Remarks on the superinduction of anaesthesia in natural and morbid parturition : with cases illustrative of the use and effects of chloroform in obstetric practice / By J.Y. Simpson...With an appendix.

VI. 6.

SUPERINDUCTION OF ANÆSTHESIA + APPENDIX *Boston*, 1848.

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REMARKS

ON THE

SUPERINDUCTION OF ANÆSTHESIA

IN

NATURAL AND MORBID PARTURITION:

WITH

CASES ILLUSTRATIVE OF THE USE AND EFFECTS OF CHLOROFORM IN OBSTETRIC PRACTICE.

BY

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

PROFESSOR OF MIDWIFERY IN THE UNIVERSITY OF EDINBURGH, AND PHYSICIAN-ACCOUCHEUR TO HER MAJESTY IN SCOTLAND.

Serve me—as Mandragora—that I may sleep.
WEBSTER'S DUCHESS OF MALBY.

But there is
No danger in what show of sleep it makes,
More than the locking up the spirits a time,
To be more fresh, reviving.
SHAKESPEARE'S CYMBELINE.

WITH AN APPENDIX.

BOSTON:
PUBLISHED BY WILLIAM B. LITTLE & CO.,
CHEMISTS AND DRUGGISTS,
104 Hanover, Corner of Salem Street.
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PREFACE TO THE BOSTON EDITION.

The discovery of an anæsthetic agent, possessing the power of annulling all sense of pain under the severest surgical operation, and employed in all cases without the slightest bad results of any kind whatever, is certainly one of the most important achievments of modern times, and forms an epoch in the annals of the nineteenth century.

Doct. Charles T. Jackson, of this city, discovered that temporary insensibility to pain may be safely induced by the inhalation of Sulphuric Ether, with a proper admixture of atmospheric air; he inferred from his experiments, that, by this means, surgical operations might be rendered absolutely painless. It may be proper to add, that Dr. Jackson's experiments were made with Sulphuric Ether, only;—he presumed, however, that other substances of a similar character would produce similar effects upon the system.

With the view of improving on the discovery of Sulphuric Ether, Prof. Simpson, of Edinburgh, first demonstrated, by actual trial, the anæsthetic effects of Chloroform. The experiments which he performed are of great value, and entitle him to the gratitude of mankind.

Chloroform, as an inhaled agent, possesses many advantages over Sulphuric Ether. Professor Simpson speaks most confidently of its superior anæsthetic properties, and affirms, that in no single instance has he known the slightest bad results to occur from its employment.

WM. B. LITTLE & CO.

Boston, February 1, 1848.

TO

JOHN C. WARREN, M. D.

THIS REPRINT, IS DEDICATED,

WITH THE RESPECTS

OF THE

PUBLISHERS.

ON THE

SUPERINDUCTION OF ANÆSTHESIA, &c.*

Among the many improvements by which the operative part of medicine has, from time to time, been enriched, few or none have exerted a more potent, or a more beneficial influence over its advancement and progress, than the introduction, in the 16th century, of the application of ligatures to arteries, with the object of arresting the hemorrhage attendant upon surgical wounds and operations. Previously to that time, surgeons had no other means of stemming the flow of blood—after amputation of the limbs, for instance—than by scorching over the raw and bleeding wound with a red hot iron, or by plunging it into boiling pitch, or by applying strong potential cauteries to its surface. With laudable efforts to diminish the fearful severities of their practice, they exerted their ingenuity in devising, as it were, refinements upon these necessitous cruelties. Thus, Hildanus, the patriarch of German Surgery, amputated the limbs of his patients with red hot knives, in order that he might divide the flesh and sear up the vessels at one and the same time. Upon all these practices, the great and happy suggestion of Ambrose Paré, viz. to shut up the bleeding vessels, by constricting or tying them with slender ligatures, was a vast and mighty improvement. It at once made the arrestment of hemorrhage in operations far more simple, more certain, and more secure. It saved immeasurably the sufferings of the patients, while it

* Read to the Medico-Chirurgical Society, of Edinburgh, at their meeting on the 1st December, 1847.

added immeasurably to their safety. But the practice was new, and an innovation; and consequently, like all other innovations in medical practice, it was, at first and for long, bitterly decried and denounced. The College of Physicians of Paris attacked Paré for his proposed new practice: they attempted, by the authority of the French Parliament, to suppress the publication and dissemination of his observations: and, for nearly a long century afterwards, some of the Hospital Surgeons of Paris continued, with the characteristic obstinacy of the profession, to prefer cauterizing bleeding arteries "with *all* the ancients," rather than simply tie them "after the manner of a few ignorant and presumptuous moderns."* "Without," (writes the late Mr. John Bell,)—"without reading the books of these old surgeons, it is not possible to imagine the horrors of the cautery, nor how much reason Paré had for upbraiding the surgeons of his own time with their cruelties. . . . The horrors of the patient, and his ungovernable cries, the hurry of the operators and assistants, the sparkling of the (heated) irons, and the hissing of the blood against them, *must* have made terrible scenes; and surgery *must*, in those days, have been a horrid trade."†

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* All writers on surgical history give more or less full details upon this opposition to the practice of Paré. Thus, for example, Professor Cooper observes, "By many surgeons, however, the tying of arteries continued to be deemed too troublesome, and hence they persisted in the barbarous use of the actual cautery; of this number were Pigrai, F. Plazzoni, and P. M. Rossi. Nay, so difficult was it to eradicate the blind attachment shown to the ancients, that Theodorus Baronius, a professor at Cremona, publicly declared, in 1609, that he would rather err with Galen than follow the advice of any other person. . . . . I shall not here expatiate upon the ill-treatment which Paré experienced from the base and ignorant Gourmelin, president of the Parisian College of physicians; nor upon the slowness and reluctance with which the generality of surgeons renounced the cautery for the ligature. . . . Almost one hundred years after Paré, a button of vitriol was ordinarily employed in the Hotel Dieu, at Paris, for the stoppage of hemorrhage after amputations; Dionis was the first French surgeon who taught and recommended Paré's method. This happened towards the close of the 17th century, while Paré lived towards the end of the 16th."—*Cooper's Dictionary of Practical Surgery*, 7th edit. pp. 46, 47. See also *Sprengel's Histoire de Medecine*, Vol. III. p. 315: *Bell's Surgery*, Vol. I. p. 226, &c.

† Principles of Surgery, Vol. I. p. 212.

The sentiments which Mr. Bell here expresses, are those with which the human mind often *looks back* upon our opinions and practices, when these opinions and practices are past and gone, and have become mere matters of history. In the above, as in many other instances, we never become fully awakened to the cruelty and enormity of some of our established doctrines and doings, until, from time to time, an advance is made in civilization or science, and we find that this or that doctrine and practice, with all its attendant sufferings and inhumanities, was in reality utterly unnecessary, and utterly uncalled for.* In general, however, long years elapse before this new aspect of matters is duly seen, or at least, duly acknowledged. While the practices themselves are in full operation, the mind enthralled by education and habit, cannot be easily made to view them in their true character; and when, in the progress of the march of knowledge and science, their propriety and perpetuation come at last to be challenged and contested, human passions and prejudices ever (as in the above instance of cauterization) rise up to argue for, and insist upon, the continuance and safety of the past, and the total impolicy and high peril of any attempted alteration. But time passes on, and brings with it, sometimes abruptly—generally almost imperceptibly—a perfect change of doctrine and practice. Any surgeon who, in the days of Paré, dared to arrest the hemorrhages from his amputation wounds, by applying ligatures *instead* of red-hot irons, would have been denounced by his compeers. Any surgeon, on the contrary, who now, at this present day, dared to arrest the hemorrhages from his amputation wounds,

* Witness, for example,—(as compared with the *past* opinions of those who practiced them)—our *present* opinions regarding the burning, by our Druidical forefathers, of whole wickerfulls of living human beings, and in the name of religion; or, in times nearer our own—in Christian times—the application of the fire and fagot by man to man, still under the plea of religion; or the use of the rack and torture; the incremation in the sixteenth and seventeenth centuries of many poor wretches for the alleged crime of witchcraft; the altered existing ideas regarding the required frequency of capital punishments, and the whole question regarding their policy; the recent rapid and complete change of doctrine regarding the horrors and inhumanity of slavery; the changes in practice regarding insanity from what it was in the last century, when chains and a dungeon were the portion of every poor lunatic; &c. &c.

by applying to the bleeding vessels, not ligatures but red-hot irons, would as certainly be denounced by his compeers, and his talents, as well as his humanity, would be strongly challenged. We look back with sorrow upon the pitiless practices, in that respect, of the contemporaries and opponents of Paré. In the course of years our successors in the profession will, I most sincerely believe, look back with similar feelings upon the alleged "insignificance," and "propriety," and "desirability," of pain in surgical operations, as maintained by many members of the profession at the present day; and they will equally marvel at the idea of men—of humane men—complacently confessing and upholding, that they prefer operating upon their patients in a waking instead of an anæsthetic state; and that the fearful agonies which they thus inflict—the agonies of the surgeon's knife—should be endured rather than avoided—quietly and decorously submitted to, and not attempted to be eschewed. I have elsewhere discussed,* at some length, the strange opinions and practices of some modern surgeons, upon this alleged propriety and necessity of pain in surgical practice and surgical operations. On the present occasion my object is to offer some remarks regarding the pains attendant upon parturition, and the propriety of alleviating and annulling the sufferings of our patients in obstetrical operations. But let me first adduce some evidence of *their* intensity and amount.

