

The question considered : is it justifiable to administer chloroform in surgical operations, after its having already proved suddenly fatal in upwards of fifty cases, when pain can be safely prevented, without loss of consciousness, by momentary benumbing cold? / by James Arnott.

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WHEN PAIN CAN BE SAFELY PREVENTED, WITHOUT LOSS
OF CONSCIOUSNESS, BY MOMENTARY BENUMBING COLD?

BY
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LATE SUPERINTENDENT OF THE MEDICAL ESTABLISHMENT AT
ST. HELENA.

LONDON:
JOHN CHURCHILL, PRINCES STREET, SOHO.

1854.



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THE QUESTION CONSIDERED, &c.

IF the insensibility, during surgical operations, produced by the inhalation of ether, chloroform, and other intoxicating gases, were unattended with danger, few discoveries would exceed in importance that of the anæsthetic property of these substances; and mankind would hail with delight the announcement that, after numerous abortive efforts, some safe and certain means had, at last, been invented, of removing one of the greatest ills which humanity is subject to. Those who discovered this use of ether and chloroform, or were interested about their introduction into practice, boldly asserted their safety. Attributing the first instances of death which occurred from their use to blunders in the mode of administering them, they ridiculed the fears of those who, reasoning from analogy, could not suppose it possible that agents of such extraordinary power might be always, or even often, employed with impunity. The public were put on their guard against the remonstrances of an opponent having so "ominous a name" as Dr. Gull; the objections of the celebrated physiologist, Majendie, were called natural, as he had acquired a taste for screams and groans from his vivisections in the College of France; and certain surgeons, it was said, could not proceed agreeably in their operations without such a musical accompaniment. As time went on, and these fatal effects of chloroform, even in the hands of the most careful and expert, rapidly multiplied, this line of defence was abandoned; and all that can now be alleged in favour of retaining this agent in the practice of

surgery is, that, though often fatal, and often productive of minor bad consequences, the good it confers in giving immunity from pain, outweighs the evil; so that, upon the whole, though the discovery of etherization may not be so brilliant as was once imagined, it is, nevertheless, a gain to humanity.

Even were there no other safe means of attaining the same object, this conclusion might well be contested; but as there is another mode of preventing pain in operations, not only of perfect safety, but attended with advantages as respects the healing of the wound caused by the surgeon, which chloroform has no pretensions to, there ought not, with regard, at least, to the great majority of surgical operations, to be any hesitation on the point. After a bridge has been constructed, there can no longer be any doubt whether it is better to attempt a dangerous ford, or make a wearisome, circuitous journey. It is the purpose of this tract, after briefly stating the dangers attendant on etherization, to describe the substitute for it just adverted to; and the following narrative will serve as an introduction to the subject.

On the 10th of October, 1849, John Shorter was operated upon in St. Thomas' Hospital for the removal of the nail of the great toe, which had grown into the flesh and caused much irritation. He was 48 years of age, and is described in the report of the case, as being apparently in perfect health. The operation of extracting a toe-nail being a very painful one, he was made to inhale the vapour of chloroform until insensibility was produced. Immediately after the operation the danger of the patient was perceived. "After struggling for about a minute he became still, the skin cold, pulse scarcely perceptible, and soon ceased to be felt at the wrist, respiration became slow, and at intervals, but continued a few minutes after the cessation of the pulse." No *post mortem* examination of the body was permitted.

This is not the only case of the extraction of the toe-nail

which has proved fatal from the use of chloroform. The very first death from it—that of a woman near Newcastle, was of this description; and another was that of a young gentleman at Govan, near Glasgow; but I have preferred adducing the case at St. Thomas' Hospital, because at this hospital, and more than a year before, I had in vain sought the opportunity of showing how such a result could be certainly averted.

In Paris I met with no such difficulty. During a visit to the hospitals of this city soon afterwards, I explained and exhibited to M. Velpeau the plan which I had adopted of completely preventing sensibility in surgical operations by benumbing the part to be cut by means of extreme cold; and he not only himself quickly adopted the expedient at the hospital La Charité (after having been satisfied of its sufficiency by coolly plunging a penknife into the congealed arm of the inventor), but happening at this time to be President of the Academy of Medicine, he gave it publicity at one of the meetings of that distinguished body.*

Unfortunately, the opinion that chloroform was without danger, when properly administered, was at that time as general there as in this country, and the communication, therefore, that a substitute might be found for it in frigorific applications, was little more interesting to the assembled academicians, than the information that a new shield had been invented, would be to a warrior already deeming himself invulnerable from his armour.

The following reports of M. Velpeau's use of a frigorific mixture to produce insensibility, previous to performing the very operation just referred to, are taken, the first from the 42nd No. of *L'Union Medicale* for 1850; the second from the *Philadelphia Medical Examiner* for 1852.

The French Report is drawn up by M.M. Bérard and Foucher, Internes of the hospital La Charité.

After mentioning that the hopes, once entertained, that the

* See Bulletin of the Academy of Medicine for Oct., 1849.

local application of ether or chloroform might produce local insensibility had been disappointed, they thus proceed :—

“ It is now some months since M. Arnott, in pursuance of this idea (that it was not only useless but dangerous to render the whole organism insensible when the surgeon’s intention was to apply an instrument on only one region of it), made some trials of a refrigerating mixture in the hospitals of Paris ; and M. Velpeau reported to the Academy of Medicine the encouraging results of these. The Professor of ‘ La Charitè ’ has since then himself employed the same means, and it is our duty now to relate the three facts of which we have been witnesses.

