish so much good, and diminish so much the risk of artificial delivery?

Again, the obstetric physician is conversant with the effect of mental anxiety—of mere apprehension on the action of the uterus. Cases frequently come under his notice, in which the pains of labour are interrupted, become irregular and feeble, and labour is consequently greatly protracted, because his patient has not fortitude to meet the trial she is exposed to: but let the severity of these pains be removed, or let sleep be induced, and the uterus at once returns to its regular action, labour rapidly proceeds, and delivery is completed in one-tenth, perhaps, of the time it would otherwise occupy.

Fully impressed with the importance of determining how far an agent possessing these anodyne properties may be safely used in the practice of midwifery, the writer did not hesitate to take every opportunity of testing its value, believing that if we have such a means of removing, or even of diminishing the pains of the parturient woman without rendering her liable to any serious risk, it is certainly the physician's duty to alleviate the sufferings of his patient by any means that he can safely employ.

The objection that has influenced the minds of many conscientious persons, that in attempting to lessen "the sorrows of childbirth," we are opposing ourselves to a Divine decree, is evidently

the result of very erroneous reasoning. To suppose, for an instant, that we could interfere with the designs of an All-wise Providence, or abrogate a single tittle of the penalty which it is his pleasure to impose on us, and that, too, by the march of intellect, would be to assume imperfection in the intelligence and foreknowledge of the Deity. Besides, if such an objection were at all valid, it must be so in its entire extent—no attempt of any kind should be made to lessen the sorrows of child-birth. The woman must drink the cup of misery prepared for her to its very dregs, and midwifery, as a profession, be at once prohibited.

The following brief detail of cases, in which chloroform has been administered by the writer, will sufficiently illustrate its effects, and, taken in connection with those already published by Professor Simpson, will enable the Society to form a just estimate of its value.

CASE I.—*Contracted Pelvis, two and a half inches from Pelvis to Sacrum. Delivery by perforation after thirty-nine hours' labour.*

E. G. æt. thirty-six years, living in Grove Street, Camden Town, of moderate height and delicate appearance, was taken in labour with her seventh child, November 24th, 1847. All her previous labours were protracted, varying from fifty-six to eighty hours' duration, and all her children (males with one exception), still-born. In her last confinement, after being sixty hours in labour, she was delivered by the forceps, of a dead child.

Her present labour commenced, November 24th, at six o'clock A.M.; and the pains continued without interruption during the whole of that day and night; she was seen on the following morning, about eleven o'clock. The os uteri was nearly dilated, the vagina moist and cool, the head above the brim of the pelvis, and its conjugate measurement contracted to two and a half inches. It was evident that the head could not descend into the pelvic cavity, but labour was allowed to proceed, in order to ascertain whether it might enter the pelvis sufficiently to be extracted by the long forceps. She was seen again in the evening at half-past eight o'clock, having been left in charge of the

gentleman in attendance (Mr. Fox) during the day. She had now been more than thirty-eight hours in labour, nearly all of which time she had very strong and regular labour, but without any alteration in the position of the head; the writer therefore determined on delivery by perforation. A large quantity of urine was drawn off by the catheter, and everything prepared for delivery. Dr. Snow, who kindly gave me his assistance, proceeded to administer chloroform. At first, the woman made considerable resistance, and could scarcely be persuaded to inhale, having, as we afterwards found, misapprehended our object. She said, she supposed that we meant, first to put her to sleep, and *after she awoke*, to deliver her. She soon however fell into a quiet sleep.* The pulse before inhalation was 120, it rose afterwards to 140, and then fell to 130. The operation was then commenced, during which she talked incoherently, the child at length with much difficulty was extracted, and the placenta expelled in about ten minutes, without any hemorrhage, although the uterus felt spongy. She was bandaged, the soiled clothes removed, and the bed settled before she awoke. In about fifteen minutes she looked up, recognised me, and said she felt no pains then, but was evidently in expectation of their return. When she was told that all was over, she looked about incredulously, and as some of the gentlemen present were leaving the room, she became quite alarmed, imagining that we were about to desert her; when at length convinced of the fact of her delivery, her countenance lighted up with delight. She said that chloroform caused her a much more refreshing sleep than she had previously enjoyed, so much so, that when first spoken to, she felt annoyed at being disturbed. The recovery of this patient was most favorable; she had not a bad symptom.

CASE II.—*Contracted Pelvis, three inches from Pubis to Sacrum.
Delivery by turning, after thirty hours' labour.*

A week after the above operation, the writer was summoned to attend a lady in labour with her twelfth child. All her former

* In using the term *Sleep*, the writer only means to express the apparent effect produced by Chloroform.

labours were more or less protracted; and in her previous confinement he was called in to deliver her. When she became again pregnant, the writer's services were requested at the time of her delivery. Labour commenced, November 29th, 1847, attended by short and irregular pains, which continued until the morning of December 2nd. Strong and steady labour then commenced, and went on without interruption during that day and the following night. Next morning the writer was summoned to her assistance. The os uteri was two-thirds dilated, the head at the brim of the pelvis, and the upper part of the sacrum easily touched by the fore finger. Delivery was deferred for a few hours in the hope that the head might descend sufficiently to be more easily extracted by the long forceps, and in the interval, every preparation was made for using chloroform. No advance however was made: the head was still in the brim of the pelvis. In this case also, Dr. Snow administered chloroform with his usual success; and when the patient was completely under its influence, the long forceps was applied. After half an hour's trial, it failed in its object; perforation was then attempted, but the perforator pushed the head into the iliac fossa, the hand of the child was felt at the same time just above the pubis, and an effort was made to turn the child, which completely succeeded. The hand and arm were passed through the brim of the pelvis with a good deal of difficulty, the knee seized, the body of the child brought down—and by steady and powerful traction, the head at length was extracted. The child (a boy) was born living, and is now, after two months, as well and as strong as any child of that age.