"The distress and pain (observes Dr. Denman†) which women often endure while they are struggling through a difficult labor, are *beyond* all description, and seem to be more than human nature would be able to bear under any other circumstances." But even the amount of agony endured in most cases of *natural* parturition, is abundantly severe.‡ Viewed apart, and in an isolated light, the total sum of actual pain attendant

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* See Monthly Journal of Medical Science, of September, 1847, pp. 156, 166, "On the Allegation of the Prevention of Pain in Surgical Cases being Unnecessary and Improper."

† Introduction to Midwifery. 5th edition, p. 377.

‡ Cases undoubtedly ever and anon occur, in which the mother suffers comparatively little or no pain; but these are exceptions, rare exceptions, to a general rule.

upon common labor is as great, if not greater, than that attendant upon most surgical operations. It is, I believe, education and custom, and perhaps the idea of its inevitable necessity, which have made the profession in general look upon the degree of maternal pain and physical suffering accompanying natural parturition, as less deserving of consideration than in reality it is. These circumstances have, in a great measure, blinded us as to its actual amount, and intensity, and importance. For it was, no doubt with perfect truth, remarked by an author* who wrote three hundred years ago, "Mulier, in partu, maximos et fere intolerabiles sustinet dolores."

Some living authors—without any view to such a question as the possibility of avoiding it—in fact, with a view only to the accurate painting of nature, have described to us in forcible language the degree of suffering attendant upon the last stages of the process of common parturition. "The pulse (says Dr. Merriman) "gradually increases in quickness and force; the skin grows hot; the face becomes intensely red; drops of sweat stand upon the forehead; and a perspiration, sometimes profuse, breaks out all over the body; frequently violent tremblings accompany the last pain, and at the moment that the head passes into the world, the extremity of suffering seems to be beyond endurance."† Or, let us take the picture of the sufferings of the mother in the last part of natural labor, as portrayed by one who is universally reputed by the obstetric profession as the most faithful of living observers—Professor Naegele of Heidelberg—"The pains (he observes) of this stage are still more severe, painful, and enduring; return after a short interval, and take a far greater effect upon the patient than those of the previous stage. Their severity increases so much the more from the additional suffering arising from the continually increasing distension of the external parts. They convulse the whole frame, and have hence been called the *dolores conquassantes.* The bearing down becomes more continued, and there is not unfrequently vomiting. The patient quivers and trembles all over. Her face is flushed, and, with the rest of the body, is bathed in

* Hieronymus Mercurialis, in Spachius Gynaecia, p. 233.

† Synopsis of Parturition, p. 15.

perspiration. Her looks are staring and wild; the features alter so much that they can scarcely be recognised. Her impatience rises to its maximum with loud crying and wailing, and frequently expressions which, even with sensible, high-principled women, border close upon insanity. Every thing denotes the violent manner in which both body and mind are affected."* "This (observes Dr. Rigby) is the moment of greatest pain, and the patient is frequently quite wild and frantic with suffering; it approaches to a species of insanity, and shows itself in the most quiet and gentle dispositions. The laws in Germany have made great allowances for any act of violence committed during these moments of frenzy, and wisely and mercifully consider that the patient at the time was laboring under a species of temporary insanity. Even the act of child murder, when satisfactorily proved to have taken place at this moment, is treated with considerable leniency. This state of mind is sometimes manifested in a slighter degree by actions and words so contrary to the general habit and nature of the patient, as to prove that she could not have been under the proper control of her reason at the moment. It is a question how far this state of mind may arise from intense suffering, or how far the circulation of the brain may be affected by the pressure which is exerted upon the abdominal viscera."†

Such is the description of the amount of pain and agony endured in natural parturition, given by some of our best and most esteemed authorities in obstetric literature.

Is it right for the physician to interfere with these fearful sufferings and agonies in order to save and shield his patients from the endurance of them? Is it proper for him to exercise the skill of his art so as to moderate and remove these "almost intolerable pains *(fere intolerabiles dolores?")* Would it be fit and meet in him to use human means to assuage the pangs and anguish attendant upon the process of parturition in the human mother?

These questions, and questions like these, I have often dur-

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* Lehrbuch der Geburtshulfe, p. 104. See British and Foreign Medical Review, vol. xix. p. 64.

† System of Midwifery, p. 103.

ing the currency of the present year, heard complacently put by medical men,—men, too, whose opinions and actions in other matters, and in other respects, were fully and truly actuated by that great principle of emotion which both impels us to feel sympathy at the sight of suffering in any fellow creature,* and at the same time imparts to us delight and gratification in the exercise of any power by which we can mitigate and alleviate that suffering. Such questions, I repeat, are seriously asked by physicians and surgeons, the professed object of whose whole science and art is the relief of human disease and human suffering. They are questions propounded with all imaginable gravity and seriousness by individuals who (in a mere abstract point of view) would, no doubt, strongly object to being considered as anxious to patronize and abet human misery, or traffic in the perpetuation of human pain. Nay, probably, at the date at which I write, there is not one in twenty—perhaps not one in a hundred—of the physicians and surgeons of Great Britain who have, as yet, thought seriously upon the propriety of alleviating and annulling the tortures attendant on human parturition; or who have acknowledged to their own minds the propriety of their bestirring themselves so as to be able, in the exercise of their profession, to secure for their patients an immunity from the throes and agonies of childbirth.

Perhaps, as an apology for their indolence and apathy, some may be ready to argue, that the pain and suffering attendant on parturition is not dangerous and destructive in its results, however agonizing and distressing it may be to the patient during its continuance. But the argument is fundamentally unsound. All pain is *per se*, and especially when in excess, destructive and even ultimately fatal in its action and effects. It "exhausts (says Mr. Travers) the principle of life."† "It exhausts (says Mr. Burns of Glasgow) both the system and the part."‡ "Mere pain (observed the late Dr. Gooch) *can* destroy life."§ And the

* "Inditus est, ab ipsa Natura, homini, *misericordiæ* affectus nobilis et excellens." Bacon—"De Augmentis Scient.," Lib. viii. cap. ii.

† Inquiry concerning Constitutional Irritation, vol. i. p. 76.

‡ Principles of Surgery, vol. i. p. 502.

§ Dr. Merriman's Synopsis of Parturition, p. 239.

great pain accompanying human parturition is no exception to this general pathological law. For, in fact, the maternal mortality attendant upon parturition, regularly increases in a ratio progressive with the increased duration of the woman's sufferings. The statistical data published by Dr. Collins, in his Report of the Dublin Lying-in Hospital, affords ample proof of this general principle. According to calculations which I some time ago made from Dr. Collins' data, I found that while in the women delivered in the Dublin Hospital, and whose sufferings were terminated within 2 hours, only 1 in 320 of the mothers died; where the labor varied in duration from 2 to 6 hours, 1 in 145 of the mothers died; in those in whom it continued from 7 to 12 hours, 1 in 80 died; where it endured from 12 to 24 hours, 1 in 26 died; where it lasted from 24 to 36 hours, 1 in 17 died; and out of all those whose parturient sufferings were prolonged beyond 36 hours, 1 in every 6 perished.

Again, some may possibly be inclined to reason, that any means by which we could produce a state of anæsthesia or insensibility to the physical pains of labor, must, of necessity, be of such a character as to add to the perils and dangers of the patient. I believe this argument to be as futile and untenable as the one that I have just noticed. Indeed, judging from analogy, and from what is the fact in surgery, I believe that, as a counteraction to the morbific influence of pain, the state of artificial anæsthesia does not only imply a saving of human suffering, but a saving also of human life. Out of above 300 cases of the larger amputations performed during the current year, upon patients in an etherized or anæsthetic state, and which I have collated from different hospitals in Great Britain, Ireland, and France, a smaller proportion died than formerly used to perish in the same hospitals under the same operations without etherization. I shall take one of these amputations as an illustration of the whole—and that one the most severe of all—viz. amputation of the thigh. Malgaigne (1842) showed, that under amputations of the thigh, in the hospitals of Paris, 62 in every 100 died; in Edinburgh, the mortality from this operation, in the only years during which the hospital reports were published (1839–42,) was 50 in every 100; Mr. Phillips of London

(1844,) found the average mortality 40 in 100; Dr. Lawrie at Glasgow (1839,) found it also in the hospitals of that city to be 40 in 100.* I have notes of 135 cases in which this same operation has been performed in hospital practice upon patients in an etherized state. Out of these 135 cases 33 died, or only 24 in 100. Hence I repeat, that the condition of anæsthesia not only preserves the patient in surgical practice from agony and torture, but actually preserves him too from the chances of danger and death. And I firmly believe, that the superinduction of anæsthesia in obstetric practice will yet be found to diminish and remove also, in some degree, the perils as well as the pains of labor.

In an essay which I wrote in February last, "On the Employment of the Inhalation of Sulphuric Ether in the Practice of Midwifery," (*Monthly Journal of Medical Science* for March 1847, p. 728,) I offered some remarks on its application to cases of common as well as of morbid parturition, and took occasion to observe, "The question which I have been repeatedly asked is this—Will we ever be 'justified' in using the vapour of ether to assuage the pains of natural labor? Now, if experience betimes goes fully to prove to us the safety with which ether may, under proper precautions and management, be employed in the course of parturition, then, looking to the facts of the case, and considering the actual amount of pain usually endured, I believe that the question will require to be quite changed

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* The following table exhibits the actual number of the cases of amputation of the thigh referred to in the text, with their respective results:—

MORTALITY ACCOMPANYING AMPUTATION OF THE THIGH.

