Simpson on Chloroform.

AN

ACCOUNT

OF A

NEW ANÆSTHETIC AGENT,

AS A

SUBSTITUTE FOR SULPHURIC ETHER

IN

SURGERY AND MIDWIFERY.

BY

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RUSHTON, CLARK, & CO.

PREFACE TO THE AMERICAN EDITION.

The subscribers have been induced to re-publish this pamphlet in consequence of the deep interest felt, at the present time, in everything relating to the newly discovered method of relieving and preventing pain during surgical and all other painful operations.

During the short time which has elapsed since the successful experiments with Ether were made known to the medical world, scientific and medical men have investigated the subject with great attention, and every arrival from Europe brings accounts of new series of successful experiments, proving the value of the discovery.

As Dr. Simpson speaks so confidently of the superiority of Chloroform to Ether, as being more uniform in its effects, and also more safe and agreeable, and the few extracts from his pamphlet which have appeared in our medical journals and newspapers being so incomplete, we have thought the republication of it would meet with the approval of the public generally.

RUSHTON, CLARK, & CO.,
(late Rushton & Co.)

New York, January 1, 1848.

SECOND EDITION.

During the few weeks that have elapsed since republishing this pamphlet, Chloroform has been used by some of the most celebrated Surgeons and Dentists in the country, with the most gratifying success.

R., C., & CO.

February 1st, 1848.

PREFACE TO THIRD AMERICAN EDITION.

Since the publication of our Second Edition of Dr. Simpson's pamphlet, we have received reports of numerous cases from abroad, where Chloroform has maintained its reputation for all the advantages claimed for it by Dr. Simpson, and it has been used in every variety of operation by the Physicians, Surgeons, and Dentists in our own country, particularly in New York, Boston, and Philadelphia, with, in all cases, the most gratifying success, where a pure article had been used. We annex a number of additional cases reported by Dr. Simpson, and others, which we trust will be found interesting to the Medical Faculty.

Testimonials to the value of Chloroform from a number of distinguished American Surgeons, are also contained in the Appendix.

As this newly discovered remedy is so valuable an agent in the hands of the practitioner, when perfectly pure, and its effect depends so much upon its purity, too much care cannot be taken in procuring it from a reliable source, as there is much of it which is offered for sale that is quite impure. One of the best and most simple tests of its purity, is its specific gravity, which should be 1·480,—about 5½ to 6 fluid drachms should weigh an ounce.

As many physicians and patients have complained that, in its application with a sponge or handkerchief, it is very liable to vesicate the lips, we have invented a small inhaler, perfectly simple and economical, which prevents the possibility of such an occurrence, and as the nostrils are not covered, the patient receives a portion of atmospheric air with the Chloroform, which is less likely to produce coughing, and, at the same time, is less liable to headache and irritation of the mucous membrane of the nose, than when the Chloroform vapor is inhaled both by mouth and nostrils.

R., C., & Co.

ON CHLOROFORM.

From the time at which I first saw Ether-Inhalation successfully practised in January last, I have had the conviction impressed upon my mind, that we would ultimately find that other therapeutic agents were capable of being introduced with equal rapidity and success into the system, through the same extensive and powerful channel of pulmonary absorption. In some observations, which I wrote and published in February last, relative to the inhalation of sulphuric ether in midwifery, I stated that, in several obstetric cases, I had used ergot of rye in this way, along with ether.—(See *Monthly Journal of Medical Science*, pp. 724; and 795, case of successful inhalation of opium, to arrest the vomiting of pregnancy.)

With various professional friends, more conversant with chemistry than I am, I have, since that time, taken opportunities of talking over the idea which I entertained of the probable existence or discovery of new therapeutic agents, capable of being introduced into the system by respiration,

and the possibility of producing for inhalation vaporizable or volatile preparations of some of our more active and old established medicines: and I have had, during the summer and autumn, ethereal tinctures, &c., of several potent drugs, manufactured for me, for experiment, by Messrs. Duncan, Flockhart, & Co., the excellent chemists and druggists of this city.

Latterly, in order to avoid, if possible, some of the inconveniences and objections pertaining to sulphuric ether—(particularly its disagreeable and very persistent smell, its occasional tendency to irritation of the bronchi during its first inspirations, and the large quantity of it occasionally required to be used, more especially in protracted cases of labor)—I have tried upon myself and others the inhalation of different other volatile fluids, with the hope that some one of them might be found to possess the advantages of ether, without its disadvantages. For this purpose, I selected for experiment and have inhaled several chemical liquids of a more fragant or agreeable odor, such as the chloride of hydro-carbon (or Dutch liquid), acetone, nitrate or oxide of ethyle (nitric ether,) benzin, the vapor of iodoform, &c.* I have found, however, one

* In talking over, with different chemists, what fluids might be sufficiently volatile to be respirable, and hence deserving of being experimented upon, Mr. Waldie first named to me the Perchloride of Formyle as worthy, among others, of a trial;—Dr. Gregory suggested a trial of the chloride of hydrocarbon, &c. I have been deeply indebted to Dr.

infinitely more efficacious than any of the others, viz. Chloroform, or the Perchloride of Formyle, and I am enabled to speak most confidently of its superior anæsthetic properties, having now tried it upon upwards of thirty individuals. The liquid I have used has been manufactured for me by Mr. Hunter, in the laboratory of Messrs. Duncan, Flockhart, & Co.

Chloroform was first discovered and described at nearly the same time by Soubeiran (1831), and Liebig (1832); its composition was first accurately ascertained by the distinguished French chemist, Dumas, in 1835.—See the *Annales de Chimie et de Physique*, vols. xlviii. xlix. and lviii. It has been used by some practitioners internally; Guillot prescribed it as an anti-spasmodic in asthma, exhibiting it in small doses, and diluted 100 times.—(See Boucherdet's *Annuaire Therapeutique* for 1844, p. 35.) But no person, so far as I am aware, has used it by inhalation, or discovered its remarkable anæsthetic properties till the date of my own experiments.

