On benumbing cold, as a preventive of pain and inflammation from surgical operations : with minute directions for its use / by James Arnott.

With the Author's compliments

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ON

BENUMBING COLD,

AS A

PREVENTIVE OF PAIN AND INFLAMMATION

From Surgical Operations.

WITH

MINUTE DIRECTIONS FOR ITS USE.

BY JAMES ARNOTT, M.D.

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ON BENUMBING COLD.

My recent publication on the question, whether it is justifiable to endanger life by the employment of chloroform in those operations in which insensibility can be safely produced by cold, being incomplete, inasmuch as it did not contain any details of the mode of using this substitute, the present additional pages are intended to supply this deficiency, and, at the same time, to remove certain misapprehensions which still exist on the subject.

In the great majority of surgical operations, complete insensibility may be produced, with perfect safety, by a very short application of intense cold. These only implicate the skin and cellular membrane beneath it ; but in the remaining class of deep-seated and prolonged operations, only partial anæsthesia can as yet be thus obtained. Nevertheless, congelation is a valuable addition to surgery with respect to both classes. As the pain from every operation proceeds principally from the incision of the skin, and as intense cold causes complete insensibility of this texture, it will prevent the more intolerable and injurious portion of pain in those cases in which the presence of organic disease, or any other cause, prohibits

the use of chloroform; and in every operation, whether superficial or deep-seated, the powerful antiphlogistic property of such a degree of cold is of the utmost importance as a preventive of erysipelas or phlebitis. These rapidly extending inflammations being the usual causes of the unfortunate issue of operations, whatever would certainly prevent their occurrence must be deemed a greater addition to surgical therapeutics than even the most perfect mode of producing insensibility.

Death from chloroform continues a frequent occurrence. The diminution predicted by those who erroneously attributed its fatal effects to faulty modes of administering it, has not taken place. In the hospitals of London alone there have been four sudden deaths from this cause during the last six months; and in three of these anæsthesia might have been produced by cold. In fact, this distressing occurrence has now become too common to cause surprise, or to be noticed in the newspapers or journals. Were the deaths and other evils from chloroform happening elsewhere during the last six months fairly laid before the conscientious surgeon, he would require no other argument to convince him of the necessity of at least a full investigation of the subject of anæsthesia. And if the evidence to be now adduced be sufficient to show that in three-fourths of the numerous reported cases of death from chloroform, insensibility might have been safely produced by cold, he can no longer refuse it the preference. He is compelled by humanity and the highest interests of his patient, to choose that mode of producing insensibility which is safest, if equally effectual; and he will find that cold is not only a certain and safe substitute for chloroform in a great many operations, but that its use is more agreeable to the patient, and less troublesome to himself.

The following are among the operations which may be rendered completely painless by employing cold in the way which will be described.

One of the severest operations in surgery, and one which has proved fatal from chloroform in four cases, is the evulsion of the nail in onychia M. Velpeau, Dr. Wood, Dr. Berry, and others, have employed congelation in this operation with perfect success. "I have," says Dr. Wood, "repeatedly witnessed the most perfect composure of countenance in my patients while a nail of the toe or finger was rudely torn with a strong forceps from its matrix."—*Western Lancet*, April, 1854, and *Medical Times and Gazette*. Aug. 19. Dr. Berry, in the *Philadelphia Medical Examiner*, 1852, describes six operations of this kind which he had seen performed by M. Velpeau, and one by himself.

Small tumours have been excised under anæsthesia from cold by several surgeons, who have favoured the profession by a report of the operations. M. Velpeau speaks of his having successfully employed cold for this purpose in his recent work on diseases of the breast; an account of Mr. Paget's operations of this description is given in the *Medical Times and Gazette*, July 1, 1854—"although the incision required (in one case) was four inches long, yet no pain was complained of, and a considerable part of the wound healed by the first intention; and Mr. Ward, of the London Hospital, relates, in the same journal, Sept. 2, the details of the excision of a tumour under cold, "without the slightest sensation of pain." In large tumours, particularly when the adhesion of their inner surface is close, there must be a certain amount of pain after cold, though probably not more than is often felt—if we may judge from the struggles and cries of the patient, from the incision of the sensitive skin under an ordinary dose of chloroform.

Both Mr. Paget and Mr. Ward have adverted to the speedy

healing of the wound. In the first excision which I performed under congelation—that of an encysted tumour from the scalp, this advantage of congelation was rendered prominent by the union between the cut surfaces having taken place within twenty-four hours ; and I have elsewhere related the very speedy adhesion that took place between a piece of skin which had been entirely separated and a denuded surface.

The first report of the use of benumbing cold in the Hôpital la Charité, in Paris, by MM. Berand and Foucher (*Union Medicale*, No. XLII., 1850,) mentions its employment in the opening of a large abscess, "without the patient being sensible of pain." M. Richet has, in the *Bulletin de Therapeutique*, of the 15th of May, related fifteen operations under cold, produced by ether, some of which were of this description ; but as the cold which is caused by the evaporation of ether or chloroform is very slight, the insensibility in some of these was not complete.