Name of Reporter.	Number of Cases.	Number of Deaths.	Per Centage of Deaths.
Malgaigne—Paris, ...	201	126	62 in 100
Peacock—Edinburgh, ...	43	21	50 in 100
Phillips' Collection of Cases, . . .	660	263	40 in 100
Lawrie—Glasgow, ...	184	73	40 in 100
Total, ...	1088	483	44 in 100
Upon Patients in an Anæsthetic state.	135	33	24 in 100

in its character. For, instead of determining in relation to it whether we shall be 'justified' in using this agent under the circumstances named, it will become, on the other hand, necessary to determine whether on any grounds, moral or medical, a professional man could deem himself 'justified' in withholding, and *not* using any such safe means (as we at present pre-suppose this to be,) provided he had the power by it of assuaging the pangs and anguish of the last stage of natural labor, and thus counteracting what Velpeau describes as 'as those piercing cries, that agitation so lively, those excessive efforts, those inexpressible agonies, and those pains apparently intolerable,'* which accompany the termination of natural parturition in the human mother."

Since the latter part of January, I have employed etherization, with few and rare exceptions, in every case of labor which has been under my care. And the results, as I have already elsewhere stated, have been, indeed, most happy and gratifying. I never had the pleasure of watching over a series of more perfect or more rapid recoveries; nor have I once witnessed any disagreeable result to either mother or child. I have kept up the anæsthetic state during periods varying from a few minutes to three, four, five, and six hours. I do not remember a single patient to have taken it who has not afterwards declared her sincere gratitude for its employment, and her indubitable determination to have recourse again to similar means under similar circumstances. All who happened to have formerly entertained any dread respecting the inhalation, or its effects, have afterwards looked back, both amazed at, and amused with, their previous absurd fears and groundless terrors. Most, indeed, have subsequently set out, like zealous missionaries, to persuade other friends to avail themselves of the same measure of relief in their hour of trial and travail; and a number of my most esteemed professional brethren in Edinburgh have adopted it with success, and results equal to my own. All of us, I most sincerely believe, are called upon to employ it

* Traite des Accouchemens, Vol. 1. p. 449. "Ces cris percans, cette agitation si vive, ces efforts excessifs, ces angoisses inexprimables, ces douleurs qui parassaient intolerables," &c.

by every principle of true humanity, as well as by every principle of true religion.* Medical men may oppose for a time the superinduction of anæsthesia in parturition, but they will oppose it in vain; for certainly our patients themselves will force the use of it upon the profession. The whole question is, even now, one merely of time. It is not—Shall the practice come to be generally adopted? but, When shall it come to be generally adopted? Of course, it will meet from various quarters with all due and determinate opposition. Medical men will, no doubt, earnestly argue that their established medical opinions and medical practices should not be harshly interfered with by any violent innovations of doctrine regarding the non-necessity and non-propriety of maternal suffering. They will insist on mothers continuing to endure, in all their primitive intensity, all the agonies of childbirth, as a proper sacrifice to the conservatism of the doctrine of the desirability of pain. They will perhaps attempt to frighten their patients into the medical propriety of this sacrifice of their feelings;† and some may be found who will

* See "Answer to the Religious Objections urged against the employment of Anæsthetic Agents in Midwifery and Surgery."

† We can all recollect the many absurd stories of apocryphal disasters and deaths that the opponents of etherization busily and anxiously reported towards the commencement of the present year, as having occurred from the employment of ether-inhalation in surgery. Dr. Forbes, in his excellent article on etherization, in treating of these unscrupulous and disreputable pieces of professional gossip, observes—"One day we had death from asphyxia; another from coma; another from hemoptysis; some from convulsions; a few from pneumonia; and one or two from actual incremation, or explosion, through the accidental firing of the ethereal vapour within the air passages. We have not had time to investigate all these terrible cases; but we may state that we traced *the one* which seemed the *best* authenticated—that from hemoptysis—from its full-blown majesty in after-dinner gossip, to its humble source in the hospital. And this was the case, as the man himself detailed it to us:—A day or two after a successful operation for hernia, under etherization, the man pricked his gums while picking his teeth with a pin; and it was the product of *this* operation, not of the ether, seen in the spitting-pot by the patient's bedside, that was bruited about town, as of itself sufficient to settle the question in all future time!—(British and Foreign Medical Review, No. XLVI. April 1847, p. 564.)—When first employing etherization in midwifery, I met with no small number of similar strange tales and accusations. For example, in February last, a patient who happened to be severely frightened had, in consequence, a premature labor. The child presented preternaturally; and died a day or two after birth. The mother was at-

unscrupulously ascribe to the new agency any misadventures, from any causes whatever, that may happen to occur in practice. But husbands will scarcely permit the sufferings of their wives to be perpetuated merely in order that the tranquillity of this or that medical dogma be not rudely disturbed. Women themselves will betimes rebel against enduring the usual tortures and miseries of childbirth, merely to subserve the caprice of their medical attendants. And I more than doubt if any physician is really justified, on any grounds, medical or moral, in deliberately desiring and asking his patients to shriek and writhe on in their agonies for a few months—or a few years longer—in order that, by doing so, they may defer to his professional apathy, or pander to his professional prejudices.

Two agents have the power of producing anæsthesia during labor, viz. the inhalation of sulphuric ether, and the inhalation of chloroform. With most, if not all, of my professional brethren, I believe that the latter agent possesses various important advantages over the former, particularly in obstetric practice; and that, in particular, it is far more portable; more manageable and powerful; more agreeable to inhale; is less ex-

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tacked with phlegmasia dolens, and made a very long and protracted recovery. Various kind friends, anxious about the results of etherization in midwifery, warned me of the professional odium which this case was bringing upon the new practice, and of the strong argument which it was affording to others against the safety of ether-inhalation in obstetrics. I was repeatedly and credibly told that ladies had informed their physicians, that the quantity used was *so* great that they had felt the odour of it perfectly oppressive when calling, even days afterwards, at the house of my patient. The answer to all this was sufficiently simple. The danger of death to the child from its prematurity and preternatural presentation appeared to be from the first so imminent, that I did not choose to peril the character of the new practice by following it in this case. The ether had not only not been used: but not a drop of it had ever been in the house. One of my patients was zealously attempted, some months ago, to be persuaded against the "horrors of ether," on the strong and round assertion, that some dozen ladies or more in Dublin, upon whom the practice had been tried, had indubitably perished from the effects of it. Unfortunately for the veracity of this statement, ether-inhalation had never once been used, or attempted to be used in obstetric practice in Dublin, up to that date, or for a long time afterwards. Indeed, the first case in which ether was employed in midwifery in Dublin only occurred this week (28th Nov.;) as I am informed in a letter of that date, which I have just received regarding it, from Dr. Tyler.

citing than ether; and gives us far greater control and command over the superinduction of the anæsthetic state. In the remaining part of these observations I shall detail briefly some instances illustrative of its effects and utility in the production of anæsthesia in cases of natural and morbid parturition.

Case I.—The patient to whom it was first exhibited had been previously delivered in the country by craniotomy after a very long labor. Her second confinement took place a fortnight before the full time. Chloroform was begun to be inhaled when the os uteri was becoming well expanded, and the pains very severe. In twenty-five minutes the child was born. The crying of the infant did not rouse the mother, nor did she awake till after the placenta was removed. She was then perfectly unaware that her child was born. She stated her sensations to be those of awaking from "a very comfortable sleep." It was, for a time, a matter of no small difficulty to persuade her that the labor was over, and that the living child presented to her was her own.

Case II.—I exhibited it, with Mr. Carmichael, to a patient who had, at her preceding confinement, been in severe labor for twenty hours—followed by flooding. She began the inhalation when the dilatation of the os uteri was half completed. The child was born in fifty minutes afterwards. She was kept under its influence for a quarter of an hour longer, till the placenta was removed, and the binder, body, and bed-clothes, all adjusted. On awaking, she declared she had been sleeping refreshingly; and was quite unconscious that the child was born, till she suddenly heard it squalling at its first toilet in the next room. No flooding. An hour afterwards, she declared she felt perfectly unfatigued, and not as if she had borne a child at all.

Case III.—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;) andin a few pains the first child was born, assisted by some 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 on soundly, 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 in no small degree distressed when not one—but two —living children were brought by the nurse to her. Dr. Christison accompanied me to this case.

Case IV.—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 for the chloroform, that it was necessary to pacify her by giving her some immediately. In all, four ounces of chloroform were used." Like the others, she was quite unconscious of what had gone on during her anæsthetic state; and awoke altogether unaware that her child was born.

Case V. — Second labor. This patient, after being several hours in labor, was brought to the Maternity Hospital. I saw her some time afterwards, and found the first stage protracted by the right side of the cervix uteri being thick, œdematous, and undilatable. The inhalation of chloroform was begun, and the first stage was terminated in about a couple of hours. Two or three pains drove the child through the pelvic canal, and completed the second stage. Fifteen minutes in all elapsed from the termination of the first to the termination of the third stage, or the expulsion of the placenta. The patient was dressed and

removed into a dry bed, where she slept on for a short time before awaking, and being conscious of her delivery.

Case VI.—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 perineum. 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 to be told that it was so. I had the conviction that in this case the forceps would in all probability have been ultimately required, perhaps hours subsequently, 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 misery and agony upon her, and meeting with great resistance.

Case VII.—A third labor. The patient had been twice before confined of dead premature children; once of twins, under the care of Mr. Stone of London; the second time of a single child, under my own charge. The liquor amnii began to escape about one o'clock, A. M., but no pains followed for some time. I saw her between three and four, with the pains commencing, and the os uteri beginning to dilate. In two hours afterwards the first stage was well advanced, and, the pains becoming severe, she had the chloroform exhibited to her, and slept soundly under its influence. In twenty minutes the child was born, and

cried very loudly without rousing the mother. In about twelve or fifteen minutes more she awoke, as the application of the binder was going on, and immediately demanded if her child was really born and alive, as she thought she had some recollection of hearing the nurse say so. She was rejoiced beyond measure on her son being brought in and presented to her.