“ 1. In the case of a young girl having a large abscess above the right knee, M. Velpeau applied the frigorific mixture, composed of two parts of ice to one of sea salt. After four minutes, the skin having become blanched in all the points in contact with the mixture, it was practicable to make an incision of about an inch in extent without the patient being sensible of pain. There was nothing peculiar in the after progress of the abscess.†

“ 2. A few days afterwards, having to remove a nail which had grown into the flesh of a woman, M. Velpeau applied the frigorific mixture upon the affected great toe. After two minutes he was able to introduce the point of a scissors under the nail, cut it in two parts, and tear it out with a pincers, without producing the least pain. The patient watched the different steps of the operation like an unconcerned spectator. The remaining history of the case differed in nothing from the usual consequences of this operation.

“ 3. On the same day a patient entered the hospital for the like purpose of having an ‘ ongle incarnè ’ removed. After having had the same anæsthetic agent applied during four minutes, she was operated upon in the same manner, and, as in the former case, without any pain being produced.

† In a fatal case from chloroform occurring at Boulogne, the operation was the opening of an abscess.

“ In these three cases, the insensibility lasted from two to four minutes ; the part which had been rendered insensible, quickly returned to its former normal condition.”

In the American Journal, Dr. Berry states, that he has seen six patients operated upon, for the removal of the toe-nail, by M. Velpeau, after complete insensibility had been produced by the frigorific. In reference to an objection which he thinks might naturally occur to those whose opinions of congelation are influenced by their knowledge of minor degrees of cold, he mentions that neither in any of these operations, nor in one he performed himself, was there any injurious reaction.

So far then as relates to the extraction of the toe-nail, there can be no doubt that the deaths which have occurred from chloroform might have been prevented, while complete insensibility was secured by the substitution of benumbing cold. But it is needless to remark that there is no peculiarity in this operation, and that if the expedient prove perfectly successful here, it will prove equally so in an immense number of other operations. In such as implicate little more than the skin, pain may thus be completely prevented, and in those remaining, where the deep-seated parts cannot be conveniently brought under the benumbing influence of cold, the most acute portion of the pain, at least, or that proceeding from cutting the skin and the textures adjoining it, may be also thus certainly avoided.

As respects the question of the safety of this expedient, it will suffice at this stage of the enquiry to remark, that in the thousands of times it has been used by myself and others, and often, as in cases of inflammation or malignant disease, to much greater extent than is ever necessary in surgical operations no untoward event, far less any fatal result, has been the consequence.

In order to judge correctly of the value of ether or chloroform as means of producing insensibility, it is necessary to divest th

subject of certain errors or misrepresentations, with which it has been associated, and so recommended to public favour. It is worth while, in the first place, to enquire, whether etherization is, in principle, a modern discovery; or whether, like some other alleged discoveries in medicine of late date, it is only the revival of a practice of former days, which, after a time, had been thrown aside and forgotten, in consequence of its demerits or dangers.

The production of insensibility, in surgical operations, is not of recent origin. We find, in ancient medical works, various allusions to this subject, and particularly to the inhalation of the fumes of the plant called mandrake, as an anæsthetic; and even so late as the middle of the seventeenth century, Middleton, in his tragedy of "Women beware women," introduces the following passage:—

"I'll imitate the pities of old surgeons
To this lost limb, who, ere they show their art,
Cast one asleep, then cut the diseased part."

Boccacio, also, refers to the same practice, in one of his tales.

The problem respecting the production of insensibility for surgical purposes, to which the reputed feats of mesmerism have again drawn attention, has been greatly misunderstood. It is not alone required that pain should be prevented, but that this should be effected without incurring danger; to such a degree, at least, as would counterbalance the advantage of the insensibility.

If the first thing required—the mere prevention of pain—were all that was necessary, there would be no difficulty of solving the problem; for the body may be rendered insensible to pain by a great variety of means. About twenty years ago, it was actually proposed by a writer on surgery of some repute, that patients about to undergo very painful surgical operations, should be previously bled to fainting, in order that the operation might, during the continuance of the fit, be painlessly performed; and,

I think, a case was related of amputation of the breast, effected under these circumstances.*

Concussion of the brain, or apoplectic congestion artificially produced; stupor from intense cold; extreme intoxication from alcohol, or narcotism from opium, ingested or inhaled; asphyxia, from immersion in water or other causes; the artificial production of epilepsy, catalepsy, or hysteria, (with one or other of which the mesmeric condition alluded to must be identical or nearly allied,) are other possible means of causing insensibility, but all so dangerous, uncertain, or otherwise objectionable, that medical men have, in modern times, at least, been unwilling to use them. If, indeed, the insensibility be produced by natural causes, or has existed independently of the wish of the surgeon, he has occasionally taken advantage of it. Operations have been performed while the patient has been insensible from drinking spirits to excess; the trephine is often applied when the patient is without feeling, from injury to the brain; and I, myself, many years ago, performed what is usually a painful operation, while the patient was apparently insensible from an attack of epilepsy.

That the inhalation of ether or chloroform, does not, in respect to danger, differ essentially from these, (if there is even a distinction, in principle, between it and the usual modes of intoxication,) is manifest from the fact, that already, during the short time it has been employed, more than fifty sudden deaths have been reported as occasioned by its use, to say nothing of numerous unreported cases of this description, and of cases of death and other minor evil consequences which have happened some time after its employment.

In a paper on the subject by Dr. Crisp, read before the

* Dr. Dewees recommended profuse bleeding to prevent pain in Midwifery; not, however, by producing insensibility, but by removing the cause of pain, which, he supposed, arises principally from the unyielding nature of the soft parts. A fluid pressure dilator, described in my "Essay on Therapeutical Enquiry," answers this and more important purposes.

Medical Society of London, in June last, (see the *Lancet* of that date) the amount of *reported* deaths from chloroform, expressly excluding certain doubtful cases, is said to be forty-two. In a discussion on the able report of a case of death from chloroform, by M. Robert, in the Surgical Society of Paris, of about the same date, the deaths were spoken of as being upwards of eighty.* But it must be borne in mind that these calculations have reference only to certain countries in Europe and to the United States of America. As to the amount of unrecorded fatal cases, and those that have happened from chloroform some time after its exhibition, the enquirer must judge from his own knowledge of such cases, and from the reflection, that it is not every surgeon, who, for the sake of science and the public benefit, would deem himself bound to wound the feelings of relatives, and, perhaps, damage his own reputation by an announcement of the real cause of death.