It is a dense, limpid, colorless liquid, readily evaporating, and possessing an agreeable, fragrant, fruit-like odor, and a saccharine pleasant taste.

Gregory and Dr. Anderson, for their kindness in furnishing me with the requisite chemical agents for these experiments;—and also to my assistants, Dr. Keith and Dr. Duncan, for the great and hearty zeal with which they have constantly aided me in conducting the inquiry.

As an inhaled anæsthetic agent, it possesses over sulphuric ether the following advantages:—

1. A greatly less quantity of Chloroform than of ether is requisite to produce the anæsthetic effect; usually from a hundred to a hundred and twenty drops of Chloroform only being sufficient; and with some patients much less. I have seen a strong person rendered completely insensible by six or seven inspirations of thirty drops of the liquid.

2. Its action is much more rapid and complete, and generally more persistent. I have almost always seen from ten to twenty full inspirations suffice. Hence the time of the surgeon is saved; and that preliminary stage of excitement, which pertains to all narcotizing agents, being curtailed, or indeed practically abolished, the patient has not the same degree of tendency to exhilaration and talking.*

* In practice I have found that any such tendency, even with ether, is avoided by, 1st, giving the patient from the first a large and overwhelming dose of the vapor, and 2ndly, by keeping him perfectly quiet and still, and preventing all noise and talking around him. I have elsewhere insisted on the importance of these points. (See the numbers of the Monthly *Journal of Medical Science* for March, 1847, p. 726, and for September, p. 154.) In the paper last referred to, I took occasion, when discussing the conditions requisite for insuring successful etherization, to observe, "*First*, The patient ought to be left, as far as possible, in a state of absolute quietude and freedom from mental excitement, both during the induction of etherization, and during his recovery from it. All talking and all questioning should be strictly pro-

3. Most of those who know from previous experience the sensations produced by ether inhalation, and who have subsequentlybreathed the Chloroform, have strongly declared the inhalation and influence of Chloroform to be far more agreeable and pleasant than that of ether.

4. I believe, that considering the small quantity requisite, as compared with ether, the use of Chloroform will be less expensive than that of ether; more especially, as there is every prospect that the

hibited. In this way any tendency to excitement is eschewed, and the proper effect of the ether inhalation more speedily and certainly induced. And, *Secondly*, with the same view, the primary stage of exhilaration should be entirely avoided, or at least reduced to the shortest possible limit, by impregnating the respired air as fully with the ether vapor as the patient can bear, and by allowing it to pass into the lungs both by the mouth and nostrils, so as rapidly and at once to superinduce its complete and anæsthetic effect; * * * * a very common but certainly a very unpardonable error being to exhibit an imperfect and exciting, instead of a perfect and narcotizing dose of the vapor. Many of the alleged failures and misadventures are doubtless entirely attributable to the neglect of this simple rule;—not the principle of etherization, but the mode of putting it in practice being altogether to blame. But, *Thirdly*, whatever means or mode of etherization is adopted, the most important of the conditions required for procuring a satisfactory and successful result from its employment in surgery, consists in obstinately determining to avoid the commencement of the operation itself, and never venturing to apply the knife *until* the patient is under the full influence of the ether-vapour, and *thoroughly and indubitably soporized by it.*" In fulfilling all these indications, the employment of Chloroform evidently offers great and decided advantages, in facility and efficiency, over the employment of ether.

means of forming it may be simplified and cheapened.

5. Its perfume is not unpleasant, but the reverse; and the odor of it does not remain, for any length of time, obstinately attached to the clothes of the attendant,—or exhaling in a disagreeable form from the lungs of the patient, as so generally happens with sulphuric ether.

6. Being required in much less quantity, it is much more portable and transmissible than sulphuric ether.

7. No special kind of inhaler or instrument is necessary for its exhibition. A little of the liquid diffused upon the interior of a hollow-shaped sponge, or a pocket-handkerchief, or a piece of linen or paper, and held over the mouth and nostrils, so as to be fully inhaled, generally suffices in about a minute or two to produce the desired effect.*

* When used for surgical purposes, perhaps it will be found to be most easily given upon a handkerchief, gathered up into a cup-like form in the hand of the exhibitor, and with the open end of the cup placed over the nose and mouth of the patient. For the first inspiration or two, it should be held at the distance of half an inch or so from the face, and then more and more closely applied to it. To insure a rapid and perfect anæsthetic effect—more especially where the operation is to be severe—one or two teaspoonfuls of the Chloroform should be at once placed upon the hollow of the handkerchief, and immediately held to the face of the patient.

I have not yet had an opportunity of using Chloroform in any capital surgical operations, but have exhibited it with perfect success, in tooth-drawing,* opening abscesses, for annulling the pain of dysmenorrhœa and of neuralgia, and in two or three cases where I was using deep, and otherwise very painful galvano-puncture for the treatment of ovarian dropsy, &c. I have employed it also in obstetric practice with entire success. The lady to whom it was first exhibited during parturition, had been previously delivered in the country by perforation of the head of the infant, after a labor of three days' duration.

Generally a snoring sleep speedily supervenes; and when it does so, it is a perfect test of the superinduction of complete insensibility. But a patient may be quite anæsthetic without this symptom supervening.