Case VIII.—Fourth labor. The patient had born three dead children prematurely, about the sixth and seventh months of utero-gestation. During her present pregnancy I placed her under strict rules and discipline; and she used, from an early period, small doses of chlorate of potass several times a day. She carried her child to the full time. Labor came on about one o'clock, A. M. The membranes broke at eight, A. M., when the os uteri was still very slightly open. It had made very little progress till ten o'clock, when Dr. Keith exhibited the chloroform to her. The pains continued very strong and regular, the passages relaxed, and at half-past eleven she was delivered of a large living child. The placenta came away immediately; and she was bound up, and her soiled clothes removed, before she awoke. She remembered nothing whatever that had occurred after she began to inhale the chloroform till the period of her awaking.

The preceding instances afford, perhaps, a sufficient number of examples of the use of chloroform in natural labor. In these and in all others which I have seen, or that have been reported to me, the immediate effects of the chloroform have been delightful. The mothers, instead of crying and suffering under the strong agonies and throes of labor, have lain in a state of quiet, placid slumber, made more or less deep at the will of the medical attendant, and, if disturbed at all, disturbed only unconsciously from time to time by the recurring uterine contractions producing some reflex or automatic movements on the part of the patient—like those of a person moving under any irritation of the surface, or from the touch of another, though still in a state of sleep. Nor have the ultimate consequences and results been less happy. No difficulties have been met with in the third stage; and the uterus has contracted perfectly after delivery. I never saw mothers recover more satisfactorily or

rapidly,—or children that looked more viable. And the practice is not a great blessing to the patient merely; it is a great boon also to the practitioner. For whilst it relieves the former from the dread and endurance of agony and pain, it both relieves the latter from the disagreeable necessity of witnessing such agony and pain in a fellow-creature, and imparts to him the proud power of being able to cancel and remove pangs and torture that would otherwise be inevitable. It transforms a work of physical anguish into one of painless muscular effort; and changes into a scene of sleep and comparative repose, that anxious hour of female existence, which has ever been proverbially cited as the hour of the greatest of mortal suffering.

The effects of the superinduction of anæsthesia in parturition are, if possible, still more marked and beneficial in cases of morbid labor and operative delivery. In proof of its influence in this respect, I shall cite some examples of its employment in cases of turning, of the application of the forceps, and of embryulsio.

Case IX.—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 embryulsio; 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 her about four o'clock, P. M. The pains were then 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 œdematous ridge of the scalp pressed 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 stethescope, and he at once agreed to my proposition, that I should try to deliver her by turning the infant,—compressing and indenting the flexible skull of the fœtus, instead of perforating it, and thus 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 chloroform still more deeply than when the forceps were used, in order, if possible, entirely to arrest the uterine contractions. 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, much compressed and elongated. The child was still-born, but, by applying the usual restorative means, it speedily began to breathe and cry. The child continues well, and the mother has made a rapid recovery.

Case X.—In the Maternity Hospital; first child. Labor began at ten, P. M. (21st Nov.) I was desired to see her at six A. M. (22d.) The os uteri was well dilated, but it was evident that the pelvic canal was contracted throughout, and the head was passing with unusual difficulty through the brim. The patient was complaining much of her sufferings. It was clear that it would be a very tedious and probably, at last, an instrumental case, and one therefore calculated to test the length of time during which chloroform might be used. She began to inhale it at a quarter past six, A. M., and was kept under its influence till a quarter past seven, P. M., the date of her delivery; thirteen hours in all. From the time it was begun to the time delivery was completed, her cries and complaints ceased, and she slept soundly on throughout the day. The bladder required to be emptied several times with the catheter. The head passed the os uteri at ten, A. M. and, during the day, gradually descended

through the pelvis. At seven, A. M. I at last deemed it proper to deliver her by the forceps; the head, which was now elongated and œdematous, having by that time rested for some hours against the contracted pelvic outlet with little or no evidence of advancement, the bones of the fœtal cranium overlapping each other, and the fœtal heart becoming less strong and distinct in its pulsations. A warm bath, irritation of the chest, &c., were necessary to excite full and perfect respiration in the infant. Whilst we were all busied with the infant, the mother lost some blood; but the placenta was immediately removed, and the uterus contracted perfectly. On afterwards measuring the quantity of blood lost, it was calculated to amount to 15 or 18 ounces. The mother's clothes were changed; she was bound up and removed to a dry bed before she awoke. She had at first no idea that the child was born, and was in no respect conscious of being delivered. In fact she had been "sleeping," according to her own account, from the time she had begun the inhalation, and only thought she once or twice remembered or dreamed that she heard Dr. Williamson, the house surgeon, speak near her. Dr. Beilby, Dr. Zeigler, &c., saw the case with me. The mother and child have continued perfectly well.

In this, as in other cases, I have watched and noted the effects of the chloroform upon the duration of the pains and of the intervals, the rate of the fœtal and maternal pulse, &c.

Case XI. — Patient with a deformed spine and contracted pelvic outlet. At her first confinement two different medical gentlemen had failed in effecting delivery by the forceps. At this, her second confinement, she placed herself under the care of Dr. Paterson of Leith. After being very long in labor, and the symptoms of the case becoming urgent, I saw her with Dr. Paterson. The head was low down in the pelvis; but it was placed in the right occipito-posterior position (the third of Naegele,) and the forehead instead of the vertex was presenting, one orbit being easily felt behind the symphysis pubis. It had been lodged in nearly the same position for many hours. The fœtal heart was still distinct, but weak. I applied the forceps — turned the head round with them a quarter of a

circle, into an occipito-anterior position (the second of Naegele,) and, after being so adjusted, it still required considerable force to extract it. Before applying the forceps the patient was sent into a state of deep anæsthesia by the inhalation of chloroform; and subsequently, when she awakened out of it, she was in no small degree surprised to find that she had really been delivered while she was sleeping and resting so soundly. The placenta separated, and the uterus contracted firmly. The child, which was large, lived for eight hours after delivery; but, despite of all the measures tried, full and perfect respiration was never established in it, apparently in consequence of some effusion or injury about the base of the brain. Unfortunately a post-mortem examination was not obtained. The mother has made an excellent recovery.

I quote the following instance of craniotomy under chloroform from a letter (dated 29th November,) which I have received from my friend, Professor Murphy of London. I give the case in Dr. Murphy's own words: —

Case XII. — "I have tried the chloroform with great success in a case of distorted pelvis. It was the ovate deformity, the conjugate measurement being only $2\frac{1}{2}$ inches; the head of the child could not enter the brim, and I was obliged to perforate. I got Dr. Snow to assist me in bringing her under the influence of chloroform. She made some 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 crochet (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 she was made 'clean and comfortable,' as the midwives say. My patient was perfectly unconscious all this time, and did not awake for about a quarter of an hour after the operation; she did so then quite quietly, and was greatly surprised to find that all her miseries were over. There was no hemorrhage, but the uterus felt rather spongy and large.

She is now recovering most favorably. I never had a case recover so far, so well."

Other cases, both of natural and morbid labor, in which the patients were delivered in an anæsthetic state from the inhalation of chloroform, have been reported to me by Dr. Protheroe Smith, Dr. Imlach, Dr. Robertson of Birkenhead, Dr. Malcolm, Dr. Buchanan, &c.; but as these, and some other instances which I have myself seen, presented nothing new or different in their phenomena from the cases which I have already detailed, I have thought it unnecessary to overload the present communication by the details of them.

APPENDIX.

MANY distinguished members of the Medical Profession, have furnished us with their testimonials in relation to the use of Chloroform, from which we select the following:

LETTER FROM JOHN C. WARREN, M. D.,

Emeritus Professor of Anatomy and Surgery in the University at Cambridge, and Surgeon at Massachusetts General Hospital.

BOSTON, Feb. 2, 1848.

MESSRS. LITTLE & Co.,—Three or four days since I received your note, informing me of your intention to republish Professor Simpson's pamphlet on the use of Chloroform in Midwifery, and of your wish that I should give an account of my experience of this article in Surgical Practice. Although the time allotted for the purpose is too short to allow me to give a full statement, I shall readily comply with your request, so far as to send you some few remarks. This I do the more willingly as a return for your polite attention in exhibiting to me the actual process for making Chloroform, and because the first information of the discovery of Chloroform appeared here after the printing of the principal part of my remarks on Etherization; so that I had little opportunity, before the actual publication was made, of experimenting on its use. Immediately on being acquainted with the discovery of Chloroform, and its application to Etherization, I determined to give it a fair trial, and to make up, as far as I was able, a faithful judgment of its value. The result I shall communicate of course very briefly.

Chloric Ether was discovered in this country in the year 1831, by Mr. Guthrie, in consequence of some experiments performed by him, on the suggestion of Professor Silliman, for the purpose of manufacturing the chloric ether of the Dutch chemists.

Chloroform is the product of the redistillation of chloric ether with an additional quantity of chloride of lime, and it seems proper enough for this, as well as other reasons, to continue the use of the term "etherization," to designate the action of Chloroform on the animal body. Chloric Ether has been for many years employed in medical practice; and its use, in the way of inhalation, has been resorted to, among others, by the celebrated Mr. Lawrence, of London, and by ourselves. Chloroform as distinguished from the latter seems to have been first pointed out by the French chemists, and first employed to relieve pain by Mr. Bell, of London, in February, 1847. This gentleman, however, did not pursue its application very decidedly, and it remained for Professor Simpson, of Edinburgh, already well known for his successful practice of Etherization in Midwifery, to show its full importance in preventing and relieving pain.