Cold has been used with success to produce anæsthesia, previously to operating on the eye by Mr. Critchett. (*Lancet*, Sept. 23.) He states, that judging from his experience in such cases, "if the operation had been performed without local anæsthesia, there would have been severe pain at the time, extensive bleeding, consequent painful distension of the globe, and a tedious recovery"

Dr. Hargrave, professor of surgery to the Royal College of Surgeons of Ireland, has, in the *Dublin Medical Press*, Sept. 27, recorded his use of it in extracting a needle imbedded in the foot of a girl. He made "a free and deep incision" without pain or hæmorrhage. "I am convinced," he says, "that cold will supersede the use of chloroform by inhalation in many operations, to the great satisfaction of the surgeon and comfort of the patient."

Professor Nelaton, of Paris, is spoken of in the *Union*

Medicale, Nov. 13, 1850, as employing ice and salt daily to prevent the pain of cauterisation. A report of its successful employment for this purpose, in a case under Mr. Lawrence's care at St. Bartholomew's Hospital, is contained in the *Medical Times and Gazette*, June, 1853.

In the *Gazette des Hopitaux*, Sept. 23, there is a report of its employment in the amputation of the fore and middle fingers, by M. Richard, of the Hôpital St. Antoine, in Paris. "During the whole time occupied in the dissection of two semilunar flaps, as also during the amputation of the two extremities of the fingers, about one inch from the metacarpal joint, there was no sensation of any kind.—*Le malade ne sentit absolument rien.*"

It is unnecessary to make further reference to reports.* In addition to these operations of the evulsion of nails, the removal of small tumours, the opening of abscesses, the extraction of foreign bodies, and the amputation of fingers, it may be briefly stated that complete, or nearly complete, insensibility may be produced by cold in the formation of setons and issues, in laying open fistulæ, in paracentesis, in bleeding, in scarification, in cutting upon arteries, in tying varicose veins, in removing hæmorrhoids, warts, and other excrescences, in paronychia and carbuncle, in phymosis, in strangulated hernia, in trephining, and in various ophthalmic, dental, plastic, and orthopœdic operations. In amputation of the limbs, excision

* Besides other published reports, several private ones have been communicated to me, but their corroborating evidence is hardly required. I will only allude to the last of these, relating to the applications of cold in the excision of small fatty and osseous tumours by Mr. Erichsen, at University College Hospital. The report is interesting in reference to the quickness of the healing process in these cases, and of this the reporter could form an accurate opinion as he dressed the wounds.

of the joints and large tumours, and in lithotomy, only partial anæsthesia can be thus obtained; but this is of the most sensitive tissues—the skin and contiguous membrane.

Intense cold can be produced for anæsthetic purposes, either by bringing in contact with the part certain substances which abstract caloric rapidly while they are in the act of changing their solid or fluid form, as ice, various salts, ether, solidified carbonic acid, &c., or bodies which have already been artificially cooled to the required degree. Although some other may be better adapted for certain cases, it will be advisable, on the present occasion, to confine our attention to that plan of employing intense cold, which is the most generally applicable—the placing a frigorific mixture immediately on the part, or with the interposition only of a piece of thin gauze or tulle containing it.

This piece of gauze (formed, for the sake of convenience, into a small net or bag) the components of the frigorific mixture, a canvass bag or coarse cloth, a mallet or flat iron, a large sheet of paper, a paper-folder, and a sponge, constitute all the articles required for congelation.* The common frigorific of ice and salt will generally possess sufficient power; when greater is required, nitre or an ammoniacal salt may be added. Every systematic work on chemistry contains tables of frigorific mixtures, as well as instructions for making ice, which last, when but a small quantity is required, may be thus artificially procured almost at as little expense as from the fishmonger.

A piece of ice of the size of an orange, or weighing about a quarter of a pound, will be sufficient for most operations. It

* Most of these, with a refrigerating ball and spoon, neatly packed in a case, may be had of Mr Ferguson, Giltspur street.

is put into a small canvass bag or a coarse cloth, and beaten into powder by the quickly-repeated strokes of a mallet or flat iron. As it is important that this powder should be fine, it is not unnecessarily minute to state, that the bag ought to be turned in various directions during the pounding, and that the pounded ice, squeezed into a cake by the iron, should have its particles again separated by rubbing the bag between the hands. Instead of thus reducing it, the ice may be pulverised by the ice-plane.

The pounded ice having been placed on a large sheet of paper, any loosely-cohering particles may be separated by a paper-folder, and the unreduced larger bits removed. Beside it, on the paper, about half its weight of powdered common salt is placed, and they are then quickly and thoroughly mixed together, either by the ivory folder while on the paper, or by stirring them in a gutta-percha or other non-conducting vessel. If the mixture be not quickly made, the extreme cold of one part of it may again freeze other parts into lumps.

The mixture is now put into the net (which may be conveniently supported and preserved from contact by placing it in the mouth of a jar or ewer), and as soon as the action of the salt on the ice appears established by the dropping of the brine, it is ready for use.