* A young dentist who has himself had two teeth extracted lately,—one under the influence of ether, and the other under the influence of Chloroform,—writes me the following statement of the results:—"About six months ago, I had an upper molar tooth extracted whilst under the influence of ether, by Mr. Imlach. The inhalation was continued for several minutes before I presented the usual appearance of complete etherization; the tooth was then extracted; and, although I did not feel the least pain, yet I was conscious of the operation being performed, and was quite aware when the crash took place. Some days ago, I required another molar extracted on account of toothache, and this operation was again performed by the same gentleman. I inhaled the vapour of Chloroform, half a drachm being poured upon a handkerchief for that purpose, and held to my nose and mouth. Insensibility took place in a few seconds; but I was so completely *dead* this time, that I was not in the very slightest degree aware of anything that took place. The subsequent stupifying effects of the Chloroform went off more rapidly than those of the ether; and I was perfectly well and able again for my work in a few minutes."

In this, her second confinement, pains supervened a fortnight before the full time. Three hours and a-half after they commenced, and, ere the first stage of the labor was completed, I placed her under the influence of the Chloroform, by moistening, with half a teaspoonful of the liquid, a pocket handkerchief, rolled up into a funnel shape, and with the broad or open end of the funnel placed over her mouth and nostrils. In consequence of the evaporation of the fluid, it was once more renewed in about ten or twelve minutes. The child was expelled in about twenty-five minutes after the inhalation was begun. The mother subsequently remained longer soporose than commonly happens after ether. The squalling of the child did not, as usual, rouse her; and some minutes elapsed before the placenta was expelled, and after the child was removed by the nurse into another room, before the patient awoke. She then turned round and observed to me that she had "enjoyed a very comfortable sleep, and indeed required it, as she was so tired,* but would now be more able for the work before her." I evaded entering into conversation with her, believing, as I have already stated, that the most complete possible quietude forms one of the principal secrets for the successful employment

* In consequence of extreme anxiety at the unfortunate result of her previous confinement, she had slept little or none for one or two nights preceding the commencement of her present accouchement.

of either ether or Chloroform. In a little time she again remarked that she was afraid her "sleep had stopped the pains." Shortly afterwards, her infant was brought in by the nurse from the adjoining room, and it was a matter of no small difficulty to convince the astonished mother that the labor was entirely over, and that the child presented to her was really her "own living baby."

Perhaps I may be excused from adding, that since publishing on the subject of Ether Inhalation in Midwifery, seven or eight months ago,* and then for the first time directing the attention of the medical profession to its great use and importance in natural and morbid parturition, I have employed it, with few and rare exceptions, in every case of labor that I have attended; and with the most delightful results. And I have no doubt whatever, that some years hence the practice will be general. Obstetricians may oppose it, but I believe our patients themselves will force the use of it upon the profession.† I have never had the pleasure of watching over a series of better and more rapid recoveries; nor once witnessed any disagreeable result fol-

* See *Monthly Journal of Medical Science* for February, p. 639; for March, p. 718 and 721; and April, p. 794, &c.

† I am told that the London physicians, with two or three exceptions only, have never yet employed ether-inhalation in their midwifery practice. Three weeks ago, I was informed in a letter from Professor Montgomery of Dublin, that he believed that in that city, up to that date, it had not been used in a single case of labor.

low to either mother or child; whilst I have now seen an immense amount of maternal pain and agony saved by its employment. And I most conscientiously believe that the proud mission of the physician is distinctly twofold—namely, to alleviate human suffering, as well as preserve human life.

CHEMICAL CONSTITUTION OF CHLOROFORM.

Formyle is the hypothetical radical of Formic acid. In the red ant (*Formica rufa*) formic acid was first discovered, and hence its name. Gehlen pointed it out as a peculiar acid; and it was afterwards first artificially prepared by Doebereiner. Chemists have now devised a variety of processes, by which formic acid may be obtained from starch, sugar, and, indeed, most other vegetable substances.

A series of chlorides of Formyle are produced when chlorine and the hypochlorites are brought to act on the chloride, oxide, and hydrated oxide of methyle (pyroxylic or wood spirit). In the same way as formic acid may be artificially procured from substances which do not contain Formyle ready formed,—so also are the chlorides of this radical capable of being procured from substances which do not originally contain it.

Chloroform, Chloroformyle, or the Perchloride of Formyle, may be made and obtained artificially by

various processes,—as by making milk of lime, or an aqueous solution of caustic alkali act upon chloral,—by distilling alcohol, pyroxylic spirit, or acetone, with chloride of lime,—by leading a stream of chlorine gas into a solution of caustic potass in spirit of wine, &c. The preparation which I have employed, was made according to the following formula of Dumas:—

"R. Chloride of lime in powder, ... lb. IV.
Water, ... lb. XII.
Rectified Spirit, ... f ʒ XII.

"Mix in a capacious retort or still, and distill as long as a dense liquid, which sinks in the water with which it comes over, is produced."—(Gray's *Supplement to the Pharmacopœia*, 1846, p. 633.)

The resulting Perchloride of Formyle consists of two atoms of carbon, one of hydrogen, and three of chlorine. Its specific gravity is much greater than that of water, being as high as 1·480. It boils at 141°. The density of its vapor is 4·2. It is not inflammable; nor changed by distillation with potassium, potash, sulphuric, or other acids.—(See Turner's *Elements of Chemistry*, 8th edition, p. 1009; Gregory's *Outlines of Chemistry*, part ii., p. 401; Fownes' *Manual of Elementary Chemistry*, p. 419; Thomson's *Chemistry of Organic Bodies*, p. 312; Loewig's *Organische Chemie*, vol. i., p. 498.)

It is now well ascertained, that three compound

chemical bodies possess, when inhaled into the lungs, the power of superinducing a state of anæsthesia, or insensibility to pain in surgical operations, &c., namely, Nitrous Oxide, Sulphuric Ether, and Perchloride of Formyle. The following tabular view shows that these agents are entirely different from each other in their chemical constitution, and hence that their elementary composition affords no apparent clue to the explanation of their anæsthetic properties:

	Propor. of Nitrogen.	Propor. of Oxygen.	Propor. of Carbon.	Propor. of Hydrogen.	Propor. of Chlorine.
Nitrous Oxide.	1 Atom.	1 Atom.	----	----	----
Sulphuric Ether.	----	1 Atom.	4 Atoms.	5 Atoms.	----
Chloroform,	----	----	2 Atoms.	1 Atom.	3 Atoms.