Chloroform is a beautiful substance. Its limpidity, specific gravity, agreeable taste, fragrant odor, and its wonderful power of alleviating and preventing pain, combine to render it quite remarkable. These properties have been fully displayed by Professor Simpson, and I have only to advert to its effects comparatively with those of Sulphuric Ether.

The operation of these two substances on the living body is essentially the same, especially in the wonderful influence, first discovered in this city, of preventing and alleviating the suffering from painful impressions. Is there any difference in their mode of action, which entitles one to be preferred above the other? Chloroform, so far as my experience enables me to determine, has advantages over the other ethers. It seems to me to steal away the senses in a more quiet and insidious manner. The distinction between the abolition of the tactile and intellectual functions is less marked. They fall together, and thus indicate a simultaneous invasion of the organs which perform them. There is less of intellectual, vascular and muscular excitement in the beginning, more of depression in the course and termination; and we are therefore led to the conclusion, that the successive disappearance of these faculties from sulphuric etherization is owing to a difference in the degree of ethereal action, rather than to a difference of the parts acted on. There is less pulmonary irritation. The time necessary with chloroform for the production of these effects is less than with sulphuric ether. The degree of insensibility is, I think, greater from chloroform; as we do not so often notice the unconscious shrinking, which seems to indicate pain. The duration of this state is also more

considerable. The restoration of nervous action is more sudden and perfect. A gentleman from whom I removed a large tumor of the groin required five minutes for the accomplishment of etherization, remained fifteen wholly unconscious, and then awoke with faculties perfectly unclouded, and without a dream, or the knowledge of what passed during his sleep. The more sudden action of chloroform, and more perfect termination of this action is to be attributed probably to its greater volatility; for although a more dense liquid than sulphuric ether, its emanations diffuse themselves more rapidly, act of course more speedily, and are more suddenly absorbed into the circulation.

A great advantage of chloroform is found in the comparatively small quantity required for etherization: twenty or thirty drops judiciously applied are often sufficient. This fact has contributed much to its sudden and extensive use in this country. An additional recommendation is the absence of inflammability.

The facility with which chloroform is inhaled may no doubt lead to an abuse of this article for the purpose of intoxication. The knowledge of the probability of such an occurrence will, it is to be hoped, lead those who may employ it to reflect on the dangers that must result from the frequent application to the nervous system of a substance exhausting to the bodily and mental powers, and which may ultimately lead to the permanent derangement of both.

The effects of the new anæsthetic I have had opportunity of observing in a considerable number of operations, and among these anchylosis, strangulated hernia, amputation, removal of tumors, etc. It was a great satisfaction to me to do an operation for strangulated hernia—an operation which I have so often seen attended with severe distress—on a gentleman with a bad strangulation, who during the ten minutes required lay as perfectly tranquil as a subject on the dissecting table of the anatomist, and who directly after its completion awoke in his right mind, and with no knowledge of the operation. This gentleman accidentally swallowed about half a tea-spoonful of pure chloroform without any material ill consequence.

The phenomena have generally been of an agreeable character; but, as in regard to sulphuric ether, there have been exceptions. In two cases convulsions took place before perfect insensibility; in one a sense of insupportable enlargement of the heart; in another dizziness, nausea, fainting, and great depression of strength for five or six days.

The mode of administration, which my experience leads me to adopt, is different from that of Sulphuric Ether. The latter is most con-

veniently employed by a large sponge, while Chloroform, applied to the skin, producing an inconvenient and sometimes painful irritation, ought to be enclosed in a vessel. The apparatus I prefer is very simple. It is constructed so as to introduce the vapor through the nostrils instead of the mouth, for reasons stated in my remarks on Etherization. The nostrils are the natural apertures for inhalation; cold air and all irritating fluids disturb the lungs less when introduced by them than by the mouth. The apparatus then should consist of a straight tube, to one end of which are affixed two small tubes, a little curved, about an inch and a half long, adapted to the nostrils; to the other end is connected a little box with an aperture on its upper plate for the entrance of air, and another communicating with the principal tube. The box opens at the upper part to receive a piece of muslin, or a sponge.

Chloroform may be used externally, as well as by inhalation. Time has not permitted me to employ it thus to any great extent, but having used it with advantage in a number of instances, I should recommend it in the way of friction in rheumatic, neuralgic and other local pains. The friction should be so conducted as to prevent the ready escape of the volatile liquid, and the possible etherization of the nurse. Its property of irritating the skin would in this way have a double advantage; first, in producing counter-irritation, and second, in disposing by this irritation to cutaneous absorption of the anodyne liquid. These effects are more certainly secured, if the friction be made with a sponge, than if with a cloth, on account of the rapidity of evaporation from the latter.

The agreeable action of Chloroform depends on its purity. When it was first brought here, on inhaling it myself, a violent burning, like that from a flame, was experienced in the nostrils, larynx and lungs, which continued to the next day. The irritation was produced no doubt by a liquid impure, whether from retained alcohol, sulphuric acid, or from some other irritating exhalation combined with alcohol, I am unable to say. A test of easy application is said to be found by dropping the chloroform into water, mixed with an equal quantity of sulphuric acid;—when perfectly pure it retains as it sinks into the water its transparency, when otherwise it becomes cloudy. That which you have recently exhibited to me seems to possess the former quality in a high degree. The reduction of its price I heard with great pleasure, as its dearness must have proved a serious impediment to its extensive employment in public institutions.

The vapor of Sulphuric Ether has the effect of producing headache in many individuals, and I can state, that I have never administered it,

for any length of time, without experiencing this inconvenience; Chloroform, so far as I can judge, has not the same objection.

Whether Chloroform will supersede the other Ethers as an anæsthetic, is yet unsettled. The present impression is in favor of this expectation, but however strongly our bias may be in this direction, we must wait a little before we conclude to banish Sulphuric Ether, and receive exclusively its new relation. We may venture to say, perhaps without qualification, that the article so happily introduced into practice by Professor Simpson, is the most valuable improvement on Etherization hitherto made.

JOHN C. WARREN.

Note.—Perhaps it will be an advantage to know the latest improvement of the French chemists, in the mode of preparing chloroform.

"Take 10 kilogr (26*lb.* 9*oz.* 4*dr.* 20*gr.*) of the chlorinated lime of commerce at about 90°; dilute carefully in 60 kilogr (160*lb.* 9*oz.* 2*dr.*) of water; fill a brass still, up to two-thirds only, with the calcareous milk which results from this combination; add 2 kilogr (5*lb.* 4*oz.* 2*dr.* 28*gr.*) of alcohol 85°. Adapt the capital and worm; then apply a brisk fire underneath the apparatus. At about 80° the action produced is such as would raise the mass and cause it to pass in the recipient, if the fire were not promptly abstracted. After a few moments, distillation commences and goes on rapidly; it terminates almost entirely of itself:—This is known by the almost entire absence of the sweetish taste of chloroform in the liquors in process of distillation.

"The produce is composed of two layers; the inferior is dense, and of a slight yellowish hue; it is chloroform mixed with alcohol and tainted with a little chlorine. The superior layer, more abundant, is a mixture, now and then milky, of water, alcohol, and chloroform, or chloric ether. A certain quantity of this produce is deposited in about twenty-four hours. The chloroform is separated by decantation, and washed with water; then with a weak solution of carbonate of soda, which frees it from the chlorine; add chloride of calcium, and rectify by distillation *per balneum maris*. M. Soubeiran thinks that for medical use it is superfluous to rectify anew by sulphuric acid.

"The waters which float on the chloroform in the direct produce of distillation, and those that have been used to wash it, are united and spread with a new quantity of water and distilled *per balneum maris*. The chloroform soon passes, carrying away a little alcoholized water which floats upon it. Purify as directed above. What renders the fabrication of chloroform difficult, is the necessity in which the operator is placed, of working with chlorinated lime considerably spread, in order to enable him to separate impurities; hence, the necessity of operating with vases of great capacity, and of acting at the same time with very limited quantities of alcohol. In the actual state, the quantity of the produce is always sufficiently restricted.

M. SOUBEIRAN."

LETTER FROM WALTER CHANNING, M. D.,
Professor of Midwifery in Harvard University.

BOSTON, January 25, 1848.

Messrs. Wm. B. Little & Co.,

GENTLEMEN,—I have read this morning Prof. Simpson's tract on the employment of Chloroform in childbirth. It is a very important contribution to the use of Chloroform in the cases treated of, and cannot fail to produce very useful results. With the pamphlet came a request that I would furnish for an Appendix to an edition about to be published by yourselves, the results of my own observations on the use of Chloroform. I should with pleasure do this, and feel highly honored by having my name associated with that of Prof. Simpson in this behalf. But having a purpose soon to put to press a volume on the employment of Etherization in Childbirth, I have thought it best to reserve my contributions to this subject till they appear in the work referred to.

I am very glad to find that you have entered with so much zeal in the making of Chloroform. I have witnessed the happiest effects in all cases in which I have employed it. I am glad too that it is your purpose to republish this second pamphlet of Prof. S. upon Chloroform. We owe our American Edition of his first work to the Druggists in New York, and it is grateful to me that a Druggist in Boston is about to publish the second in a Boston Edition. I have not met with Prof. Simpson's answer to the "Religious Objections" urged against Etherization, but I hope you will publish it here as soon as you receive it. We have discovered, and successfully employed in our city, an agent, Sulphuric Ether, which is of the deepest interest to humanity—which destroys pain,—diminishes the chances of death,—and makes processes which were once attended with almost unmitigated suffering, and great danger, comparatively safe and even pleasurable. We acknowledge our obligations to Prof. Simpson for his introduction of Chloroform for the same objects.

Let us have light from whatever source, so it be light, and then let us in the spirit of a noble charity diffuse it every where.