After delivery, the uterus was unusually large: firm pressure over the fundus expelled some clots; and, fearing hemorrhage, the placenta was extracted. The bandage was then applied, and soon after she awoke without any excitement. She complained of exhaustion, felt no pain, was quite unconscious of all that she had gone through, and was only aware that her sufferings were over when she heard the child cry. The pulse before inhalation was 100 small and compressible; after Chloroform was respired, it rose to 115, and became full and strong: it soon fell to 96.

Respiration, at first, was laboured and attended with coughing, (the lady had had influenza): it soon became equal, as she went off to sleep, attended with some stertorous breathing. After two or three inspirations, she struggled a little to avoid further inhalation, but was soon overcome by the influence of chloroform.

She describes her sensations when she began to inhale as unpleasant; she felt as if suffocating, but soon forgot everything. During the operation she was restless; and towards its conclusion, as the head was being extracted, she moaned as if in pain; but, after she recovered consciousness, said that she felt no pain at all.

This lady rapidly recovered.

CASE III. is a case of difficult parturition, in which chloroform was administered by RICHARD HICKS, Esq., Surgeon, London.

“Argyle-square, New-road, Dec. 1847.

“Upon the 17th December, 1847, I was called to Mrs. P——, who had been in lingering labour for twelve hours. Upon making an examination, I found a large tumour, probably fibrous and ovarian, so occupying the posterior portion of the pelvis as to preclude the possibility of the child's head passing it entire. Having resolved upon performing craniotomy and administering chloroform, I sent to a chemist to obtain a supply, and requested the husband of my patient to ask Dr. Murphy to come and assist me. Finding he would not be able to do so for an hour, I at once reduced the child's head, and was just going to let my patient inhale the chloroform (which, until that moment, I could not obtain), when the doctor arrived, and very kindly administered that agent. After about a drachm of it had been consumed, an apparently tranquil sleep was induced, during the continuance of which the birth of the child was with some difficulty effected by Dr. Murphy. My patient very shortly awoke, not a little surprised to find her infant born, though much distressed upon being told it was not alive. The uterus was not firmly contracted; and on it becoming apparent that the placenta was adherent, we again gave the chloroform, which in a very short time produced its effect. I then completely introduced my hand into the cavity of the uterus, slowly peeled off and removed the placenta, and felt the uterus contract upon my hand. Having removed the soiled linen, and carefully applied a bandage and compress, our patient in a little while recovered from the effects of the chloroform, and appeared unable fully to express her gratitude to us for having saved her from agonies similar to those which she had experienced at the birth of her first child, this being her second confinement. She is now

perfectly recovered without having had one untoward symptom! Indeed I never recollect having seen any one who had had so severe a labour arrive at so speedy a restoration to health."—*Lancet*, Jan. 8, 1848.

CASE IV.—*Forceps Operation.*—*First Child.*

Just before the writer received Mr. Hicks' message, he was summoned to attend a lady confined with her first child. The pains of labour commenced in the morning, and had continued regularly but not severely throughout the day.

In the evening they increased in strength; the os uteri was about one half dilated, the passages perfectly cool and abundantly moistened with mucus. Labour was suffered to proceed without any interference until the os uteri was nearly open.

At midnight a small portion only of the anterior lip remained before the head which was descending into the pelvic cavity. The action of the uterus was becoming powerfully expulsive and the pains very severe and trying to the patient.

The writer thought this a favourable opportunity to try the effect of chloroform: forty minims were administered which was inhaled just as the pain was commencing; this quantity did not produce any loss of consciousness nor excitement in the patient; but she experienced the greatest relief to her sufferings, the contractions of the uterus were neither interrupted nor suspended.

In this manner chloroform was inhaled at the commencement of every pain until the quantity given (forty minims) was exhausted, the effect of each inhalation was weaker than the preceding one until the whole having evaporated, the severity of the pains returned to its original degree. The same quantity was then repeated with similar results. Sometimes the dose was increased to a drachm, which (if I might use the expression), *muffled* the pain more completely, and the patient approached the state of unconsciousness.

The writer had thus an opportunity of observing the effect of chloroform in diminishing doses. The action of the uterus went on regularly, the pain being inversely as the dose; there was no excitement, and consciousness remained unimpaired until the full

dose (3j) was administered. In fact the patient was so conscious of the relief she experienced, that when she observed its effects becoming weaker, she earnestly entreated for more chloroform. In this case, the straining efforts of the patient seemed also to be inversely as the dose given; the greater the dose, the less the aid of the abdominal and other auxiliary muscles was called upon: she did not bear down with her pains after a full dose, and did so as they became less. The head advanced more and more slowly as it descended into the pelvic cavity; and, fearing lest the delay might arise from this circumstance, the mode of administration was altered. The action of the uterus was allowed to commence in the ordinary manner, and when the pain was at its height, chloroform was given. The effect was most beneficial: the pain was much more supportable, although still felt, and as it subsided, the patient fell into a tranquil dose, from which she was generally roused by the next pain. In this interrupted manner, the action of chloroform was maintained for three hours. The supply, which was small (3iv), was now nearly expended, and as, at that early hour (three o'clock a.m.) it could not be renewed, the writer was obliged to reserve the remainder lest it might be required at the conclusion of the labour. During its administration, the dilatation of the uterus was rapidly completed, and the head descended into the cavity of the pelvis; its progress became slower as it advanced, and was arrested just above the outlet. The most powerful pains continued in rapid succession for about three hours without any effect, the writer therefore determined to deliver with the forceps. The head being very tightly adapted to the pelvis, it was difficult to feel the ear, the forceps was applied at six o'clock a.m.; by steady traction with the pains, the head at length made some progress; the perinæum readily dilated, and a living child was delivered about half past seven o'clock.

The residue of chloroform (3ß) was administered before the operation: a fresh supply was sent for, but did not arrive until it was concluded; the delivery was therefore nearly as painful as such operations generally are. The placenta, however, was retained; and it being necessary to withdraw it, a full dose of chloroform (which had just arrived) was exhibited. The patient fell into a stupor, breathing equally with long and deep inspirations. When the hand was introduced into the vagina she grew restless;

and as the placenta was being removed from the surface of the uterus, she moaned and talked incoherently, seeming to suffer pain: nevertheless when she awoke after its extraction, the patient was quite unconscious of what she went through, and when told that it was quite as painful as her delivery, she was greatly surprised.