An analysis of these cases has shewn, that if there be a peculiarity of constitution rendering etherization dangerous, this peculiarity may be of very recent origin, as several persons have died, although chloroform had been administered to them on former occasions with impunity. In contradiction to the assertion that the fatality has been owing to the impurity of the chloroform employed, it has repeatedly happened that other patients have had chloroform exhibited to them from the same bottle on the same day; and on trial, the substances forming the impurity have, when separated, been found innocuous. The explanation of death from chloroform, that it is not the agent itself which kills, but the faulty mode of exhibiting it, is now abandoned. He who principally insisted on this, has, himself, had the misfortune to cause death by chloroform. But even granting the truth of the allegation, it was of little force. Still was there danger, though from a different source. Of what importance is it, as regards the unfortunate patient, whether his

*Bulletin de la Societe de Chirurgie de Paris, pendant L'Annee, 1852—1853.

death proceeds from a poisonous agency, or from being choked by the difficulty of exhibiting a drug? Although asphyxia may not be so quickly produced as certain writers seem to imagine, common sense points out the necessity of largely diluting the narcotic vapour with atmospheric air. And it is not improbable, that so far from being injurious, the impurities just alluded to, may answer another purpose of such dilution, in preventing the administration of too large a quantity of the drug. The chloroform may be too pure; and the evil effects which have been attributed to the substances mixed with it, may be so with as little justice, as the evil effects of drunkenness are sometimes imputed by the tippler, not to the large quantity of spirits which he takes, but to the vile water with which it is adulterated.

Not a little mystery has been thrown on the origin of the various kinds of etherization, which, it may be useful to dispel.

Mr. Neale, in his lately published *Travels in the East*, describes a curious operation which he saw performed on a horse, by a Turkish veterinary surgeon. After the animal was thrown down, he was made to breathe the fumes of a mixture of burning narcotics until insensibility was produced, when the operation was proceeded with.* What was this in principle but etherization, and what consequently is modern etherization but an extension of veterinary to human surgery? In the "*Journal de Toulouse, 1847,*" Dr. Dauriol recommends the production of insensibility by the inhalation of the fumes of henbane, belladonna, and other narcotics of this class, in preference to the substances at present employed; and in support of this recommendation, he relates five cases in which the method was employed by himself with success.

The inhalation of sulphuric ether, as a means of producing insensibility, originated in the United States. Three persons have contested the invention, Messrs. Wells, Morton, and

* See Appendix A.

Jackson; and to this day it has not, I believe, been determined to which of the three it entirely or principally belongs. The substitution of sulphuric ether for nitrous oxide, or "laughing gas," had, from the similarity of their properties, already been extensively made for other purposes. It is a curious circumstance that both the vapour of ether, and the local anæsthetic consisting of ice and salt, should have been employed as amusements long before being applied to medical purposes. I have elsewhere related the astonishment expressed by a patient from the north of Scotland, to whose rheumatic arm a frigorific mixture was being applied, when he discovered that it consisted of the same materials as that into which he and his companions had often, when boys, dipped their hands to see "whose fingers would become the hardest and whitest." Not only had ether been employed in frolick, but it is said, that the notorious empiric, Dr. Graham, the exhibitor of the "celestial bed," used, in his old age, to produce celestial oblivion of his dishonourable career, by intoxicating himself with the vapour of ether, in a chemist's shop at Bath.

It was obvious, however, that amongst the various ethers and analogous substances, others might be found better adapted for the purpose intended than those that had as yet been employed. Before Messrs. Morton and Jackson (who had stained the improvement of the substitution of sulphuric ether for Mr Wells' nitrous oxide, by an attempt to appropriate it by a patent) had revealed the particular vapour which they employed, Dr. Bigelow, of Boston, had instituted experiments with chloric ether and other vapours; but none has had the reputation of the vapour of chloroform. Dr. Simpson, of Edinburgh, was the first who employed it on the human subject, having had it recommended to his notice by Mr. Waldie, a chemist at Liverpool, who happened to be aware that it had already been used for other purposes, as a substitute for sulphuric ether. It is singular that, as in the instance of ether, there should be three com-

petitors for the comparatively small honour of the mere substitution of chloroform. We are informed, by French writers, that M. Flourens had experimented with it on animals before it was employed in this country. But whatever claims M. Flourens and Mr Waldie may prefer, it is, undoubtedly, to Dr. Simpson that is due whatever credit there may be from an indefatigable exertion in making it known and popular.

Professor Miller, of Edinburgh, is not content with this award to his friend, Dr. Simpson. He claims for him the entire invention of chloroform, which, he says, eclipses all his other medical improvements. In his facetious pamphlet, termed "The Surgical Experience of Chloroform," he has told us the story of this invention; and an interesting story it is, worthy of its narrator's celebrated patronymick, though it does not impress one with a high idea of the difficulties which, in Mr. Miller's opinion, doubtless, must be overcome in the making of great discoveries. Just as a party of friends might set about tasting a variety of wines and spirits in order to assist each other's judgment (apt to be obscured by the nature of their occupation) in selecting the best, so, it appears, did Dr. Simpson and his companions, seated round the supper table, commence the testing of a batch of ethers, and other intoxicating vapours. The chloroform recommended by Mr Waldie was found the most pleasant and potent, as was signally demonstrated by Dr. Simpson's falling under the table after partaking of it; and if we agree with Mr. Miller, that the Doctor's reputation has been raised to a sublime height by this fall of his body, (with such results, a Newtonian apple fall)—it was, indeed, a royal road to immortality. An impartial judge, however, would be inclined to give as much credit to him who recommended, as to him who made the trial of chloroform; and perhaps Mr Miller, in calling Dr. Simpson its "maternal parent," tacitly recognizes the paternity of Waldie. After all, the dispute whether ether or chloroform is best, is of little moment: each