It is perhaps not unworthy of remark, that when Soubeiran, Liebig, and Dumas engaged, a few years back, in those inquiries and experiments by which the formation and composition of Chloroform was first discovered, their sole and only object was the investigation of a point in philosophical chemistry. They labored for the pure love and extension of knowledge. They had no idea that the substance to which they called the attention of their chemical

brethren could or would be turned to any *practical* purpose, or that it possessed any physiological or therapeutic effects upon the animal economy. I mention this to show, that the *cui bono* argument against philosophical investigations, on the ground that there may be at first no apparent practical benefit to be derived from them, has been amply refuted in this, as it has been in many other instances. For I feel assured, that the use of Chloroform will soon entirely supersede the use of ether; and, from the facility and rapidity of its exhibition, it will be employed as an anæsthetic agent in many cases, and under many circumstances, in which ether would never have been had recourse to. Here then we have a substance which, in the first instance, was merely interesting as a matter of scientific curiosity and research, becoming rapidly an object of intense importance, as an agent by which human suffering and agony may be annulled and abolished, under some of the most trying circumstances in which human nature is ever placed.

POSTSCRIPT.

Since the above observations were sent to the press, I have—through the great kindness of Professor Miller and Dr. Duncan—had an opportunity of trying

the effects of the inhalation of Chloroform, to-day, in three cases of operation in the Royal Infirmary of Edinburgh. A great collection of professional gentlemen and students witnessed the results, and among the number was Professor Dumas of Paris, the chemist who first ascertained and established the chemical composition of Chloroform. He happened to be passing through Edinburgh, engaged along with Dr. Milne Edwards, who accompanied him, in an official investigation for the French Government,—and was, in no small degree, rejoiced to witness the wonderful physiological effects of a substance with whose chemical history his own name was so intimately connected.

I append notes, obligingly furnished to me by Professor Miller and Dr. Duncan, of the three cases of operation. The two first cases were operated on by Professor Miller ; the third by Dr. Duncan. In applying the Chloroform in the first case, I used a pocket-handkerchief as the inhaling instrument; in the two last I employed a hollow sponge.

Case I.—"A boy, four or five years old, with necrosis of one of the bones of the fore-arm. Could speak nothing but Gaelic. No means, consequently, of explaining to him what he was required to do. On holding a handkerchief, on which some Chloroform had been sprinkled, to his face, he became frightened, and wrestled to be away. He was

held gently, however, by Dr. Simpson, and obliged to inhale. After a few inspirations he ceased to cry or move, and fell into a sound snoring sleep. A deep incision was now made down to the diseased bone; and, by the use of the forceps nearly the whole of the radius, in the state of sequestrum, was extracted. During this operation, and the subsequent examination of the wound by the finger, not the slighest evidence of the suffering of pain was given. He still slept on soundly, and was carried back to his ward in that state. Half an hour afterwards, he was found in bed, like a child newly awakened from a refreshing sleep, with a clear merry eye, and placid expression of countenance, wholly unlike what is found to obtain after ordinary etherization. On being questioned by a Gaelic interpreter who was found among the students, he stated that he had never felt any pain, and that he felt none now. On being shown his wounded arm, he looked much surprised, but neither cried nor otherwise expressed the slightest alarm.

Case II.—"A soldier who had an opening in the cheek—the result of exfoliation of the jaw—was next made to inhale. At first he showed some signs of moving his hands too freely; but soon also fell into a state of sleep and snoring. A free incision was made across the lower jaw, and from this the dense adhering integuments were freely dissect-

ed all round, so as to raise the soft parts of the cheek. The edges of the opening were then made raw, and the whole line of incision was brought together by several points of suture. This patient had previously undergone two minor operations of a somewhat similar kind; both of them had proved unsuccessful, and he bore them very ill—proving unusually unsteady, and complaining bitterly of severe pain. On the present occasion, he did not wince or moan in the slightest degree; and, on the return of consciousness, said that he had felt nothing. His first act, when apparently about half awake, was suddenly to clutch up the sponge with which the Chloroform was used, and re-adjust it to his mouth, obviously implying that he had found the inhalation from it anything but a disagreeable duty.

"This case was further interesting, as being one of those operations in the region of the mouth, in which it has been deemed impossible to use ether, and certainly it would have been impossible to have performed the operation with any complicated inhaling apparatus applied to the mouth of the patient."

CASE III.—"A young man, of about twenty-two years of age, having necrosis of the first phalanx of the great toe, and ulceration of the integuments, the consequence of injury. The ulcerated surface

was exceedingly tender to the touch, so much so, that he winced whenever the finger was brought near to it; and the slightest pressure made him cry out. After the removal of the dressings, which caused some pain and fretting, the inhalation was commenced, and the patient almost immediately* became insensible, and lay perfectly still, while the diseased mass was being removed by amputation of the toe through the middle of the second phalanx. The inhalation was now stopped. The edges of the wound were then brought together with three stitches, and the wound dressed. The patient shortly afterwards awoke, looked round him, and gratefully declared his entire and perfect freedom from all pain and uneasiness during the operation."

The whole quantity of Chloroform used in these three operations did not exceed half an ounce,—and, as Professor Miller afterwards observed to the students that were present, if ether had been used, several ounces of it would have been requisite to produce the same amount of anæsthetic effect.

The following case occurred also to-day, to Mr. Miller, in private practice. The notes of it, and the subsequent remark, are in his own words.