This lady's recovery has been in every respect most satisfactory.

CASE V.—*Shoulder and Arm Presentation.*

E. P. æt. twenty-eight, who received a letter for attendance from University College Hospital, was confined with her fourth child. A very confused account was given of her previous labours. She stated, that she was three days in labour with her first child, which was ultimately delivered by the forceps living. She said she was *nine days* ill with her second; but as far as could be collected, she seems to have been in actual labour only twelve hours; she gave birth to a living boy, and had severe flooding. The third labour is said to have *lasted a week!* when a girl was delivered, succeeded also by flooding. In her present confinement labour pains commenced ten o'clock p. m. (January 3rd, 1848), and continued without interruption during the night. On the following morning, the os uteri was more than half dilated, across which the right arm and hand lay, the fingers being felt through the membranes at the right side of the pelvis. The writer saw her about five o'clock in the afternoon and was about to administer chloroform previous to turning, when his intentions were opposed by the mother of the patient, an old midwife, who saw not the least occasion for doing either the one or the other. She very wisely argued that her daughter was always in labour a week; and therefore there was full time yet for her delivery. The patient was consequently alarmed, as well from this wise decision as from seeing my two assistants (Mr. Clapp and Mr. Drew) and a medical friend (Dr. Humble) in the room with me, which increased her apprehension respecting herself. However, having explained the case to the patient's husband, who possessed sufficient common sense to understand our object, he assisted us in tranquillising her, and we were permitted to proceed. About a drachm of chloroform was administered, and in a few minutes the patient became

apparently insensible; but the moment that the hand was introduced into the vagina she cried out as if in pain, but became quieter as the hand passed into the cavity of the uterus, only muttering incoherently to herself. In about ten minutes a living child was brought down and delivered, after which the uterus contracted firmly, and the placenta was expelled in seven minutes from the birth of the child.

Previous to inhalation, the pulse was 100 (the effect perhaps of excitement), after the first inspirations it rose to 130, but soon fell to 85, and so remained. The influence of chloroform passed away without the least degree of excitement; and the patient, when asked (in consequence of her cries), did she suffer much pain, *declared that she felt none*. This answer greatly surprised the bystanders, especially the midwife, who was now quite reconciled to the new practice.

This patient recovered rapidly, without a single drawback.

CASE VI.—*Tumor in the Vagina obstructing Delivery.*

On the morning of the 1st of January, the writer was requested by Mr. Rawlins of Kentish Town, to see with him a case of difficult labour. His patient, a young woman, pregnant with her first child, had been in labour twenty-four hours. A firm elastic tumor, without fluctuation, lay between the rectum and vagina, protruding the surfaces, so as nearly to close both canals. The os uteri was dilated to the size of a shilling; she had suffered severely from her pains during the whole previous day and night. Mr. Rawlins describes them as being "of the most excruciating description, without any decided sleep between them." No interference could then be attempted; so it was agreed to place her under the influence of chloroform, until the os uteri was sufficiently dilated to admit of delivery. Mr. Rawlins states, "that after chloroform was administered, the pains became immediately expulsatory, of a more favourable character, recurring punctually every ten minutes." She slept in the intervals of her pains, but seemed conscious of their return. "The most remarkable feature (observes Mr. R.) was the sudden transition from profound sleep to perfect consciousness." Labour proceeded in

this manner throughout the day, and in the evening (about nine o'clock) the os uteri was dilated about one half, the head of the child had entered the brim of the pelvis, which was evidently contracted: its exact degree could not, however, be estimated, as the tumor prevented any satisfactory examination being made. It was impossible for the head to pass, and equally so to turn the child; it was agreed, therefore, to terminate the labour by perforation. A drachm of chloroform was given, and when completely under its influence, the operation was commenced. It was rendered unusually difficult from the extreme thinness of bones of the cranium, which gave way at once to the crotchet or craniotomy forceps. She was delivered in about an hour, and the placenta expelled in ten minutes afterwards. During her delivery she was restless, cried out sometimes, as if in pain, but afterwards lay in a tranquil sleep.

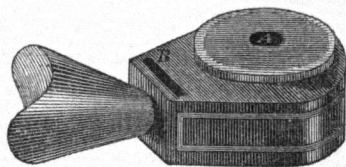
Mr. Rawlins, speaking of this patient's recovery, states, "I never saw a patient more comfortable than she has been since her delivery."

CASE VII.—*Forceps Operation.*

January 16th. At a very early hour in the morning (three o'clock) the writer received a message from Mr. Stewart of Weymouth-street, requesting him to see a case of protracted labour in the neighbourhood of Clerkenwell. The lady had been in severe labour for nearly forty-eight hours, and had suffered a great deal; the head of the child had descended into the cavity of the pelvis, and was there arrested in the second position; the ear could not be felt; the catheter passed readily into the urethra, and the finger could be introduced (although with difficulty) between the head and pubis. We determined to deliver, if possible, with the forceps. A drachm of chloroform was given. After a few inspirations she was composed, and in about three minutes lay apparently asleep.

While the blades of the forceps were being applied, she cried out, and during the extraction of the child moaned and muttered incoherently. Delivery was completed in about half an hour, and a living boy born. The uterus contracted firmly, and in ten minutes expelled the placenta. The bandage was applied, and

the soiled clothes removed before the lady regained her self-possession. She said she was conscious when the child was born, had been dreaming a good deal, felt some pain, but very slight, which increased as the head was being delivered. This patient slept quietly for five hours after her delivery, and awoke greatly refreshed. She was thirty-six years of age, and delivered of her first child.



THE INHALER.