may be preferable to the other for certain purposes. Mr Warren, of Boston, in an address to the Medical Society of Cincinnati, says that he and his colleagues, after giving chloroform a fair trial, were induced to return to ether, and he advises the general disuse of the former; and the surgeons of the Hotel Dieu, at Lyons, have recently, it would appear, come to a similar determination. M. Robert mentions the names of several foreign writers who advocate the same opinion; and that he, himself, prefers a mixture of the two substances. It would be well, perhaps, if the not very civil contention that has existed about which is the best, should, like the civil wars of the roses, be thus terminated by their union.*

The obvious resemblance between the delirium, stupor, and other effects of ether or chloroform, and the intoxication produced by alcohol, added to the similarity of these substances in chemical composition, has led to the question, whether their actions are not identical, and whether one might not be substituted for the other. "Considering (says Mr. Lawrence) the nature of the ether vapour, and the mode in which it influences the sentient and motive power, we may infer that its influence on the sensorium is analogous to that of intoxicating liquors introduced into the stomach. Many years ago a middle aged woman was brought into St. Bartholomew's drunk, with a compound fracture, and other serious injury of the leg, requiring amputation. Having reflected on the circumstances, I could see no reason why the state of intoxication should prevent the performance of an operation absolutely necessary, and I accordingly removed the limb above the knee. The gentlemen

* Dr. Hayward (who first performed a capital operation on a patient under the influence of ether) says, that "as there are already on record (he writes in April, 1850) at least twenty well authenticated cases of death from chloroform, he does not know how a conscientious man, knowing this fact, can willingly take the responsibility of employing it, and expose his patient to this fearful result." But has it been clearly ascertained that fewer deaths have happened from ether, in proportion to the times it has been employed, than from chloroform?

present, and myself, were perfectly satisfied that the patient was unconscious of the proceeding, though, being subsequently jeered on the subject by her fellow patients, she contended that she knew what was done at the time, but did not feel pain.”*

Dr. Snow has related a similar case, which occurred a few years ago at King’s College Hospital. The man was very drunk, evinced little feeling, and did not seem to be aware that his leg was being cut off. He called out once during this proceeding, that he had the cramp, and when questioned afterwards, said he did not remember anything of the operation. The pains of childbirth have been similarly prevented. Dr. A. L. Pierson states (*Boston Medical Journal*, 1850) that he remembers “to have seen, twenty years ago, a young woman delivered after severe travail, perfectly unconscious, while made dead drunk with brandy, and as I recal the case now, she appears to have been in the same state as that of entire narcotism from ether.” The celebrated Dr. Rush also mentions in one of his writings, and on the authority of Dr. Church, the case of a woman delivered in a fit of drunkenness, in which there was neither consciousness nor recollection of pain.

“If no better means had been discovered (says Dr. Snow), there can be no doubt that it would be both practicable and available to prevent the pain of some operations by getting the patient to swallow a large quantity of spirits and water.” There could be better means than this devised for quickly stupefying the patient by alcohol, and I question much whether they would not be as safe, if not safer, than either chloroform or ether. The admission, however, that the action of alcohol and the ethers is identical, can hardly be expected from the eulogists of the latter. The name, drunkenness, does not “smell so sweet” as that of anæsthesia, the term wisely substituted for “excessive inebriation,” by which phrase the insensibility from ether was designated in the first communication on the

* *Medical Gazette*, Vol. 39.

subject which reached this country. The zealous advocates of etherization would be slow to grant that this great discovery—only second, in their estimation, to vaccination—is merely the bringing a patient, dead drunk, to the operating table; that it is only the extension to physical pain, of what has been so long resorted to, by the cowardly, for producing insensibility to moral suffering. They would differ from Professor Meigs, another American physician of eminence, in thinking that “the insensibility produced by chloroform in no wise differs from the insensibility resulting from alcoholic potations save in the suddenness and transitiveness of its influence.” (*Philadelphia Medical Examiner*, March, 1848.)

It is interesting, in connexion with this enquiry, to learn that Mr. Horace Wells (unquestionably, in my own opinion, the originator of *modern* etherization) was led to the employment of nitrous oxide by his reflection on the condition of the body in drunkenness from alcohol. He merely substituted a well known means of intoxicating quickly for the usual slow methods. But the *discovery* principally consisted in ascertaining that such extreme intoxication was less dangerous than could have been anticipated. To attain this knowledge, an unusual degree of rashness was, perhaps, only required—for the idea that drunkenness would suspend the sensibility to pain must have occurred to thousands before. That Wells possessed this recklessness in an eminent degree, his own most melancholy fate would testify; but that his intelligence was not remarkable, is clear from the circumstance, that he does not appear to have been aware that *his* discovery was that of a principle, whereas all that his pupil (Morton) accomplished, was the suggestion of another (though undoubtedly a better) mode of carrying out this principle in practice than that which he (Wells) had adopted.

Sir Humphrey Davy’s unheeded suggestion to the same effect, made fifty years before, and soon after the invention of nitrous oxide, had a different and a higher origin; it arose from his

experience on his own person of the properties of a new substance. It is impossible to contemplate the incredulity or indifference with which Davy's suggestion was received, without regretting that, in England at least, the laborious, and often humiliating task should be left to the discoverer himself of pushing into notice his addition to knowledge, if he wishes to preserve it from piracy or oblivion. Horace Wells only found a refuge from his galling disappointments and vexations in self-destruction; whilst those who have had nothing more to do with the invention than the mere substitution of one intoxicating gas for another, have reaped all the honour and reward. An inventor, relying on the solid foundation of his claims, is too often disposed to await patiently the due acknowledgment of his merits; but he who pirates an invention, or (which is the same thing) who appropriates it by constantly appearing before the public as its recommender, while he cunningly conceals, or detracts from the merits of the real inventor, knows that it is only by importunity and storm that he can carry his point; and the constitution of his mind generally fits him for such warfare.