I have constructed a very simple inhaler which covers both *mouth* and *nose*. It admits atmospheric air with sufficient freedom to prevent all difficulty of breathing, and allows of the free egress of the expired air. I have used this in a case of exceedingly embarrassing dyspnœa, and spasmodic cough. I first tried Chloroform on a handkerchief, and great disturbance followed. The *conical* inhaler above referred to, was used with entire freedom from all annoyance.

I remain your friend, &c., W. CHANNING.

LETTER FROM HON. A. R. THOMPSON, M. D.

CHARLESTOWN, Jan. 29, 1848.

Messrs. Wm. B. Little & Co.,

GENTLEMEN :—To your note of Jan'y 28th, '48, (which I received last evening) requesting my opinion of the use of Chloroform, I reply that my experience in the use of both Ether and Chloroform is quite limited as to the number of cases—but the very first can settle at once and forever in my mind, the *grand fact*, viz. that under a judicious administration of Ether or Chloroform, *Parturient action* may go on to a safe conclusion, while the suffering of the mother is entirely suspended. This is the *grand fact* to be established—and this *fact* proved and believed, makes the rule of practice plain, clear and absolutely binding on every humane Obstetrician. The power to take off the perception of pain, without, at the same time, essentially interrupting vital or physical action, rests on a Physiological *truth*—long ago settled—viz. that the sensitive nerves—those nerves by which we feel and act, and which bring in into relation to the world around us—are different from the vital nerves ; that is those nerves by which we live. This great Physiological fact, so long known as a theory, has recently been applied with such brilliant success in practice, that it assumes all the freshness of a new discovery, it certainly is a delightful advance in the glorious science of humanity. For whatever disputations there may be in Theoretic schools, the great facts of relief for human suffering, form the true science for the people, Dr. Rush said, that " when Physicians became better Metaphysicians, and Metaphysicians became better Physicians, it would be happier for mankind." And now one word in regard to the morale of this matter. I hear that some objections have been raised to the use of Ether and Chloroform, on the ground that it is a contravention of the original plan, or as it has been sometimes called, the doom of Parturition. " In sorrow shalt thou bring forth thy children." At the time when our common mother brought forth her first born, and while that event was expected, her situation must have been highly interesting, and she must have had a great many things to think of, and doubtless much sorrow of mind to bear, whether she had a hard or an easy labor. The record is not particular on this point, nor is it at all important that it should be ; all that is said of the " sorrows of a travailing woman" may be well understood without the necessity of bringing in mere bodily pain. This I think is incidental, rather than penal, and through all the successive generations of the race, sympathy

and science have been found intimately united and earnestly striving to ameliorate the pangs of woman. We may safely conclude that neither Ether nor Chloroform were known in that day; but they certainly are now, and I think it is our duty to use them. I have no disposition to contend with those who cling to the old dispensation and insist on the infliction of the "primal curse." For my part I hold to a "new and better covenant," believing firmly in Jesus Christ,

> "In whom the tribes of Adam boast,
> More blessings than their father lost."

Those who believe that all knowledge should ever be under the control of religious principle, have in their hands, in these two agents, Chloroform and Ether, a sublime power, which makes them "ministers of God" for good; co-workers with him, and in the true spirit of his blessed son, in the holy calling of soothing and relieving human suffering and sorrow. It is a divine revelation—a blessed gift—and as "every good gift and every perfect gift cometh down from the Father of light," let us use it with gratitude,—and to him be all the glory.

In regard to the comparative value of Chloroform and Ether, I believe that they both operate on the same principle, and produce the same results. But Ether is very disagreable to many, and all things considered, the Chloroform is to be preferred. It has the most power; is more invariably to be depended upon, and is not merely unobjectionable, but is even delightful in its odor. Let Physicians, who know its inestimable value and its mighty power, be solemnly mindful how they use it; and be faithful to guard the community against the abuse of a power alike mighty for evil as well as good.

Wishing you success, Gentlemen, in all your endeavors to advance the cause of humanity and science, I am, with great respect,

Very faithfully, Yours,

AB'M. R. THOMPSON.

Letter from CHARLES T. JACKSON, M. D., State Assayer.

Messrs. W. B. Little & Co.,

GENTLEMEN,—In reply to your letter requesting from me some account of my experiments with Chloroform, I send you an extract from an article published by me in the Boston Atlas of 3d January last, also some additional remarks which are at your service.

Respectfully, your obedient servant,

C. T. JACKSON.

CHLOROFORM.

BOSTON, Jan. 1st, 1848.

To the Editor of the Atlas:

DEAR SIR:—In order to meet the inquiries of numerous friends as to the nature and application of Perchloride of Formyle, or Chloroform, an anæsthetic agent lately employed by Prof. J. Y. Simpson, of Edinburgh, as a substitute for Sulphuric Ether, I offer you a short account of the method of preparing it, and a statement of the experiments which I have made in confirmation of the results obtained by that gentleman.

So far as I can form an opinion, from a considerable number of careful experiments, I think it probable that this new application will supercede that of Sulphuric Ether, and when manufactured on a large scale in capacious stills, Chloroform may be made at a sufficiently moderate cost to authorize its general employment in surgical cases, when painful operations are to be performed. It may be made advantageously from rum or whisky, while pure Sulphuric Ether can only be made from the most highly rectified alcohol. It may be made in any rum distillery where a steam or water bath heat is employed, and may be collected in tanks, and separated from all traces of alcohol by washing it with water. Chloroform is composed of two atoms of carbon, one atom of hydrogen, and three atoms of chlorine. It is a heavy sweet liquid, having a sp. gr. of 1.489 at 60 F. (according to my experiments,) or 1.480, as given in the books. It boils at 141 F. and is very volatile, having a fragrant odor. It is not combustible when flame is applied to it, nor is its mixture with the air explosive. It is made as follows, according to the directions given in Prof. Simpson's paper:

" R. Bleaching powder (Hyper Chlorite of Lime) lb. IV.
Water. . . . . lb. XII.
Alcohol, ... floz. XII.

Mix in a capacious retort or still, and distill so long as a dense liquid which sinks in the water with which it comes over, is produced."

I have found, by experience, that a much larger proportion of alcohol may be advantageously used, and any excess of it which may come over may be readily separated by the action of water, which dissolves the alcohol and leaves the Chloroform in the state of a dense, oily looking fluid at the bottom. The water, after having stood some time, is to be drawn off from the surface of the chloroform, which may then be more completely separated by means of the separating funnel or bottle prepared for that purpose. The Chloroform thus obtained free from alcohol is sufficiently pure for inhalation, but if it is required to be absolutely pure, it must be carefully agitated with concentrated sulphuric acid, and re-distilled in a glass retort placed in a water bath.

Berzelius recommends the following process for the production of Chloroform :

Take one part of slacked lime and mix it with 24 parts of cold water. Pass chlorine gas through the mixture, to saturation. A little more slacked lime is then added, to restore the alkaline reaction. The clear liquid is then mixed with one part of alcohol or wood spirit, and after standing 24 hours, it is cautiously distilled in a very spacious still. A watery liquid, containing a little spirit and a heavy oil, collect in the receiver. This is the Chloroform. It is to be agitated with cold water and allowed to subside to the bottom of the containing vessel, and then the water may be drawn off and the Chloroform may be obtained and separated from any remaining water by means of Chloride of calcium and redistillation.

In the usual process of making "Chloric Ether," proof spirit (common rum) is mixed with Hyper Chlorite of lime and distilled. Some of the alcohol escapes decomposition, and comes over with the Chloroform produced, so that the Chloric Ether of the shops is the tincture of Chloroform. It was tried as a substitute for Sulphuric Ether, after I discovered the anæsthetic effects of that liquid, but without any satisfactory results. This I now understand was owing to the stimulating effects of the alcohol present in the preparation.

In 1833–4 I introduced very strong " Chloric ether" as a remedy for toothache, and gave samples of it to several dentists in this city, and it has been used for that purpose ever since. Weak chloric ether has been used successfully in medicine, as an anti-spasmodic. Its application by inhalation, for the prevention of pain, did not succeed, as above mentioned.

To Professor Simpson, of Edinburgh, I am indebted for the first account of this new application of Chloroform, and immediately on receiving his pamphlet and letter, I began a series of experiments which resulted in entire success. I have prepared Chloroform from alcohol and from wood naptha, (the latter giving quite a peculiar Chloroform,) and I have tried several experiments with it by inhaling it myself, and by causing my pupils to inhale it. I have also furnished samples of the Chloroform to some of our distinguished surgeons, physicians, and dentists, and have administered it myself to several distinguished gentlemen, and to persons who were to have teeth extracted; and in all the cases I have witnessed, not a single failure has taken place nor have any unpleasant symptoms followed.

It appears to me that the effects of inhalation of Chloroform passed off sooner than those of inhalation of Sulphuric Ether. In one experiment in my office, the insensibility to the prick of a pin was kept up for five minutes, without any unpleasant consequences following.

I administered the Chloroform to three of my pupils, in the presence of Dr. L. V. Bell, who ascertained that the frequency of the arterial pulsations was reduced. If any excitement of the pulse is observed, I think it will be found to be owing to other causes, rather than to any stimulus from the vapor inhaled.

In administering it, no apparatus is needed beyond a simple piece of cloth of open texture, a small conical sponge, or a linen cambric handkerchief. Take the cork from the phial of Chloroform, and apply the cloth to its mouth, and shake the bottle, so as to wet a spot on the handkerchief, (just as people commonly scent a handkerchief with cologne,) cover the mouth and nose with it lightly, and let the air be drawn partly through the cloth. Five or six full inspirations generally suffice to produce momentary insensibility, and a few more bring on a sound, snoring sleep, in which no pain can be felt, even when the knife or cautery are applied.