In all the cases quoted (except in the first two), chloroform had been administered through an inhaler of very simple construction, contrived by Messrs. Stevens and Pratt, of Gower-street. A small circular tin box, to which a mouth-piece like a speaking-trumpet was attached, contained a piece of sponge. Behind the mouth-piece a tin plate was interposed, leaving a small fissure below for the vapour of chloroform to be drawn into the mouth. The expired air passed through an opening in the upper part of the mouth-piece, and atmospheric air entered through longitudinal fissures in the lid of the box, beneath which, a small piece of cloth was placed. Thus the patient inhaled chloroform by the mouth.

After one or two inspirations, the nostrils were closed by the fingers until the effect of chloroform was observable in the patient, when they were allowed to remain open. The admission of atmospheric air in this way prevented so rapid an action of the vapour as would otherwise take place. Its influence was less powerful than if the chloroform alone were inspired, and yet was quite sufficient to accomplish the desired object—relief from pain. The writer did not observe in any of the cases where chloroform was so given, the exciting effects produced by æther.

The dose of chloroform varied from half a drachm to a drachm; but before it was given to the patient, the writer generally tested its strength by taking a single inspiration of the vapour. A little practice in this way will soon enable the practitioner to detect weak and impure preparations of chloroform.

The effect is influenced as much by the manner of giving this anodyne as by the quantity administered. If half a drachm be inhaled without any mixture of atmospheric air, and by the mouth and nostrils, the effect is more rapid and complete than when double the quantity is given more gradually. The free admission of atmospheric air into the lungs, when the vital functions begin to give evidence of the influence of chloroform, the writer thinks very important; because it moderates its action, and prevents any dangerous constitutional disturbance, while it does not interfere with its anæsthetic effect on the sentient nerves.

The effect of chloroform, thus modified by the dose and manner of administration, may be examined in the same manner as Dr. Snow has investigated the effects of ether, according to its different stages or degrees of anæsthetic power.*

In the first degree (that caused by thirty or forty minims given through the inhaler) *the nerves of sensation* were blunted, the patient was conscious of the presence of the uterine pains, and also of the extreme relief she experienced from the inhalation of chloroform. As the vapour diminished, the sentient nerves

* Dr. Snow "divides ætherization into five degrees, which may be called degrees of narcotism. The division was made according to symptoms which may be observed before an operation begins, leaving out of the classification the immunity from pain, which can only be ascertained during the operation, and which, curiously, does not correspond with the state of the patient in other respects. In what I [Dr. Snow] called *the first degree*, there is exhilaration or altered emotions, or sensations of some kind, but the patient still retains consciousness and volition. *In the second degree*, the mental functions may still be performed, but only in an irregular manner; there may be ideas of a dreaming kind, and voluntary efforts in accordance with them, or the patient may be passive. When mental excitement occurs, it is chiefly in this degree in which the functions of the cerebral hemispheres seem to be impaired, but not yet abolished. *In the third degree*, these functions appear to be totally suspended, but those of the spinal cord and its nerves still continue to some extent; the *orbicularis palpebrarum* may contract when the eyelids are touched; there may be other involuntary motions resulting from external impressions, and groans or cries may occur, but no sounds of an articulate kind. There are also in this degree involuntary muscular contractions as an effect of the vapour — apparently a kind of excitement of the spinal cord. *In the fourth degree* no movement is obvious except that of respiration, which is unaffected by external impressions, and goes on regularly, though often with snoring, or even some degree of stertor. It would seem that the whole of the nervous centres are paralyzed by the vapour, except the *medulla oblongata*. In killing animals with vapours, I have observed the breathing to be difficult, or feeble, or otherwise impaired, before it finally ceased. This stage I call *the fifth degree*."—*Lancet*, February 12th, 1848. pp. 177-78.

gradually resumed their sensibility, so that the pain was inversely as the quantity of vapour inhaled. *Consciousness* remained unimpaired; the patient knew what was said by those about her, felt in a dreamy state, and when the pains returned, often cried out loudly with them; still, when the effect of chloroform quite passed off, she said she felt very little pain, and entreated for more chloroform. *The pulse* was not increased in frequency; but, when weak and small, often became full and strong. *Respiration* was at first a little unequal and hurried, but soon grew slow and deep, without any stertor. *The voluntary muscles* retained their power; the patient strained with her pains; the writer has, however, observed, in this stage, that these muscles are sometimes cataleptic. *The action of the Uterus* continues unimpaired, *the vagina and perinæum* are more relaxed, and the mucous secretion is increased. The dilatation of the os uteri does not seem to be hastened.

In the second degree, the patient was not only *insensible* to pain, but was quite *unconscious*. When not disturbed, she lay in an apparently sound sleep, the action of the uterus was unnoticed, but if exposed to some great irritation, she was restless, and sometimes struggled. Some patients cried out as much as if they were quite conscious of their sufferings: more frequently they muttered to themselves incoherently; but it is singular that when consciousness was restored, *they said they felt no pain*. Their exclamations also bore no proportion to the intensity of pain. In one case, the moment the hand entered the vagina, the patient cried out loudly, but as it passed along into the uterus, the cry subsided into a muttering delirium. *The pulse* was generally increased from ten to twenty beats, and again fell to its original rate.

Respiration was slow and deep, sometimes stertorous. *The voluntary muscles* were torpid as in sleep; the patient did not bear down with the action of the uterus; nevertheless, there were exceptions. In one case, the woman strained as much during the operation of turning as if she were awake, and was all the time unconscious of having done so, as she afterwards stated. *The action of the Uterus* continued, and the state of the passages were the same as in the former stage.

The third degree is one which the writer was always anxious to avoid in any of the cases where he used chloroform, believing, that however necessary it may be, in order to overcome the

excessively acute pain of some surgical operations, it is not essential nor advisable in the practice of midwifery. The patient is insensible, unconscious; the pulse, from being frequent, is slower and smaller. *Respiration* is stertorous. *The voluntary muscles* are paralyzed, sometimes spasmodically and irregularly contracted. *The action of the uterus* is suspended, *the surface* is cold, and *vomiting* may take place.