Just as we are in the habit of speaking of the different stages or grades of alcoholic intoxication, from protestations of sobriety to speechless drunkenness, so have certain writers tried to discriminate (in more scientific terms, of course,) the different stages of intoxication from ether and chloroform; and they have very properly cautioned against the use of these in the greater degrees, as being, unquestionably, the most dangerous. Unfortunately, under a moderate dose, the patient is not so still as the surgeon requires him to be, nor is the sensibility sufficiently blunted to prevent pain from incision of the skin.

Little is known of the physiological effects of these agents: although the subject has been carefully investigated by M. Flourens, and others, no practical good has, as yet, resulted from the enquiry. The symptoms preceding a fatal result, are obviously allied to those observed either in cases of suffocation

or of fainting ; and, in corroboration of this, the measures best adapted for recovery in these conditions, are those appropriate to persons labouring under the dangerous effects of chloroform. Many reports have been published, of persons rescued from death, by their timely adoption. The French surgeon does not hesitate to produce artificial respiration, "bouche à bouche," passing breath from his own mouth directly into that of his patient. The ladies, amongst whom, when in the straw, chloroform is becoming fashionable, will, no doubt, exercise their taste in the choice of this respiratory apparatus, and have a selected resuscitator in attendance, in addition to a chloroformer.

It has been alleged in defence of chloroform, that, although it has often proved fatal, many have been saved by it who would otherwise have died from the fear or shock of operations, or the exhaustion produced by pain. Any advantages of this description, are, probably, more than counter-balanced by the eventual evil caused by the entrance of the noxious substance into the constitution. It has been said, in proof of this advantage, that certain great operations have, since the introduction of chloroform, been numerically less fatal than before. Besides the objection, that conclusions drawn from calculations of this sort, are proverbially fallacious, the argument only applies to the greater or more serious operations, constituting a small portion of those for which chloroform is used.

Another argument in defence, is, that it would be as reasonable to object to the introduction of railroads, because accidental deaths have been occasioned by them, as to chloroform, on this account. The argument is fallacious ; and, for this, amongst other reasons, that fewer deaths happen from railroads than from any other kind of locomotion of the same amount. Were travelling by balloons ever to become practicable, they would, probably, furnish a more apt comparison.

The advantages to the surgeon, have also been insisted upon ; but, here again, there is error. Unless the narcotic is exhibited

to an excessive and very dangerous extent, the surgeon is frequently embarrassed by the patient's struggles and involuntary movements. It is otherwise objectionable in this respect, and on several accounts.

In certain diseased conditions, as when the heart or brain is affected, and when the patient is labouring under the consequences of shock, or is in a state of great debility, it has been the rule to abstain from chloroform; and, there would be danger of suffocation from hæmorrhage, were it exhibited, in operations about the mouth or throat.

I shall now proceed to consider, in the same brief manner, the advantages of the substitution of benumbing cold or congelation for chloroform, referring for details to my published works on the subject.

Benumbing cold is applied to a part about to be operated upon, by placing in contact with it, for a few moments or minutes, a thin net of silk gauze containing a mixture of finely-pounded ice and common salt. The skin and adjacent textures immediately become perfectly insensible, and this insensibility lasts for upwards of five minutes. When the heat returns, and the blood again circulates through the part, there is increased redness, but, this is so far from indicating reaction or an inflammatory condition, that wounds of the skin so congealed, have invariably healed by the first intention, more speedily than under ordinary circumstances. The small arteries have, in fact, lost their tonicity for a time, and are thus rendered incapable of the inflammatory process. In proof of this, I may adduce an example of the use of congelation in plastic surgery. About three years ago, I cut off (and without causing any pain or sensation) a circular piece of congealed skin from the side of a patient, for the purpose of making an issue. On removing it, I was struck with the contraction it had undergone; and, as I thought there

would be sufficient space between the central disk and the surrounding skin for the insertion of a ring of beads, could it be made to adhere again to the bleeding surface, I placed it on the wound, and kept it in contact by two or three strips of adhesive strapping. In less than twenty-four hours, the adhesion was so close as to render it impossible to remove it by the forceps. Even were chloroform used to produce insensibility, there would be immense advantage from applying a frigorific as a preventive of inflammation in the wound. The certainty with which accessible inflammation can be immediately checked by congelation, would, alone, prove its power of preventing the same condition.

The principal objection that has been made to congelation, both as a remedy of disease and as an anæsthetic, is founded on the most erroneous idea, that it endangers the vitality of the part subjected to it. This unfortunate error arose from not reflecting on the essential difference that exists between a part congealed for a few minutes only, while the general circulation of the blood continues vigorous, and a part congealed for hours, with the circulation in a feeble condition, as happens in exposure to the cold of northern climates or severe winters. It is enough, in refutation of this idea, to state that when attempting it for the formation of an issue, I have never succeeded in destroying the vitality of the skin by very long-continued congelation; nor have I ever heard of any untoward event having followed congelation in the practice of others using the remedy in the usual way. The reports of the employment of this means in the publications of other writers, ought, long ere now, to have removed this prejudice.*

Another objection to congelation as a substitute for chloroform, is the supposed impossibility, by merely applying the frigorific to the surface, of benumbing deep-seated parts.

This objection can only apply to operations involving such parts; but the majority of operations are not of this description.

* Appendix B.