Case IV.—"A young lady wished to have a tumor (encysted) dissected out from beneath the angle of the jaw. The Chloroform was used in small quan-

* Dr. Christison, who was watching the result, informs me that this patient was affected in half a minute.

tity (about a drachm) sprinkled upon a piece of operation sponge. In considerably less than a minute she was sound asleep, sitting easily in a chair, with her eyes shut, and with her ordinary expression of countenance. The tumor was extirpated, and a stitch inserted, without any pain having been either shown or felt. Her sensations, throughout, as she subsequently stated, had been of the most pleasing nature; and her manageableness during the operation was as perfect as if she had been a wax doll or a lay figure.

"No sickness, vomiting, head-ache, salivation, uneasiness of chest, in any of the cases. Once or twice a tickling cough took place in the first breathings."

I have, up to this date, exhibited the Chloroform to about fifty individuals. In not a single instance has the slightest bad result of any kind whatever occurred from its employment.

EDINBURGH, 15th November, 1847.

APPENDIX.

ADDITIONAL CASES OF THE USE OF CHLOROFORM,

REPORTED BY DR. SIMPSON, SINCE PRECEDING DATE.

Case 1. See page 11, 12.

Case 2.—Seen with Mr. Carmichael; a second labor; she began the Chloroform inhalation before the dilatation of the os uteri was entirely completed; the child was expelled in fifty minutes afterwards. I kept her under the Chloroform for a quarter of an hour, till the placenta was removed, the binder applied, and the body and bed-clothes were arranged and adjusted. On awaking, she declared that she had been sleeping refreshingly; she was quite unaware that the child was born, till she suddenly heard it squalling at its first toilet in the next room. An hour afterwards, she declared she felt perfectly unfatigued, and not as if she had borne a child at all. In her first or preceding confinement she had been in severe labor for twenty hours, followed by flooding. No hæmorrhage on the present occasion.

Case 3.—Patient unmarried; a first labor; twins; the first child presented by the pelvis, the second with the hand and head. The Chloroform was exhibited when the os uteri was nearly fully dilated; the passages speedily became greatly relaxed, (as has happened in other cases placed under its full influence), and in a few pains the first child was born, assisted by traction. I broke the membranes of the second, pushed up the hand, and secured the more complete presentation of the head; three pains expelled the child. The mother was then bound up, her clothes were changed, and she was lifted into another bed; during all this time she slept soundly on, and for a full hour afterwards, the Chloroform acting in this as in other cases of its prolonged employment, as a soporific. The patient recollected nothing from the time of the first inhalations, and was greatly distressed when not one but two living children were brought in by the nurse to her. Dr. Christison, who was

anxious to observe the effect of the Chloroform upon the uterus, went along with me to this patient.

Case 4.—Primipara; of full habit; when the first examination was made, the passages were rigid, and the os uteri difficult to reach. Between six and seven hours after labor began, the patient, who was complaining much, was apathized with the Chloroform. In about two hours afterwards the os uteri was fully dilated, and in four hours and a half after the inhalation was begun, a large child was expelled. The placenta was removed, and the patient bound up and dressed before she was allowed to awake. This patient required an unusual quantity of Chloroform, and Dr. Williamson, who remained beside her, states to me, in his notes of the case, "the handkerchief was moistened often, in order to keep up the soporific effect. On one occasion, I allowed her to emerge from this state for a short time, but on the accession of the first pain, she called out so loudly for the Chloroform that it was necessary to pacify her by giving her some immediately. In all, four ounces of Chloroform was used." Like the others, she was quite unconscious of what had gone on during her soporized state, and awoke altogether unaware that her child was born.

Case 5.—Second labor. The patient—a person of small form and delicate constitution—bore her first child prematurely at the seventh month. After being six hours in labor, the os uteri was fully expanded, and the head well down in the pelvic cavity. For two hours subsequently it remained fixed in nearly the same position, and scarcely, if at all, advanced, although the pains were very distressing, and the patient becoming faint and exhausted. She entertained some mistaken religious feelings against Ether or Chloroform, which had made her object to the earlier use of the latter; but I now placed her under its influence. She lay, as usual, like a person soundly asleep under it, and I was now able, without any suffering on her part, to increase the intensity and force of each recurring pain, by exciting the uterus and abdominal muscles through pressure on the lower part of the vagina and perinæum. The child was expelled in about fifteen minutes after the inhalation was commenced. In a few minutes she awoke to ask if it was really possible that her child had been born, and was overjoyed when told that it was so. I have the conviction, that in this case the forceps would in all probability have been ultimately required, provided I had not been able to have interfered in the way mentioned. I might, it is true, have followed the same proceeding, though the patient was not in an anæsthetic state; but I could not have done so without inflicting great agony upon her.

The cases I have above detailed were all cases of natural labor, and required no special artificial assistance. In none of

them did the inhalation of the Chloroform do harm of any kind to either mother or child—while it saved much maternal suffering and human pain. No woman could possibly make better recoveries than they have done and are doing—and no children could look healthier and more viable. I shall now state some operative and instrumental cases of labor in which I have used the inhalation of Chloroform.