It is probable, from the experiments made in Europe and in this

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Note.—Chloric Ether was manufactured in this country by Mr. Samuel Gurthrie, of Sackett's Harbor, in 1832. (See Amer. Jour. Science, Vol. XXII, p. 105.)

Chloroform was made about the same time, by Leibig and Dumas, in Germany and France.

Mr. Gurthrie appears to have obtained nearly pure Chloroform, for he states that its Sp. Gr. was 1.486 at 60 F., and that it boiled at 166 deg.

Prof. Simpson states that it was discovered by Souberian, in 1831. Berzelius attributes it to Leibig, who, Prof. S. says, discovered it in 1832. Dumas first determined its true composition.

country, that this new agent will take the place of Sulphuric Ether in Surgery and Dentistry, and that an extensive demand for it will take place. An opportunity is thus afforded for working much of our New England Rum into an uninflammable and much more useful liquid. I understand that Messrs. Little & Co., enterprising Druggists in this city, have already established a suitable distillery for manufacturing Chloroform. Respectfully, your ob't serv't.

C. T. JACKSON.

I have administered Chloroform to more than thirty persons and generally with success, only two or three cases presenting any remarkable peculiarities, and two of these were nervous ladies and the Chloroform was administered to them with slowness and caution. The effect on them was singular, and it may have arisen from the very slow mode of administration, for they sobbed and cried out as if hysterical, but when they recovered in a few minutes they said the sensation was quite agreeable and would gladly have repeated the inhalation.

The third case was certainly an exception to general experience with regard to the influence of anæsthetic agents.

A hardy mariner, captain of a ship, called to ask my opinion as to the probable effect of Ether and Chloroform on his constitution, declaring that Exhilarating gas (Prot Oxide of Nitrogen) had no influence over him, though he had breathed it freely in a lecture room where it was exhibited. He was going to a dentist's to have a tooth extracted and I accompanied him to see the trial of the Chloroform.

It was administered to him freely for a long time until we were satisfied it would not affect him. Then Sulphuric Ether was tried in an equally persevering manner, but no other effect was noticed beyond a slight nausea from the Chloroform and a little exhilaration from the Ether vapor, so the tooth was extracted without insensibility having been produced by either of these agents.

It has been observed that those who make excessive use of ardent spirits are not so readily affected by anæsthetic agents and are withdrawn in a measure from the benefit of this new discovery, but the person above noticed said that he was not in the habit of drinking ardent spirits, and hence his case must be set down as one of those curious idiosyncracies we occasionally meet with.

It should be remarked that when we administer Chloroform very slowly and cautiously we are more liable to produce excitement than if we administer it more rapidly. It appeared to affect the head more

when inhaled through the nostrils than if taken by inhaling through the mouth. One gentleman to whom I administered it cautiously poured forth his raptures in poetry, while two others to whom I gave it in a rapid manner sunk immediately into a deep sleep of utter insensibility and powerlessness, but recovered in three minutes entirely. I have found that if we sponge the forehead with cold water the patient regains his conciousness much more rapidly and seems as if starting from a deep sleep.

I have administered both Chloroform and Sulphuric Ether vapors to the insane with very agreeable effects, the patients falling into a deep sleep and gaining, as it were, a short respite from their distressing delusions which had haunted them continually and prevented sleep. This period of rest was found to be quite salutary, and it is probable that critical changes in those troubles may be induced by this new method of treatment. In one case, that of a furious maniac who had torn his clothes entirely from his body, and whom we took from his cell and treated with Sulphuric Ether vapor, the relief by inhalation of the Ether was most remarkable. This patient who had not slept for several nights was at once subdued by this treatment and put into a deep sleep of insensibility and laid on his bed where he remained asleep all the afternoon and evening of that day, and became quite tranquil when he awoke and has up to the latest accounts not suffered any new paroxysm.* In the hands of skillful Physicians, for the insane these remedial agents may prove a great blessing.

I have long since urged the application of Etherization in cases of intermittent fever, but have not yet seen any account of its trial. I would now renew my invitation to physicians in the south and west to try both Chloroform and Ether in that troublesome disorder, if the Chloroform will break the chills and bring on, as it probably will, a copious perspiration (one of its common effects) it will prove a great blessing, and the remedy will be found quite portable, since only thirty or forty drops of this agent is required to produce its proper effects.

It was observed by Dr. L. V. Bell, that the number of arterial pulsations was diminished about 10 in the minute by the influence of Chloroform, and this seems to be a general effect for the only case in which the pulse was increased in number was one when the patient (an insane person) struggled violently during the administration.

Respectfully, your ob't serv't,

BOSTON, February 1st, 1848. C. T. JACKSON.

* My experiments were made at the McLean Hospital in the presence of Dr. L. V. Bell.

Letter from Morrill Wyman, M. D.

Cambridge, Mass. Jan. 31, 1848.

Messrs. W. B. Little & Co.,

Gentlemen,—In answer to your letter of Jan. 29th, requesting any information I may be able to communicate, illustrating the use of Chloroform in Midwifery, I send you the following case.

Jan. 25th, 1848, 12 1-2, A. M. Visited Mrs. A. B., aged 25, of slight form and an excitable temperament, in labor with her second child. She was sitting up; said her pains had been slight during the evening, within an hour had increased but were still not severe. The mouth of the womb in the course of an hour and a half was dilated to the size of a dollar, and the pains becoming more severe she kept the bed and was submitted to the influence of Chloroform. The inhalation was effected by simple means. A piece of sponge about one cubic inch in bulk was moistened with a tea-spoonful of Chloroform and held in the hollow of the hand, barely supported by the thumb and forefinger, and kept in contact with the nostrils, while the little finger and edge of the hand compressed the lips and compelled inhalation through the nose. In about one minute and a half the patient became partially insensible, said she felt "queerly," and in less than a minute after was insensible. During the following thirty-five minutes, the sponge being from time to time moistened, she was under the influence of the Chloroform with occasional intervals of apparent partial consciousness. In these intervals the only indications of pain were interruptions of her incoherent talking, which was almost constant. The pains (if I may use the expression where pain was not felt) were always accompanied by a strong contraction of the womb, felt, as usual, when the hand was placed upon the abdomen, but not accompanied by voluntary exertion of other muscles. During the following hour and a half the pains increased in frequency and in length; the child advancing regularly meanwhile. At the end of this period the head was resting very low down, the pains changed in character, becoming more expulsive, and after three or four strong throes, the labor was terminated by the birth of a strong and healthy female child.

During the whole of the hour and a half the patient was apparently perfectly insensible, lay without moving the lower limbs and with slight motion of the hands. The womb contracted at once and firmly; the after-birth being expelled without any untoward circumstances in about five minutes. The patient was allowed to remain quiet. The pulse,

which, during the early stage of the inhalation was above 90, had fallen below 70 and was slow in its beat. In about fifteen minutes she recovered her consciousness and was very much surprised to learn that her child was born, saying she knew nothing of it and thought she had been dreaming. She complained of great indistinctness of vision, a feeling in the limbs approaching to numbness, and in answer to my inquiries said she felt confused and did not wish to talk. She complained also of much smarting of the nose and upper lip.* At noon most of these uncomfortable feelings had disappeared, and she assured me she had no recollection of anything which occurred, from the time of the first inhalation of the Chloroform, not even during the half hour when I supposed her partially conscious. She had a number of after-pains but not sufficiently severe to require the use of an opiate. She remarked that the day after her first confinement she could move only with difficulty on account of pain and soreness of the limbs, the consequence of her voluntary exertions, but now she felt perfectly well in that respect. Her recovery has been, thus far, very favorable, and she expresses herself highly pleased with the effects of the inhalation. The quantity of Chloroform used during my attendance was about four ounces.†

I have found since the case above described occurred, that oiling the lips and nostrils with an animal oil will prevent, in a great measure, the uncomfortable and sometimes distressing irritation of those parts induced by the corrosive action of Chloroform after long continued inhalation.

Very respectfully,

Your obedient servant,

M. WYMAN.

Letter from J. Mason Warren, M. D.

Boston, February 1, 1848.

Messrs. Little & Co.,—In answer to your note, requesting my opinion as to the use of Chloroform in Surgery, I should be disposed, from the experience I have been able to obtain in the short time since this substance has been introduced here, to come to the following conclusions in regard to it, as compared with sulphuric ether:

1st. That the inhalation of it causes less irritation than the latter substance.

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* We are informed that the *vapor* of Chloroform produces no disagreeable effects. It is only when applied in a liquid state, that the above unpleasant consequences follow its use.

† Had a proper inhaler been used a much less quantity would have been required. Pub.

2d. That it more rapidly produces unconsciousness, and is both preceded and followed, in most cases, by less excitement. This, I have verified by administering it to one or two persons who had previously taken sulphuric ether.

It has a more agreeable odor, and requires a much smaller quantity than ether,—which are qualities much in its favor. One disadvantage is, its caustic property, when placed in contact with the lips. This may be obviated by the use of an apparatus, which, it appears to me, should be constructed so as to allow the vapor to be received through both the mouth and nostrils.

If sufficient care be taken, the most convenient and efficient method for its exhibition is on a bit of sponge or rag, held in the palm of the hand and applied as nearly as possible to the mouth and nostrils, without allowing actual contact.

Thus far I have seen no bad effects from its use, having used it myself, or witnessed its administration in a considerable number of cases.

I am, your obedient servant,

J. MASON WARREN.

Letter from Dr. David K. Hitchcock, Surgeon Dentist.

Boston, Feb. 1, 1848.