In these the skin and adjacent textures are alone concerned, or parts, at least, accessible to the benumbing influence of cold applied to the surface. Let the list of cases be consulted in which chloroform has proved fatal, and it will be seen how few there are in which insensibility could not have been produced by benumbing cold ; or, as more accessible, let the three fatal cases, recently occurring at three of our principal Hospitals, and in the short space of a month (from the 25th of September to the 20th of October), be taken as an example. The first reported, at University College Hospital, was a case of strangulated rupture. Here the parts, from being immediately beneath the surface, are quite within the influence of cold ; and congelation, in such a case, has other and great advantages. Not only is the muscular spasm, which contributes to prevent the return of the intestine, likely to give way under its action, but it also checks the inflammation already perhaps existing in the strangulated part, as well as obviates that which may be produced by the wound. The French writers include the operation for strangulated hernia, amongst those in which etherization is not advisable, on account of certain constitutional affections attending it, and particularly a tendency to syncope.* The second case occurring at St. Bartholomew's Hospital, was a malignant ulcer in the vagina, to which a red-hot iron was to be applied. To this benumbing cold might have been as easily applied as to the womb, the neck of which, I have, in uterine cancer, kept congealed for half-an-hour at a time ; and considering that a case is reported in the *Medical Times and Gazette* (June, 1853), where the pain attending the application of the actual cautery to the knee

* In an essay on strangulated hernia in the *Lancet* of 1843, I have mentioned the advantage of keeping up a long continued and perfectly uniform degree of cold in certain cases of that disease, by means of a current of water passing through two flexible tubes and a thin bladder placed upon the part. Congelation will probably supersede this, by doing all that can thus be accomplished, in the course of a very few minutes. It would also be a valuable adjunct to the plan I have there suggested, of withdrawing the intestine from the strangulating ring by distending it from below.

of a patient in the same hospital was effectually prevented by cold, it is strange that it should not have been employed on this other occasion.* The third case was perinæal section, performed for the cure of stricture of the urethra, at the Edinburgh Infirmary. This operation (which may often be necessary, so long as surgeons persist in the employment of the bougie and other imperfect means of dilatation, in preference to the dilating power of fluid pressure) certainly involves parts hardly to be reached by cold applied to the surface, but assuredly, the incision of the skin and subcutaneous textures, from which the suffering mostly proceeds, can be thus rendered painless.†

In amputations of the large members, lithotomy, and a few other operations, parts which must be cut could not be benumbed by cold, unless the frigorific were stronger or longer continued than it has usually been, or were applied, as the sponge is, after the first incisions had prepared the way. But the more acute pain does not arise from the incision of these

* The *Union Medicale* states "that M. Nelaton, (Professor of Clinical Surgery, in the Paris School of Medicine,) is in the daily practice of applying the hot iron, after producing insensibility by a mixture of ice and salt." (Nov. 13, 1850.) The neuralgic affections for which M. Nelaton thus applied cauterization, as well as the malignant affection mentioned above, would probably have yielded to congelation alone. It would have also been the appropriate treatment in many other of the recorded cases in which chloroform has proved fatal—such as that of a child about to be operated upon for nævus, who was killed by nine drops of the narcotic; the case of cancer of the breast under the care of M. Roux; that of a man named Denayers, affected with swellings of the wrist, who was chloroformed before cauterization in the Hotel Dieu of Lyons; and many cases of toothache.

† In the *Edinburgh Journal of Medical Science* for August last, a comparison is made between this operation for stricture proposed by Mr Syme, and the operation of "a M. Reybard" for which the Argenteuil prize was lately awarded in Paris. The latter is called "a quiet appropriation of Mr. Stafford's good-for-nothing proceeding of internal incision;" but it is so called in defiance of justice and historical truth. M. Reybard's and Mr. Syme's operations are in principle the same—the *thorough* incision of the contracted tissues by a *conducted* or guarded knife; and M. Reybard's preceded Mr. Syme's. The internal incision of stricture was proposed by Mr. Stafford several years after this principle of treatment was revived by the first edition of my Treatise on this disease—a revival acknowledged even by M. Civiale. It is yet much too early to say whether a deep incision has a duration of effect more than proportionate to the greater extent of the wound and, consequently, greater danger.

parts. The seat of pain is principally the skin. The incision of this, as Sir C. Bell has observed, in his "Bridgewater Treatise," constitutes the most painful part of every operation.* The pain from the incision of other parts may be termed an endurable pain; but if the patient's courage is small, and he is anxious to be free from even this, he might have such a moderate dose of ether, alcohol, or opium, administered by the lungs or stomach, as would answer this purpose (though incapable of subduing the greater pain caused by cutting the skin), with little danger to life. By such a combination of the two anæsthetics, he would not only be secured from pain, but in a great measure, from the inflammation which so often proves fatal after operations. It no doubt has occasionally happened that patients have incurred the risk of chloroform unnecessarily, even as regards the incision of the sensitive skin. Some persons, it has been ascertained, feel little or no pain on being cut. Dr. Emerson mentions (in the *Boston Medical Journal* for 1852) an anecdote illustrative of this, which was told him by the celebrated Dr. Physick. In performing, once, what is usually a tedious and very painful operation, the patient, who, to the surgeon's surprise, was for a long time silent, at last calmly observed, "Dr. Physick, how very keen your knives are. It is really a pleasure to be cut with them."