Case 6.—Fourth labor; the mother deformed, and the conjugate diameter of the brim of the pelvis contracted from the projection inwards and forwards of the promontory of the sacrum. Her first child was delivered by embryulcia; the second, by the long forceps; the third was small, and passed without artificial assistance. On the present occasion, after suffering slight pains during the whole night, labor set in with greater severity towards morning. After being in strong labor for some hours, she was seen first by Mr. Figg, and afterwards by Dr. Peddie, her ordinary medical attendant. I was called to see her about four o'clock P. M. The pains were enormously powerful and straining, imparting to the mind the dread of the uterus rupturing under their influence; but the head of the child was still altogether above the brim, and only an ædematous ridge of the scalp passed through the superior and contracted pelvic opening. The passages had become heated, the mother's pulse raised, &c., and Dr. Peddie had tried two different pairs of long forceps. After I arrived, he applied, with great skill, another pair of long forceps which I had with me, but it was found impossible to move the head in the least degree forwards. The urgency and power of the uterine contractions, the immobility of the head upon the brim of a deformed pelvis, and the state of the patient and of the parts, all showed the necessity of relief being obtained by artificial delivery. In her first labor, I had assisted Dr Peddie in delivering her, under similar circumstances, by perforation of the head. But here the child's heart was heard distinctly with the stethoscope; and he at once agreed that I should try to deliver her by turning the infant, thus compressing and indenting the flexible skull of the fœtus, instead of perforating it, and affording (as I have, for some time past, taught and believed) some chance of life to the child, and more chance of safety to the mother. The patient was placed under the influence of the Chloroform still more deeply than when the forceps were used. I passed up my hand into the uterus, seized a knee, and easily turned the infant, but very great exertion and pulling was required to extract the child's head through the distorted brim. At last it passed, compressed and elongated. The child was still-born, but by applying the usual restorativemeans, it speedily began to breathe and cry; and when I called two days afterwards, I found both it and the mother well. The mother was utterly unconscious of aught that had occurred or been

done whilst she was breathing the Chloroform, and lay most passively still and asleep during the whole of the operative proceedings. She did not awake till about a quarter of an hour after her infant was born.

In two other cases, in which I have been lately obliged to use the forceps, the patients were under the influence of Chloroform in a perfectly unconscious and apathetic state during the operation and for some time afterwards;—but as the details would be a mere repetition of those I have already given, I shall not tire the patience of my readers by dwelling on them. One of these cases occurred in the practice of Dr. Paterson, of Leith, with whom I saw the patient; the other operation and its results were witnessed by Dr. Christison, Dr. Maclagan, Dr. Johnston, of Berwick, &c. Perhaps it may interest the reader more if, instead, I cite the details of an operative case reported to me by my friend Dr. Murphy of London.

"I have tried the Chloroform," Dr. Murphy writes me, "with great success in a case of distorted pelvis. It was the ovate deformity, the conjugate measurement being only two inches and a half. The head of the child could not enter the brim. I was obliged to perforate. I got Dr. Snow to assist me in bringing her under the influence of Chloroform. She made great resistance, and struggled a good deal at first, chiefly, I think, from apprehension that we were going to do something very dreadful. However she soon began to inhale quietly, and gradually fell into a kind of dreamy sleep. I perforated the head and labored with the crotchet (sometimes with the craniotomy forceps) for three quarters of an hour before I could get the head through the brim. She was at length delivered; the placenta was separated in about ten minutes; the bandage applied; soiled clothes removed; and made 'clean and comfortable,' as the midwives say. She was perfectly unconscious all the time, and did not awake for about a quarter of an hour after the operation. She did so quietly, and was surprised to find that all her miseries were over. There was no hæmorrhage, but the uterus felt rather spongy and large. She is now recovering most favorably. I never had a case recover, so far, so well."

It seems to relieve the patient from the shock to the nervous system caused by severe pain. I think it a matter of great importance to obtain pure Chloroform, because I believe it is sometimes only a re-distillation of Chloric Ether, the inhalation of which is attended with as much excitement as Sulphuric Ether.

ST. BARTHOLOMEW'S HOSPITAL.

SURGICAL CASES TREATED AT THIS HOSPITAL.

Reported by HOLMES COOTE, ESQ.,

Fellow of the Royal College of Surgeons of England; Demonstrator of Anatomy at St. Bartholomew's Hospital, etc.

SURGICAL OPERATIONS PERFORMED UPON PATIENTS RENDERED INSENSIBLE TO PAIN BY THE INHALATION OF CHLOROFORM.

Extraction of a large Calculus from the Bladder by the Lateral Operation.

CASE 1.—A young man, aged twenty, of light complexion and spare frame, was admitted into the hospital, with stone in the bladder, under Mr. Lawrence. An attempt was made to crush the calculus by the lithontriptic apparatus, but upon forcibly driving the blades of the instrument together, Mr. Lawrence found that portions of the calculus, which was very large, broke off with difficulty, with a sharp, ringing sound, which conveyed to all around the impression of its being extremely hard and solid. Fragments which escaped by the urethra were examined by Mr. Griffiths, who pronounced them to be composed of oxalate of lime, without any trace of animal matter. Under these circumstances, Mr. Lawrence recommended its extraction by the lateral operation, to which the patient assented.

The staff having been introduced, and the patient secured in the usual manner, a piece of sponge, upon which had been poured about a drachm of Chloroform, was lightly held before the mouth and nose; there was no unwillingness to inhale; no cough, nor any disturbance of the respiration; in less than one minute the patient seemed quite unconscious; in two minutes the breathing became slightly stertorous, the pupils were dilated, and the lips assumed a bluish hue: the sponge was then removed. In a minute and a quarter Mr. Lawrence extracted a large and extremely heavy calculus, composed of oxalate of lime, deposited upon a nucleus of lighter color, and probably consisting of lithic acid; upon examination it was found that the lithontriptic instrument had broken off, at the previous operation, a considerable fragment, about the size of the last joint of the thumb; it became necessary, therefore, to distend the bladder with water, when the remainder was secured by the forceps, and removed. The patient lay, throughout the operation, like a person in a deep sleep, and was removed to bed in a still un-

conscious state; in the course of a few minutes he recovered, and is now going on favorably.

Extraction of a small Calculus from the Bladder of a Boy by the Lateral Operation.