The writer has always been desirous to shun these effects; and therefore has not been so solicitous to produce the rapid and powerful influence of this agent. *In a case of ordinary natural labour*, he has been satisfied with the first degree of inhalation, and has reserved its use until near the conclusion of the second stage of labour, or before then, if the pains are very distressing. In one case only has he used it in the first stage, when it was greatly protracted and with decided benefit.

When an operation is required, he is desirous to have the full effect of chloroform in the second degree. It is essential that the patient should be as quiet as possible; for if consciousness be at all present, and especially if the patient be previously excited, she may become very restless and even violent. The state of perfect unconsciousness does not appear to the writer essential in natural labour; and it is sometimes desirable to avoid it.

Some patients, although very desirous to be saved from as much pain as possible, yet have a very great repugnance to a state of unconsciousness. The idea excites in their minds a thousand apprehensions, lest anything unforeseen should suddenly happen to them while in that state, and, however groundless these impressions, they are difficult to overcome. It is an advantage in such instances to moderate or remove pain without destroying consciousness. Other patients, however, are just the reverse, and are delighted to think that they can escape the sorrows of childbirth and be unconsciously delivered.

The first inspirations of chloroform are attended with a peculiar and disagreeable sensation, compared by some to a feeling of strangulation, by others to the effect on respiration caused by walking against a strong wind, when "the breath is taken away." This induces the patient sometimes to refuse further inhalation; when this is the case, it is better at first to give the dose rapidly, because this sensation soon passes away when the patient is completely under the influence of chloroform.

The state of the patient at the time of its administration should be attentively considered. If they have great dread or apprehension on their mind about chloroform, or are much excited, it would be more prudent not to administer it, because these impressions are exaggerated into a temporary delirium, sometimes very violent. For the same reason, everything should be done noiselessly, not to attract too much the attention, and perfect silence in the room maintained.

The writer is unwilling to allow himself to be drawn into speculations respecting the remarkable power of this agent: much has yet to be learned about it; and still further observation is required to obtain sufficient data to derive any general conclusions as to its effects. There are some points, however, which he thinks deserving the attention of the Society. He has found that chloroform produces its anodyne effect without any previous stage of excitement. This effect also passes away without causing excitement. In his trials with æther, he has observed that the patient became excited both before and after its anæsthetic power was produced; and for this reason he discontinued any further use of it. Comparing chloroform, sulphuric æther, and nitrous oxyde, with each other—does this exciting effect depend upon the presence of oxygen in the last two, and its absence from the first preparation?*

We do not yet know the effects of chloroform, nor of æther, on the blood. With both there is a sense of strangulation in the first inspirations. Does this depend on spasm of the *rima glottidis*? If so, it resembles what takes place at the commencement of an attack of convulsions; and this leads us to the consideration whether the irritant of the *medulla oblongata* may not be an excess of carbon in the blood, and convulsions one of the dangers to be apprehended from its imprudent use †. This spasm is more

* PROPORTIONS OF	NITROGEN.	OXYGEN.	CARBON.	HYDROGEN.	CHLORINE.
Nitrous oxyde	1 atom	1 atom			
Sulphuric æther		1 "	4 atoms	5 atoms	
Chloroform			2 "	1 "	3 atoms

† A case of "successful employment of chloroform in puerperal convulsions" is related by S. V. Fearn, Esq., in the *Med. Gazette*, February 12, 1848, but notwithstanding the successful issue of this case, the writer would be very apprehensive of the use of chloroform in true puerperal convulsions, characterised by violent

distinct with æther; and in two cases delivered under the influence of æther, the writer has seen the countenance of the patient altered, and become distinctly livid. In one of these cases also, the neck was retracted and all the voluntary muscles rendered quite rigid, as if convulsions were about to seize the patient. Chloroform did not produce such effects: the sense of strangulation was the only unpleasant symptom they had in common.

The influence of chloroform on parturition is, in a practical point of view, our most important consideration; and as far as his present experience of this anodyne extends, the writer is led to the following conclusions:—

- 1st.—It does not interfere with the action of the uterus, unless it be given in very large doses, which is never necessary.
- 2nd.—It causes a greater relaxation in the passages and perinæum; the mucous secretion from the vagina is also increased.
- 3rd.—It subdues the nervous irritation caused by severe pain, and restores nervous energy.
- 4th.—It secures the patient perfect repose for some hours after her delivery. These three last effects consequently render an operation much easier to perform, and the recovery of the patient afterwards much more favorable.
- 5th.—The order of its effects on the vital functions seems to be
—loss of sensation—partial loss of voluntary motion
—loss of consciousness—complete loss of voluntary motion—stertorous respiration—loss of involuntary motion—cessation of the action of the uterus—of respiration—of the action of the heart.

rigors, hissing, expiration, and rapid action of the uterus. Mr. Fearn's patient is described as "tossing about the bed violently in a state of total insensibility, pulse small and frequent, and the pupils exceedingly contracted," and "the uterine efforts had ceased for some hours." Such are the symptoms occasionally noticed by the writer when *hysterical convulsions* seize a patient in labour, which,ameleon-like, sometimes simulate true puerperal convulsions very closely, and which might be arrested by chloroform; but with his present impressions, he would consider even the premonitory symptoms of true puerperal convulsions sufficient to contra-indicate the use of chloroform.

6th.—Its injurious effects when an ordinary dose is given, seem to depend on constitutional peculiarities, or on improper management. Much excitement about the patient may render her violent. Catalepsy has occurred in some; clonic contractions, in others. Some patients are slow in recovering from the effect of a large dose; they remain giddy during the day, and sometimes faint when they stand upright.

The writer cannot say whether it hastens the dilatation of the os uteri. In one case where it was given, it did not seem to do so; but he can readily imagine, that when the progress of this stage is retarded by the irritability of the patient and her dread of pain, chloroform, if prudently administered, would be a most valuable means of removing this interruption to labour.

The purity of chloroform is of the last importance. If mixed with alcohol, it irritates the skin and excites the patient. At first, this preparation was confounded with chloric æther, which had all the exciting properties of sulphuric æther.