It is a mistake, however, to suppose that chloroform, as it is usually exhibited, completely obviates pain. It may diminish it; but that it entirely prevents it, is disproved by the groans and struggles of the patient. After the operation, indeed, he has no recollection of his sufferings; but whoever reads the police reports in the newspapers, must be aware that loss of memory is the usual consequence of minor degrees of intoxication from other agents. Dr. Bigelow relates, that amongst the first cases of etherization in America was that of an Irishman, who, although he upbraided the surgeon during the operation for

* Appendix C.

having deceived him by promising exemption from pain, had no recollection of his suffering on the intoxication passing off, at its close. Because a condition is not remembered, it by no means follows that it did not exist. It were welcome news to a debtor, that he could cancel his obligations by forgetting them. It is a question whether there would not, on the whole, be less pain felt, even in deep-seated operations, from completely benumbing the surface by cold than by chloroform not pushed to a very dangerous extent. In benumbing the part, besides, there is no loss of consciousness—a loss that would, by some, be as much dreaded as a moderate degree of pain; notwithstanding Dr. Simpson's ridicule of their fears, and his reminding them that, every night, they became unconscious in their beds. They would have some difficulty in comprehending that the death-like, and dangerous unconsciousness, which has been caused by chloroform, is identical with that induced by sleep. In the condition, moreover, approaching and following the apoplectic stupor produced by chloroform (the occasional origin of mania, and many other evils), there is risk of a delirious expression of thought, which, as respects women particularly, would alone, were they aware of the circumstance, deter them from its unnecessary use.*

After the foregoing remarks, we are prepared to furnish an answer to the question forming the title to this paper,—Whether it is justifiable to employ chloroform in surgical operations, after so many deaths have been caused by it, especially when we might use a substitute of perfect safety? That there is a difficulty in answering the first part of the question, is proved by the

* I have thought it unnecessary to mention other minor advantages of congelation as an anæsthetic. An allusion, however, may be made to its power of repressing embarrassing hæmorrhage, in order that I may have the opportunity of stating, for the first time, that the perpetual syphon, which I placed in the Hyde Park Exhibition, on account of its use in internal congelation, is a convenient substitute for the sponge in deep operations: a constant suction is maintained by the end of the tube in the wound, whether there be blood present or not, and, instead of obstructing the sight or the dissection, as the sponge does, it assists both as a probe.

opinion upon it which so intelligent a surgeon as M. Robert has expressed in the report so often referred to. He thinks that it is justifiable to use chloroform only when the patient expresses an earnest desire for it, but adds that he must not be made acquainted with its dangers. In other words, the patient must choose or reject a thing, of the nature of which he knows nothing, and of which he must be kept in ignorance! In respect to the second part, or the whole of the question,—the use of chloroform when the same end can be otherwise attained with perfect safety,—I should consider the surgeon as culpable who so causes death, as the surgeon would be who (to illustrate the subject by reference to an operation already mentioned) should kill his patient by slitting the urethra for the removal of stricture, instead of using the safe though slow measure of dilatation, or who should cause a fatal debility by extracting pounds of blood for the cure of a whitlow or a boil.

Of this I am convinced, that had it been foreseen, on the first announcement of the subject, that so much destruction would follow the use of chloroform, it would never have come into general use ; but familiarity, as has been so forcibly remarked by the satirist, leads us to endure, and at last, to embrace that which at first we detest. Dr. Simpson, when warning his professional brethren against their inevitable fate with the ladies, should they longer barbarously hesitate about intoxicating them with chloroform in childbed, refers to some other of the principal cruelties perpetrated by mankind, on which, when civilized and enlightened, the mind *looks back* with horror, such as the wholesale burnings of human beings by our druidical forefathers, the fire and faggot of religious persecutors of various creeds, executions for witchcraft, and the recent severities of our penal code. In addition to these deplorable errors, will not our descendants have to look back with sorrow on the fact, that so late as the middle of the nineteenth century, the lives of a multitude of men and women were sacrificed by bringing them drunk

or stupefied to the surgeon's operating table, when the same object of preventing pain might have been perfectly attained, in, at least, a large majority of instances, by the substitution of a means of easy application, that neither suspends the intellect nor endangers the life?

I am anxious that benumbing cold should supersede the use of intoxicating vapours for inducing insensibility, not only that the lives of those submitting to surgical operations may be saved, but that practitioners may thereby become familiar with the use of an agent of inestimable benefit in the treatment of disease. Congelation is not only the best remedy for many inflammations and painful disorders of a rheumatic or neuralgic character, but it is the only means that can be resorted to with confidence in cancer and other malignant diseases.

An idea of the value and extensive use of this remedy may be formed from the consideration that it is merely the fulfilment of the surgeon's intention when he applies cold in the common modes; that it secures fully the benefit that is often so valuable, when thus partially or imperfectly obtained. It is the accomplishment of what has been so long aimed at, but, hitherto, unsuccessfully, on account of the bar to enquiry, caused by the unfortunate and long-enduring erroneous notion, that a severe degree of cold, for however short a period, would prove destructive to the vitality of parts subjected to it.

Much experience of this agent, in a great variety of diseases, entitles me to pronounce it a therapeutic measure, which, in power, promptitude of action, and safety, is not excelled by any other yet discovered. The idea, that because it is a local application, its use cannot be extended beyond what are generally termed local affections, is a fallacy arising from not reflecting that it is from the local affections arising in constitutional diseases that danger usually proceeds, and that it is by their effects

on certain localities or portions of the body, that general remedies usually operate. It were unfair, besides, to compare so powerful an agent with the local measures already in use, which, being comparatively inefficient, are, with justice, commonly regarded but as the auxiliaries to other remedies acting on the blood or nervous system.

16, Upper Gloucester Place, Dorset Square,
10th February, 1854.

APPENDIX A.