Case 2.—A well-grown healthy-looking boy, aged twelve, who had been once before cut for stone, was admitted into the hospital, with incontinuence of urine, under Mr. Stanley. Upon examination it was found that the bladder contained a small calculus not always easy of detection, but which, irritating the viscus, gave rise to the symptoms of which the boy complained.

The patient having been secured in a proper position upon the operating table, a piece of sponge, upon which had been dropped twenty minims of Chloroform, was held before the mouth and nose. His shrieks, which had been most violent, became gradually fainter, and in one-third of a minute, ceased entirely; the face, purple and livid from his struggles, assumed a healthy florid color; and within the minute he lay upon the pillow, (the sponge having been removed,) breathing slowly and tranquilly, as in sleep. In about a minute and a half, Mr. Stanley extracted a small calculus, composed of lithate of ammonia, the size of a horsebean. The boy was conveyed to bed, still unconscious; he recovered, however, sooner than the patient who had undergone the first operation, and is now doing well.

Extirpation of a Tumor from the Breast.

Case 3.—A healthy-looking female, aged sixty, was admitted, under Mr. Stanley, into the hospital, with a tumor, the size of a bantam's egg, imbedded in the right breast. She stated that, ten years ago, she had undergone an operation for the removal of a tumor from the same part: and she imagined that she was now suffering from a recurrence of the former disease. The second tumor, which was not of the stony hardness of cirrhus, had grown slowly and without pain; there was no retraction of the nipple.

The administration of the Chloroform gave rise to some excitement; the patient tossed her arms about, and talked incoherently for several seconds; but there was no cough, nor unwillingness to inspire, and in three minutes she became completely unconscious. The breast was then removed by Mr. Stanley in the usual manner. Consciousness returned before the hæmorrhage was arrested; no unfavorable symptom ensued, and she is now doing well.

Upon examining the morbid parts, it was found that a mammary tumor had been developed in the outer part of the gland.

Remarks.—The cases here related are of interest, in confirming the favorable report given by Professor Simpson of the effects of this anæsthetic agent. "A greatly less quantity of

Chloroform than of Ether is requisite to produce the desired effect: its action is much more rapid and complete, and generally more persistent. Its perfume, which is not unpleasant, does not remain for any length of time obstinately attached to the clothes of the attendant, or exhaling in a disagreeable manner from the lungs of the patient."

The three patients, the particulars of whose cases are here shortly given, did not experience the smallest inconvenience from the inhalation into the lungs: the condition into which they were thrown—differing from the state of stupor, which commonly ensues after the inhalation of Ether—bore the closest resemblance to profound sleep; they recovered quickly, the smell was speedily gone, and the cases are now going on most favorably.

Without wishing in any way to detract from the very great merit of Professor Simpson, in introducing this valuable agent, I may observe that for some considerable time Mr. Lawrence has used in private practice, the Chloric Ether, which is Chloroform in spirit and water. Patients with irritable lungs, who could not tolerate the violent paroxsyms of coughing induced by the Sulphuric Ether, readily inhaled the Chloric Ether, the taste and smell of which are similar to those of Chloroform; the anæsthetic effect was more gently induced, and there were fewer complaints, on recovery, of soreness of the chest, headache, &c. The less irritating effect of the Chloric Ether was noticed by Mr. Taylor, and by myself, in some experiments (reported in this journal) performed upon animals; their efforts to escape were most violent, when immersed in the vapor of Sulphuric Ether.

One of the students of the hospital, who in the early part of the year was anxious to have some painful stumps of teeth removed from the jaw, kindly consented to take the Ethers upon two different occasions, and to report the result. He described the taste of the Chloric Ether as much more agreeable than that of the Sulphuric; the effect upon the lungs as less irritating and oppressive; but he thought that the state of unconsciousness was not equally complete. Mr. Lawrence has, however, performed many most severe operations upon patients rendered perfectly insensible to pain by the inhalation of the Chloric Ether, and he is now in the habit of directing its administration.

The advantages which the Chloroform appears to possess are so numerous and important, that if the results of subsequent trials are equally successful with these here recorded, there is little doubt of its superseding all other known anæsthetic agents. Some modification in the mode of its administration may be requisite, since, as I am informed by Mr. Mitchell Henry, one of the house-surgeons, the lips of two of the patients have been vesicated by the application of the sponge.*

* R., C., & Co., have invented a small Glass Inhaler which prevents any possibility of injury to the lips or face, and is perfectly simple, cleanly, and economical.

TESTIMONIALS.

We have been kindly favored with several communications on Chloroform, from which we select the following, as the remainder are all to the same purpose.

RUSHTON, CLARK, & CO.

From Valentine Mott, M. D.

To Messrs. Rushton, Clark, & Co.

Gents.—In reply to your note relating to my experience with Chloroform; directly on my receiving the pamphlet from Professor Simpson, of Edinburgh, I requested a friend to have made for me the Chloroform which is so highly spoken of by him as a means of Etherization, this was speedily obtained; since which time, I have repeatedly used it in a number of important and very painful surgical operations. My conviction is that a much smaller quantity than of Ether is necessary to produce the full effect, which is more lasting, and attended with much less excitement and less irritation of the larynx than is produced by Ether. In several of the patients there has been slight vomiting before the full effect was induced but in no case have I seen any unpleasant consequences attend or follow its administration.

Very respectfully,

Depau Place, February 10th, 1848. V. MOTT.

From Willard Parker, M. D.

To Messrs. Rushton, Clark, & Co.

Gents.—Your request, that I give you my experience in the use of Chloroform has just come to hand.

I have employed it within the last month in twelve cases, all surgical, with the exception of one case of hysterical convulsions. Three cases were operations for Prolapsus Ani, Hemorrhoids, and Fistula in Ano. In another instance I used it while operating for Necrosis upon the arm. I also employed it in an attempt to reduce an old Luxation of six months standing, at the elbow, an exceedingly painful operation. In all the above cases it was *entirely* successful in rendering the patient insensible to pain, and so far as my own observations go, I very much prefer its use to that of Ether.