Gentlemen—I received your favor of the 28th inst., wherein you take occasion to say that in the course of my practice I probably have used the Chloroform to a greater extent than any other dentist in the city. "I should be pleased," you add, "if you would furnish me for publication a notice of the various cases where you have administered the Chloroform, and with what success," &c.

In reply to your inquiries, I would briefly remark, that I have administered the Chloroform to a great number of persons of both sexes, and of all ages, and that my first important case occurred on the 28th of Dec. last.

As it would unquestionably occupy too much space in the proposed publication, you cannot, of course, wish a full report of the different number of persons who have inhaled the Chloroform. I keep an accurate record of the names of persons to whom I have given the Chloroform, and of the day also when it was inhaled. A few cases selected from these, will, I think, be all that you now require.

Case I.—A day or two since, a little boy about six years of age was brought to my office. I was requested to remove his tooth. "I want," says the child, "some Chloroform;" he inhaled it about thirty seconds. I extracted the tooth. The boy continued talking to me while the in-

haler was over his mouth, and a smile lighted up his face when the tooth was extracted.

Case II.—Mrs. K. of Tewksbury, desired me to remove a tooth for her, with the request also that I would administer the Chloroform; adding, at the same time, that she believed it would have no effect upon her. She inhaled it about two minutes, and the tooth was drawn. I asked her how she was pleased with the Chloroform. "I am of a peculiar temperament," she replied, "and I knew that it would produce no impression upon me." The lady was not conscious of having felt the slightest pain, and was as much delighted as surprised, when she was shown the tooth that had caused her so much suffering.

Case III. The Rev. Mr. O. and lady called with three of their children, and the eldest a little girl about eight years of age, requiring the removal of two teeth. "She is a very timid child," observed her father, adding, that a short time since, while under the hands of a dentist, it required the aid of two persons to hold her. The child was quite unwilling that I should examine her teeth. After great persuasion she inhaled the Chloroform, and soon fell into a gentle sleep. While in this state I removed the two teeth. She awoke, and with a smile of joy exclaimed, "I have had a pleasant dream,—why you have taken out my teeth."

Case IV.—Mr. S. desired me to extract two of his teeth;—one in the superior and one in the inferior jaw. I administered the Chloroform, and during etherization removed the teeth. When he awoke from his very pleasant sleep, he remarked, "You have removed the tooth in the lower jaw, have you not, doctor?" I have, sir. "I wish he added, "the other was out." He soon discovered that the other was missing. "Why," he exclaimed with an agreeable surprise, "you have taken out the upper one also. I am sure I did not know it."

Case V.—The Rev. Mr. S., of Concord, N. H., visited me for the object of having a number of teeth and roots removed, under the influence of the Chloroform. As that distinguished chemist, Dr. C. T. Jackson, was present, to witness the operation, I desired him to administer the Chloroform. The patient's comments are thus given:

"Wishing to have a number of teeth and roots, seven in all, extracted, I called on Dr. Hitchcock, who administered the vapor of fifteen or twenty drops of the Chloroform and extracted the teeth without producing the least pain. The time employed in the whole operation did not exceed thirty seconds. While inhaling it, I experienced scarcely any uneasiness. No unpleasant effects followed its influence—not even

any effects which reminded me that I had been breathing any other air than that which is the common boon of all."

Knowing from experience the difficulties arising in administering Chloroform with a sponge, napkin, or otherwise, I have, to facilitate my operations, constructed an Inhaler, which completely answers the purposes for which it was intended. I have submitted this instrument to the inspection of several of my professional friends, who, without hesitation, recommend it in all cases requiring the inhalation of Chloroform. For their accommodation, I have directed an ingenious mechanic of this place to manufacture a limited number of Inhalers after my pattern. An engraving and description of the instrument are herewith enclosed.

It affords me great pleasure to add, that I have used the Chloroform manufactured at your establishment, and that its purity is unquestionable.

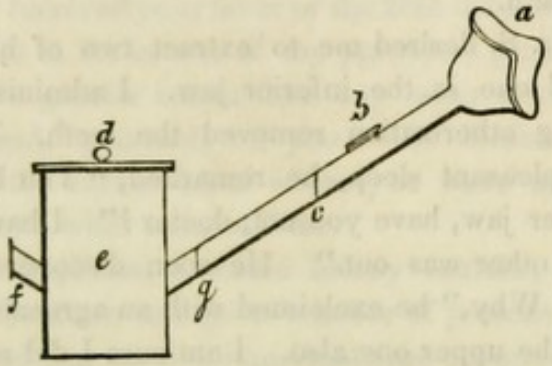
Respectfully, Yours,

DAVID K. HITCHCOCK.

Court Street, 127.

To Messrs. W. B. Little & Co.

DR. HITCHCOCK'S CHLOROFORM INHALER.*



Explanation of the Engraving. — *a* is the mouth-piece at the end of the breathing-tube, and is a large, oval, bell-shaped cup, which covers the mouth of the patient and fits on the outside of the lips so completely as to exclude the atmospheric air. — *b* is a light valve, on the outside of the tude, and through which the breath passes outward. This valve is hung by a hinge on its right or upper side—somewhat resembling the key of a flute.—At *c* there is a valve (represented by the dotted line) on the inside of the tube. This valve is vertical and hangs by a hinge on the inner upper side of the tube, and is arranged, like the valve in a common pump box, so that it can operate only in one di-

* These Inhalers are for sale by Wm. B. Little & Co.

rection—and that direction is toward the mouth-piece.—*d* is the cover of the reservoir on the top of which it shuts, with a broad rim on the inside, like the lid of a tea-kettle, but fitting air tight.—*e* is the reservoir, containing a sponge moistened with Chloroform.—*f* is a short tube opening into the reservoir.—*g* represents a joint in the breathing tube.

Now when the mouth-piece is placed over the lips, and the patient commences breathing, it is plain to see that at every *inspiration* the valve *c* will open, while the valve at *b* will be the more closely closed; and also that, at every *expiration*, or when the breath passes out from the lungs, the valve *b* will open, and, at the same instant, valve *c* will be closed. This operation is, of course, repeated at every respiration. All the air which passes through the valve *c*, enters the reservoir by the tube *f*, and consequently becomes impregnated with the Chloroform contained in the sponge in the reservoir. Some ten or twelve inspirations are generally sufficient to produce that insensibility to pain necessary for ordinary operations.

When the apparatus is not in use the breathing tube may be separated from the reservoir at the joint *g*, and an air-tight cap, or common cork, is placed in the piece of the tube which communicates with the reservoir at this joint. A similar cap, or cork, is placed in the mouth of the tube *f*. If these caps, or corks, are air-tight, and the top, or cover, *d* is also tight, it follows that the Chloroform remains in the reservoir perfectly secured from evaporation and at all times ready for use. The object of the joint at *g* in the breathing tube, is the more effectually to secure the Chloroform from evaporating, when not in actual use, than it would be if left to the protection of the valve at *c*, alone. At the same time, however, it renders the apparatus more portable and convenient.

The reservoir is about two inches in height by one in diameter—and the other parts proportioned like the engraving.

From the Boston Medical and Surgical Journal, Feb. 2d, 1848.

"MANUFACTURE OF CHLOROFORM.—Messrs. Wm. B. Little & Co., 104 Hanover st., are manufacturing this new agent in large quantities. Dr. C. T. Jackson, the Chemist whose reputation is as extensive as the boundaries of science, speaks with entire confidence of the purity and excellence of Messrs. Little & Co.'s Chloroform for all purposes for which it may be required; and it is by no means necessary to urge upon practitioners the propriety of being particular in their purchases, from men of established reputation, since a poor article from irresponsible sources may be in the market."

WM. B. LITTLE & Co., being extensively engaged in the manufacture of Chloroform, take this opportunity of calling the attention of the medical profession to the purity of the article they prepare. It is highly important that Chloroform for inhalation should be absolutely pure, otherwise its anæsthetic properties are not only much impaired, but it is liable to produce injurious effects.

We give below a few testimonials we have received from some of our most eminent Chemists.

From Charles T. Jackson, M. D., State Assayer.

Messrs. W. B. Little & Co., BOSTON, Jan. 31, 1848.

GENTLEMEN,—I have examined numerous samples of Chloroform prepared at your establishment, and can confidently recommend it to the profession as suitable for inhalation. Respectfully, your ob't serv't,

CHARLES T. JACKSON.

From John W. Webster, M. D., Erving Professor of Chemistry in Harvard University.

Messrs. Wm. B. Little & Co.,

GENTLEMEN.—I am just now wholly occupied preparing my lecture. The article looks and smells well. I have no time to examine it further. Dr. Jackson's certificate is quite sufficient to satisfy any one, and I should place entire confidence on what he says respecting it. Yours, Respectfully,

Jan. 31, 1848. J. W. WEBSTER.

From Martin Gay, M. D.

Messrs. Wm. B. Little & Co.,

GENTLEMEN,—I have examined the specimen of Chloroform with which you had the kindness to furnish me. I find it to be pure, and of course all that can be desired for inhalation. Respectfully, Yours, &c.,

Jan. 31st, 1848. MARTIN GAY.

From W. F. Channing, M. D.

Messrs. Wm. B. Little & Co.,

GENTLEMEN,—I have examined the specimen of Chloroform which I received from you and find it free from both water and alcohol. I should therefore consider it absolute. Yours,

BOSTON, Jan. 31, 1848. W. F. CHANNING.

Wm. B. Little & Co's. Chloroform is neatly put up in different sized bottles, securely packed so that it can be sent to any distance with perfect safety. All orders addressed to the subscribers will be promptly attended to and supplied at the lowest market prices.

WM. B. LITTLE & CO., CHEMISTS AND DRUGGISTS,
104 *Hanover street*, (Corner of Salem st.,) BOSTON.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