“In Acre, there is a plentiful supply of Turkish veterinary surgeons; and about the most curious sight I ever witnessed, was a horse under treatment by these practitioners. First, they threw it on the ground by tying its fore feet, or hoofs, so closely together, that it became as helpless as an infant; then a tight bandage was placed over the nose and mouth, only leaving sufficient space for the animal to breathe. The Turkish pipe, containing tobacco, bang, cuscus, and other narcotics, was inserted in one of the nostrils, and a spark being placed on the bowl, the horse involuntarily inhaled the stupefying smoke, which had the effect, after a very short period, of rendering it unconscious of what was going on. Then the skill of surgery was brought into play—and the fetlock of the poor brute being laid open, a perfect hive of worms, deposited by a fly, common in some parts of the desert between Damascus and Bagdad, was duly extracted. The wound was closed up with pitch sticking-plaister, and the bands being unloosed, buckets of cold water were thrown over the horse, who quickly revived. The foot was now placed in a sling, and, a few days afterwards, so effective had been the operation, the horse was fit to pursue its daily avocations.”—*Eight Years in Syria, Palestine, and Asia Minor.*
By F. A. Neale, Esq.

APPENDIX B.

I have introduced the following fatal case from chloroform, not only as an addition to those referred to in page 5, but to point out more strikingly and clearly than I have done in the text, the difference between long continued and short continued

congelation. For in this case, the very cause of the disease, might, when otherwise employed, have been resorted to as a means to facilitate its removal ; just as an usual dose of laudanum may be given to procure sleep, in a case where bad health has been produced by a poisonous quantity of opium accidentally taken long before.*

I have another reason for transcribing the case. If it be objected to congelation, that it cannot be used without a certain degree of smarting or tingling of the skin, it ought to be recollected that, as in the following instance, the inhaling of chloroform is often disagreeable—to say nothing of the headache and sickness that generally follows it.

Emile, a sailor, twenty years of age, a remarkably fine-looking Swiss, entered the Marine Hospital at Chelsea, Mass., under the care of Dr. Ingall, 10th March, 1852. The great toe of his right foot had been frost bitten about two months before, and there now remained a disease of this part, which it was deemed proper to treat by the removal of the nail. “Seated in the operating chair, a sponge with chloroform was applied to his mouth and nose. He disliked the application very much, was refractory, and presently refused to breathe it. I explained to him the kind of operation he was about to undergo, and the

* This illustration reminds me of another fallacy adduced in defence of chloroform, viz., that other medicines, such as opium, of universally acknowledged value, and in constant use, are nevertheless also occasionally fatal, however carefully administered. This may be true, although it is equally true, that a patient would often be safer in the hands of a homœopath, who (leaving every thing to the *vis medicatrix* of nature) only amuses his victim, than in the hands of a regular, but badly reasoning, routinier, who pours in his deadly drugs *secundem artem*. But if opium, given merely to allay pain, had often been *suddenly* fatal; if its fatality had been rendered certain from the suddenness of the deaths caused by it; I have no doubt it would have soon been expelled from the armoury of the practitioner. And I think it extremely unlikely that any other kind of practice, though of higher pretensions than merely relieving pain, would retain its ground, if apt to be suddenly, and therefore, unequivocally fatal. Bleeding to the degree of producing continued syncope, would often arrest inflammation of an important organ, but some cases of imminent danger from this proceeding (although I believe sudden death has never been actually caused by it) have rendered the practice obsolete.

exquisite painfulness of it ; that this article was given daily, and so forth. He persisted that he would hold his foot himself, without the sponge ; and with reluctance, I proceeded to loosen up the skin from the nail, which caused, as was expected, great agony ; he now said, ‘give me that.’ The sponge was wetted again, and in a very short time he fell, apparently, into the usual state of anæsthesia. Immediately I slipped a spatula above the matrix,—the nail was out. Upon looking up, I observed the part of his face which was uncovered very pale, and the eye, half closed and fixed. The pulse was hardly perceptible. Instantly the sponge was removed, the patient laid upon the floor, and the windows thrown open. Water was dashed upon his face and breast, his legs elevated, ammonia applied to the nostrils, artificial respiration, and finally, electro-magnetism. He was dead. From the time of the first application of the sponge, to the moment he ceased to breathe, could not have been more than, if so much as, five minutes.”—*Boston Medical Journal*.

APPENDIX C.

“The extreme sensibility of the skin to the slightest injury conveys to every one the notion—that the pain must be the more severe the deeper the wound. This is not the fact, nor would it accord with the beneficent design which shines out everywhere. The sensibility of the skin serves not only to give the sense of touch, but it is a guard upon the deeper parts ; and as they cannot be reached except through the skin, and we must suffer pain, therefore, before they are injured, it would be superfluous to bestow sensibility upon these deeper parts. * * *

The surgeon who has to perform an operation by incision, when he has cut through the skin, informs his patient that the greatest pain is over. If, in the advanced stage of the operation, he has to extend the incision of the skin, it is very properly considered

as a great awkwardness ; and this not only because it proves that he has miscalculated what was necessary to the correct performance of his operation, but because the patient, bearing courageously the deeper incisions, cannot sustain the renewed cutting of the skin, without giving token of severe pain. * * * *
The fuller the consideration which we give to this subject, the more convincing are the proofs that the painful sensibility of the skin is a benevolent provision, making us alive to those injuries, which, but for this quality of the nervous system, would bruise and destroy the internal and vital parts. In pursuing the enquiry, we learn, with much interest, that when the bones, joints, and all the membranes and ligaments which cover them are exposed, they may be cut, pricked, or even burned, without the patient or the animal suffering the slightest pain."—*The Hand, as evincing design.* By Sir Charles Bell. Second edition. Page 153.

as a great evil; and if it is only because it gives
the patient a great deal of pain, it is not
more of his own choice, but because the patient
only the doctor is who cannot enter the report
of the skin, without giving some of severe pain.
The latter the consideration which we give to this subject, the
more convincing are the proofs of the painful condition of the
skin in the several positions, which we give to these limbs,
which, but for the quality of the nervous system, would give
a doctor the interval and that gives in pursuing the
operation, we have, with much reason, that when the hand
is in a particular position, and in a manner which never then we
expect, they may be cut, and even without, without any
effect on the animal suffering. — The Hand, as
a very delicate. By Dr. C. L. ...