Pure chloroform in the fluid state is nearly one half heavier than water, its specific gravity being 1·480. In the state of vapour it is four times heavier than air: therefore the position of the patient during its administration makes an important difference in the quantity inhaled in a given time. If the patient be in a recumbent position with the head back, the vapour passes down quickly along with atmospheric air; but if sitting upright, so that it is drawn into the mouth from below, much less is consumed: just as a glass of wine may be either sipped, or emptied at a draught of its contents. "It was to be observed, (Dr. Snow remarks), that temperature exerted a great influence over the quantity of this vapour that the air would take up; and thus an elevation of little more than fifteen degrees in the warmth of the apartment, would double the amount that the patient would inhale in a given time if no means were taken to regulate the evaporation."

In order to test the purity of chloroform, Soubeiran proposes a mixture of equal parts of strong sulphuric acid and water; and when cool, a few drops of chloroform poured into the fluid, ought to sink to the bottom if sufficiently pure for medical use; but if they float on the surface, the chloroform should be rejected.

Chloroform is prepared from a mixture* of chloride of lime, water, and rectified spirit, “when (observes the editor of the *Pharmaceutical Journal*) a violent action ensues, accompanied by great frothing of the ingredients, so that if the still or distillatory vessel be not capable of holding ten times as much as the quantity of the ingredients introduced, the still-head may be blown off with considerable violence.” The dense liquid first obtained is impure chloroform, which, being treated with oil of vitriol, carbonate of baryta, or of potash, and subsequently distilling it from chloride of calcium, after repeated washings is rendered pure.

Not unfrequently, however, it will be found still to retain a minute portion of alcohol(?), the presence of which is considered by some persons to be prejudicial. M. Mialhe, in a communication recently made to the Academy of Sciences of Paris, states as the result of his researches:—

“1. That pure chloroform, applied to the skin or mucous membrane, produces simple redness, without cauterization or vesication. It acquires, however, caustic properties when mixed with a small quantity of absolute alcohol.

“2. That the chloroform used in medical practice, which has caused vesication of the lips or nostril, with irritation of the bronchial tubes, could not have been pure.

“3. That this chloroform contains a certain quantity of anhydrous alcohol. The presence of this liquid in chloroform was suspected by MM. Soubeiran and Gerdy, and it has been demonstrated by analysis. The alcohol may act by combining with and coagulating the albuminous fluids of the body, and thus giving rise to the local effects of irritation.

“Hence, before using chloroform vapour in surgical practice, it is indispensably necessary to ascertain whether it be pure. M. Mialhe finds that the following is a very delicate test of the presence of alcohol in chloroform:—Place some distilled water in a tube or glass, and drop on it a small quantity of chloroform.

* Chloride of Lime, in powder	4lbs.
Water	12lbs.
Rectified Spirit	12oz.

Mix in a *capacious* retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced (*Gray's Supplement to the Pharmacopœia*).

The greater part sinks immediately to the bottom of the vessel, owing to its great density (sp. gr. 1.48). A small quantity floats by repulsion, but may be made to fall in small globules by agitation. If the chloroform be pure, it remains transparent at the bottom of the vessel; but if it contain only a small portion of alcohol, the globules acquire a milky opacity.

“Assuming the whole of the facts to be as stated by M. Mialhe, this test would appear to be a very delicate one; for we have found that some specimens of chloroform which remained transparent when added to water, acquired a perceptible opalescence if treated in the same way after the addition of a one-thousandth part of absolute alcohol; and the effect became marked when the alcohol amounted to one three-hundredth. If rectified spirit be added in small quantity to transparent chloroform, the mixture becomes at once opalescent, although a larger quantity of spirit forms a clear solution; so that when transparent chloroform contains minute quantities of alcohol, it seems probable that the latter is in the anhydrous or nearly anhydrous condition, as stated by Mialhe, and that the milkiess which takes place, on the addition of water, is the consequence of the hydration of the alcohol. This milkiess generally disappears with a slight increase of temperature, the momentary application of a warm hand to the tube containing the mixture being sufficient to render it transparent. It may be inferred from this, that the test which appears to be so delicate at a low temperature, would not be equally, if at all, delicate in warm weather.

“When chloroform has become milky from contact with water, it immediately reacquires its transparency on shaking it with a little fused chloride of calcium. This effect is not so readily produced by contact with oil of vitriol; on the contrary, chloroform, previously transparent, becomes opalescent when oil of vitriol is added to it. If the opalescence be ascribed to hydration, the water must, in this case, be taken from the oil of vitriol, which is not probable.

“It is difficult to account for the effect ascribed to the presence of minute quantities of alcohol.”—*Pharmaceutical Journal*, January, 1848.

Dr. T. Cattell doubts the conclusiveness of these remarks, and proposes a new test for the detection of impure chloroform:—

“ 1.—It is stated, that impure chloroform possesses vesicating properties when applied to the skin or mucous membrane, whereas the pure liquid produces simple redness only—this is not correct. I have chloroform in which the presence of alcohol can be detected, but which will not induce any irritating action when applied to the skin. That chloroform may be made to produce a vesicating effect, I admit; but this is perfectly independent of any notion respecting its purity; the effect is referrible solely to the prevention of its evaporation, and of its limitation to a particular part. Did chloroform possess this property in a vaporized state, then, like the vapour of liquor of ammonia, it would, if inhaled, excite the capillaries of the mucous membrane into abnormal action; but this is not the case—its causticity has therefore no connexion either with its purity, or with its use as an anæsthetic agent.

“ 2.—The same remark applies to the opalescence said to be occasioned by dropping chloroform into distilled water. A short time since, when in town, I called upon a highly respectable manufacturer of chloroform, and observing two bottles of the liquid, one being opalescent, and the other not, I inquired into the cause of the difference, and was informed, that it was owing to the chloroform having been put into the bottle not perfectly dry, but had it been first rinsed with a little spirits of wine, the fluid would have remained quite clear.