1st. Because patients are brought under its influence more readily, and with less violent excitement.

2d. Because it is a more *reliable* as well as economical agent.

3d. Its effects more readily pass off, and the patient's nervous system is left tranquil and natural.

I think, from what I have seen, when this new anæsthetic agent is used with care and judgment, it saves the nervous system in a great degree from the shock of the operation, and thus removes danger and promotes a more speedy recovery.

Yours very truly,

745 *Broadway, February 9th*, 1848. W. PARKER.

FROM A. E. HOSACK, M. D.

Gentlemen:—The all exciting subject of the administering of Chloroform, for preventing pain in surgical operations having engaged your attention in so special a manner, and at the same time from the desire expressed by you to collect facts confirmatory or disproving its utility, I am induced, in compliance with your request, to state to you the result of my observations from the various trials I have made of it.

Some time since, I published in the New England Journal of Medicine a few cases of some of the severer operations in surgery, illustrative of the beneficial effects of Ether, and as these agents possess a striking resemblance to each other in destroying sensibility, I cannot but speak of them comparatively under similar circumstances. Chloroform appears to possess many advantages over Ether. It is more agreeable to the taste, more rapid in its influence, more composing, more durable in its effects, and to my knowledge has never been attended with any ill consequences; besides, a very small quantity is sufficient to produce the desired effect, while on the contrary, Ether is liable to create considerable excitement, is of shorter duration in its influence, and to many is very disagreeable, and even nauseous; and its after effects are sometimes very alarming, and in a few instances have proved fatal. But Chloroform is not entirely free from some of these objections, as it is sometimes quite as exciting as Ether, and the patient equally restless during an operation. This effect, however, is not so frequent as with Ether. They are both more efficacious in young subjects than in old, Chloroform much more so than Ether.

In cases of protracted operations, when the renewed influence is required, it is more readily produced by Chloroform than Ether; and where a continued effect is desirable for a length of time, Chloroform leaves the patient in the same state as before its administration, while Ether is apt to leave considerable headache or temporary delirium; under these circumstances, I would always give preference to Chloroform; and from the opportunities I have had in its use, I have no hesitation in saying, that I believe it to be perfectly safe when administered by judicious hands. The objection to the Chloroform being inhaled from a sponge or handkerchief, on account of its blistering the lips and face, may be completely obviated by using your inhaler, which is very simple, remarkably neat and cleanly, and in all respects adapted for the purpose.

Very respectfully,

A. E. HOSACK.

MESSRS. RUSHTON, CLARK, & CO.

[NOTE.—Dr. Hosack informs us, that one of the cases operated on by him under the use of Chloroform, was that of removal of half the lower jaw at the articulation, for osteosarcoma. The patient did not experience the least pain, and has perfectly recovered, without the necessity of anodyne or medicine of any kind.

A short time before, Dr. H. performed a similar but less extensive operation under the influence of Ether, when a portion of the lower jaw em-

From J. Kearney Rodgers, M. D., Surgeon N. Y. Hospital.

Gentlemen:—I have received your note inquiring as to my experience with Chloroform, and answer that I have used it in a number of operations, some of them severe; and in all with the most happy effects. It is certainly preferable to Ether. The patient is sooner put under its influence, which may be continued, as I am satisfied, more than an hour and a half without any unpleasant consequences; and the vapor so far from being offensive, as is the Ether to many, is rather pleasant to the bystanders. The objection of its occasionally irritating the lips can easily be obviated by a proper inhaling apparatus. I consider the discovery of these anæsthetic agents one of the most beautiful presents ever made by science to humanity.

Very respectfully yours,

J. KEARNEY RODGERS, M. D.

110 *Bleecker street*,
Feb. 14*th*, 1848.

Messrs. Rushton, Clark, & Co.

From A. Goldsmith, M. D.

Gents.—I have received your polite request for information relative to my experience in the use of Chloroform, and in reply would state, that I have used it with great satisfaction, and with the most happy results in many cases, and consider it, when judiciously used, a most valuable agent. Among other cases where I have used it, was one of an elderly lady, who had been suffering for a long time with an incurable disease of the joint of the large toe, involving the metatarsal bone. I concluded to remove the diseased part; and knowing it to be a painful operation, administered the Chloroform, although with some hesitation, owing to the age of the patient. It required about ten minutes to produce the complete anæsthetic effect. I then removed about half the metatarsal bone with the toe, tied the arteries, and dressed the wound; a few minutes after which she awoke as from a refreshing sleep, and asked if we were ready to perform the operation. I particularize the case in consequence of some doubt having been entertained relative to the propriety of administering the anæsthetic agent to aged persons, but in my own experience I have not seen any unpleasant effect follow its exhibition.

Very respectfully yours,

A. GOLDSMITH, M. D.

February 12*th*, 1848.

Messrs. Rushton, Clark, & Co.

bracing seven teeth, was removed, the patient was about 55 years of age, the other but 25. Etherization was imperfectly produced, probably owing to the advanced age of the patient, which is cited as confirmatory of the opinion expressed in Dr. H.'s letter, of the different effects of anæsthetic agents upon persons of different ages. R., C., & Co.]

Simpson on Chloroform.

AN

ACCOUNT

OF A

NEW ANÆSTHETIC AGENT,

AS A

SUBSTITUTE FOR SULPHURIC ETHER

IN

SURGERY AND MIDWIFERY.

BY

J. Y. SIMPSON, M.D., F.R.S.E.,

PROFESSOR OF MIDWIFERY IN THE UNIVERSITY OF EDINBURGH;
PHYSICIAN-ACCOUCHEUR TO THE QUEEN IN SCOTLAND, ETC.

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