“Suspecting from this that the chloroform which had been purchased contained alcohol, I tried the following experiments:—

“(a) To about two drachms of chloroform were added a crystal or two of chromic acid, which became, after a few moments' agitation, changed into the green oxide of chrome, a result positively indicative of the presence of alcohol.

“(b) To the same quantity of chloroform was added a small quantity of bi-chromate of potash and sulphuric acid, the green oxide of chrome resulting in this as in the other instance.”—*Lancet, February 5th, 1848.*

The mode of administering chloroform adopted by the writer is different from the method more generally used. The vapour is inhaled only by the mouth, while the nostrils are kept closed. He did not adopt this mode of inhalation by design, but having by accident seen with Mr. Twinberrow (the chemist who prepared for him some very pure chloroform) the very convenient little inhaler of Messrs. Stevens and Pratt, and employed it with perfect success, he has since continued to use it, and has not found any disadvantage attending this manner of inspiring the vapour. On the contrary, it seems to him to be rather more safe and convenient than the sponge or handkerchief in one respect. Atmospheric air is more readily admitted into the lungs through the nostrils when it is required, and consequently there is less danger of chloroform causing *Asphyxia*.

The writer cannot conclude these observations without expressing (in common with the profession) his deep sense of obligation to Professor Simpson, for his zeal in investigating this important subject. The inquiry has led him to the happy result of discovering the powers of an agent that, if our anticipations are realised by future experience, the writer believes will lead to very important improvements in the practice of midwifery.

NOTE.

SINCE these observations were written, an instance of the fatal application of chloroform occurred in the neighbourhood of Newcastle-upon-Tyne, which is exciting great attention among the profession, no little apprehension on the part of the public, and is increasing in no small degree the prejudice which always exists against novel modes of treatment. The following are the particulars of the Coroner's inquest, held at Winlaton, about five miles from Newcastle-upon-Tyne, on view of the body of Hannah Greener, a girl of 15 years of age, who died on Friday, January 28.

"JOHN RAYNE said, the deceased suffered a great deal in her feet, and about four months ago she became an inmate of the infirmary at Newcastle-upon-Tyne, when she had one of her toe-nails taken off. After she left the Infirmary, she returned to her father's, but her toes still continued bad. Mr. Meggison, surgeon, of Whickham, was called in to attend her, and it was considered advisable to remove the nail from the great toe of her right foot. Mr. Meggison and his assistant attended about one o'clock on Friday afternoon, to perform the operation. No one was present when the operation was performed but Mr. Meggison, his assistant, and myself [Rayne]." *Lancet, February 5.*

"Deceased was seated in a chair by the fire, and Dr. Meggison held a pocket-handkerchief to the mouth and nose; he kept moving it at times and looking at his watch, and felt the deceased's pulse. The assistant had the instruments all ready to commence. *The deceased appeared to be fainty like.* Dr. Meggison then told the assistant to take off the nail; witness held her leg to steady the foot. The assistant took off the nail very quickly; when he was removing it, the deceased shook her foot; she did not speak, but moaned after the nail was off. They dashed some water in her face and *her eyes moved.* Dr. Meggison put some brandy into her mouth, and there was a *rattling in her throat*; she did not come to her senses; she appeared in a fainting fit. Dr. Meggison bled her in the right arm, she bled a little, may be a table spoonful or so. He bled her also in the neck. She died without ever recovering."—*Medical Gazette, February 12.*

"THOMAS NATHANIEL MEGGISON said—Hannah Greener died under my hands on Friday, while under the influence of chloroform, which I had given her for the purpose of producing insensibility during the operation of removing one of her toe-nails. She was suffering from onychia. She never complained of pain in the chest to me. The pain in her toes might cause her to become thinner. I seated her in a chair and put about a *tea-spoonful* of chloroform into a tablecloth, and held it to her nose. After she had drawn her breath twice she pulled my hand down. I told her to draw her breath naturally, which she did, and in about half a minute I observed *the muscles of the arm become rigid, and her breathing a little quickened, but not stertorous.* I had my hand on her pulse, which was natural, until the muscles became rigid. *It then appeared somewhat weaker*—not altered in frequency. I then told Mr. Lloyd, my assistant, to begin the operation, which he did, and took the nail off. When the semicircular incision was made, she gave a

struggle or jerk, which I thought was from the chloroform not having taken sufficient effect. I did not apply any more. *Her eyes were closed, and I opened them, and they remained open. Her mouth was open, and her lips and face blanched.* When I opened her eyes they were congested. I called for water when I saw her face blanched, and I dashed some of it in her face. It had no effect. *I then gave her some brandy, a little of which she swallowed with difficulty.* I then laid her down on the floor, and attempted to bleed her in the arm and jugular vein, but only obtained about a spoonful. She was dead, I believe, at the time I attempted to bleed her. The last time I felt her pulse was immediately previous to the blanched appearance coming on, and when she gave the jerk. The time would not be more than three minutes from her first inhaling the chloroform till her death.

"Mr. LLOYD.—I am the assistant to Mr. Meggison, and I produce the bottle containing the remainder of the chloroform that was used for the deceased. The bottle originally contained an ounce. There was about a spoonful taken out. I have heard the statement of Mr. Meggison, and confirm it.

"At this point, the inquiry was adjourned, when

"SIR JOHN FIFE said—I am a surgeon in Newcastle-upon-Tyne. I made a post-mortem examination of the body of Hannah Greener, the deceased, along with Dr. Glover, about three o'clock in the afternoon of Saturday last. The body was that of a well-grown girl of fifteen. The legs were rather thin, calves not sufficiently fleshy, breasts tolerably well developed, and on the whole thin. There was simply the ordinary degree of rigidity. The eyes presented no appearance of congestion. On opening the chest, the lungs were not collapsed. The external appearance of both lungs, over the whole surface, but especially in the inferior portions, was that of organs in a very high state of congestion. They were mottled with patches of a deep purple, bluish, or scarlet hue. They were everywhere crepitant. Along the outer and anterior border of both lungs, particularly of the upper lobe of the left lung, were several emphysematous bubbles of small size. On cutting into the pulmonary tissue, it was found free from tubercles, unless some hard bodies about the roots of the bronchia, enlarged and partially indurated glands, could be so called. The pulmonary tissue was filled with bloody froth, which was also found in the interior of the bronchia mixed with mucus. There was no appearance of hepatization. On examining the larynx and trachea, the epiglottis was found reddened at the summit, of a vermilion hue. The mucous membrane of the larynx was redder than natural, mottled with vascular patches. The sinuses of the larynx contained a good deal of dark mucus. The œsophagus was healthy. The stomach was distended with food. Digestion had been going on at the time of death. The liver, kidneys, and spleen were more congested than usual. The heart contained dark fluid blood in both its cavities; very little in the left. Its structure, and that of the great vessels near it, were healthy. The brain, externally and internally, was more congested than usual, and the ventricles contained rather more than usual quantity of serum. In my opinion the cause of death was the congestion of the lungs; and

that congestion I ascribe to the inhalation of chloroform. Of the power of chloroform to occasion such congestion no doubt can be entertained after the experiments of Mr. Wakley and Dr. Glover on animals. There does not seem to have been anything in the previous condition of the young woman to have prevented the surgeon from having recourse to chloroform, as a means of allaying pain in one of the most painful operations of surgery. No human foresight, no human knowledge, no degree of science, could have forewarned any man against the use of chloroform in this case.

“By a JUROR. — The immediate cause of death in the case of the deceased was congestion of the lungs. Congestion is the state of a body gorged with blood, like a blood-shot eye; it is sometimes gorged to such an extent as to burst the smaller vessels, and escape in dots or drops.”

“ROBERT MORTIMER GLOVER. — I have heard the evidence of Sir John Fife, and fully agree with it.”

Dr. MEGGISON has addressed a letter to the Editor of the “Medical Gazette,” in which he observes: — “She appeared to dread the operation and fretted a good deal: in fact she commenced sobbing on our entering the house, and continued so until seated in the operating chair, and commencing the inhalation, which was done from a handkerchief, on which a tea-spoonful of chloroform had been poured. After drawing her breath twice, she pulled my hand from her mouth (from a sense of strangulation?). I told her to put her hands on her knees, and to breathe quietly, which she did. In about half a minute, seeing no change in her breathing or alteration of pulse, I lifted her arm, *which I found rigid*. I looked at the pupil, and pinched her cheek, and finding her insensible, requested Mr. Lloyd to begin the operation. At the termination of the semilunar incision, she gave a kick or twitch, which caused me to think the chloroform had not sufficient effect. I was proceeding to apply more to the handkerchief, *when her lips, which had been previously of good colour, became suddenly blanched*, and she spluttered at the mouth as if in epilepsy. I threw down the handkerchief, dashed cold water in her face, and *gave her some internally, followed by brandy*, without however the least effect, not the slightest attempt at a rally being made. We laid her on the floor, opened a vein in the arm and the jugular vein, but no blood flowed. *The whole process of inhalation, operation, and death, could not I should say have occupied more than two minutes.*” — *Medical Gazette*, Feb. 12th, p. 255.

Such are the facts of this melancholy case, which, if it occurred on the first introduction of this preparation into practice, would be sufficient to negative its use altogether. In its present position, however, it follows a multitude of cases, in which chloroform has been employed with the most perfect safety and success: it therefore stands as an exception to be explained, sufficient to check heedless and incautious experiments with a dangerous power, and a useful caution as proving the extent of the danger; but to discard chloroform from practice, because this single fatal case has occurred, would be about as reasonable as to prohibit the use of opium or belladonna, because death has been the consequence of administering these preparations.

The cause of death, in the case quoted, is certainly obscure. Professor Simpson attributes it to simple asphyxia, caused by giving the girl "water" and "brandy," when she had lost the power of swallowing; she was choked, in fact, by the fluid. It is highly probable that, if artificial respiration had been attempted at this point of exhaustion of the vital powers, so as to sustain respiration and relieve the congestion in the lungs, the girl might have survived; and it is perfectly true, that any fluid over the larynx must remove all chance of such a result; but still there does not appear to be sufficient evidence to prove that this, and not chloroform, caused her death. In the absence of artificial respiration, it appears to the writer that she would have died, although no water or brandy had been given to her. There was abundant evidence of the poisonous effect of chloroform. The muscles became rigid, and the pulse appeared somewhat *weaker* before the operation was performed. Immediately after it "she gave a kick or twitch," then her eyes were opened and remained open. Her mouth was open "and her lips and face blanched." Her eyes were also "congested." All this occurred before she got any fluid. Neither the state of the respiration nor of the heart are mentioned at this stage; but the girl seemed then to be dying, if not dead; the convulsive jerk of the lower extremity preceding death here, as in the lower animals which have been poisoned by chloroform. These are not the symptoms we should expect, if her death was the result of simple asphyxia; there was no lividity of the features nor laboured respiration. The symptoms were those of syncope, and death seemed instantaneous, as if produced by the direct action of the poison on the nervous centres. If this view be correct, the congestion of the lungs, the brain, the liver, and all the viscera, as well as congestion of the eye, observed before death, should be considered as effects consequent on the shock to the nervous centres, which in itself seemed to be the cause of death.

Another difficulty connected with this case, is *the great disproportion* between the powerful, the fatal effect, and its apparent cause. A tea-spoonful or a drachm of chloroform is a very medium dose to give a patient: much more has been administered in surgical operations, without the least bad consequence; but here it has caused death. It would, therefore, be very desirable to know a little more accurately the precise manner of its administration. The girl was sitting before a fire; and if even a drachm of chloroform were poured on a handkerchief.*; applied at once to the mouth and nostrils so as to exclude all atmospheric air, and the vapour expanded by heat, the writer could suppose it possible thus to produce its poisonous effects. It would be very unjust, however, to draw any conclusions in the present state of the question; nor will it be possible to do so until the enquiries, which discussion will no doubt elicit, are satisfied.

* In one account it is stated *on a tablecloth*.