In applying the net, the part which is to be benumbed should be placed in as horizontal a position as possible ; and it is well to raise the net for a moment every three or four seconds, in order to secure the equal application of the frigorific, and watch its effect. If the part be not horizontal, it may be necessary to hold the gauze bag containing the frigorific against it by the hand covered with a cloth ; and if the net does not cover the whole of the surface to be benumbed, it must be be passed to and fro over it. A moistened sponge placed lower than the net will absorb the fluid escaping from it, or this, on

some occasions, may be allowed to drop into a basin placed underneath.

If it be desirable to limit exactly the extent of the application, this can be done by arranging the mixture on it, with or without the interposition of the gauze, or by surrounding the part with strips of plaster or leather. Various devices may be employed for particular purposes. In amputation of the limbs or fingers, for instance, a funnel-shaped vessel of gutta-percha, fitted to and encircling the part, would receive the semifluid mixture ; or this may be confined to an irregular surface by a deep ring of the same material. In prolonged operations, or when the first application has, on trial, been found insufficient, the same, or a stronger mixture can, of course, be re-applied, for the same or for a longer period.

The procedure, as now described, may appear not only nice and troublesome, but as requiring much time. The truth, however, is, that after one or two trials, it is unlikely that any mistake will be committed, and the time occupied by the preparation of the mixture and its application should rarely exceed five minutes.* So simple is the apparatus required, that, in cases of emergency, I have frequently procured everything but the ice at the house of the patient. The application of a solid

* This short period contrasts strongly with the time often occupied both in inducing anæsthesia by chloroform, and in removing its evil effects afterwards. In a case which proved fatal at Sheffield in March last, forty minutes were expended before insensibility was produced; and, in the 'Gazette des Hôpitaux' of the 17th ult., there is an interesting detail of the measures adopted by two physicians during seven hours, to recover a lady from the dangerous state she was thrown into by a very small dose of chloroform. To the ordinary measure of artificial respiration was added, and apparently with advantage, the heat of burning spirits applied to the chest The respiration continued suspended for an hour and a-half.

brass ball which has been immersed in a freezing mixture, or a thin metallic spoon or tube containing this (with or without ice), is quite as easy. A ball, having a concavity on its surface, adapting it to the globe of the eye, would be a convenient mode of applying congelation in ophthalmic operations. Considerable experience enables me to say, that few cases of ophthalmia would resist one efficient application of such a means over the closed eye-lid.

The effects of this mode of applying intense cold are various, and their succession is as follows :—

When a well-prepared frigorific mixture is brought in contact with the skin, a certain degree of numbness is immediately produced. The skin is rendered paler than natural, but there is hardly any disagreeable sensation caused, not even of cold. In about half a minute, the whole of the surface in contact with the frigorific becomes suddenly blanched, evidently in consequence of the constriction of its blood-vessels ; and this change is accompanied with a feeling of pricking or tingling, such as that produced by mustard. The insensibility of the skin is now complete, and will remain so for several minutes. By the continuance of the application, a third effect is produced ; if there be adipose matter under the skin, it is solidified, and the part, consequently, becomes hard as well as white. The insensibility extends deeper, and is of longer continuance in consequence of this change ; and, should it last for some minutes, a redness of the skin is produced which may remain for a day or two. There is also an increase of the tingling ; but, unless in the most sensitive parts of the body, as the hand or lower part and front of the forearm, it is rarely noticed or complained of. Although this uneasy sensation soon subsides, there will, if the temperature of the part be not allowed gradually to return, and if the cold has reached the stage of congelation, be a renewal of it on the adipose matter again becom-

ing fluid. This gradual return of the natural heat is insured by placing a little powdered ice on the part, or a thin bladder containing ice and water.

The question how far the refrigeration should be allowed to proceed, or which of the three stages just described should be reached, has been answered differently by different operators. In many of the slighter operations, either of the first stages will be sufficient, and the measure just mentioned for effecting a gradual return of heat will then be unnecessary. If congelation of the fat is produced, and the operation is proceeded with before it returns to its fluid state (which is of advantage when it is important to prevent bleeding), there may be required, as Mr Paget has observed, a modification in the handling of the scalpel; not only, however, is there a certainty that the insensibility both in degree and continuance will be then sufficient, whether the incision is made before or after the fat again becomes fluid, but (what is of equal importance) that antiphlogistic effect is secured, which prevents those consequences which so often prove fatal under common circumstances. On other points there have been great varieties of opinion, though probably the results have not been so varied as might have been expected. Dr. Wood, of Cincinnati, and M. Richard, of Paris, use frigorifics differing from each other in power, as much as 30° Fahr.; and Mr. Ward applies the frigorific for only one minute, while Dr. Hargrave applies it for five. Perhaps the longer congelation is continued (and it may be safely continued for double this period) the deeper and the longer continued the produced anæsthesia may be; but it were unreasonable to prolong an operation inconveniently in order that there shall be absolutely no feeling. If it should appear, however, that a certain continuance of congelation is necessary to insure its antiphlogistic power, this would be a sufficient reason for always so protracting

it. It is possible that a long continuance of the first, or merely benumbing stage, may be equivalent to a short continuance of the third degree; or that a prolonged benumbing should precede the other stages; or that, in cases where it is desirable that the cold should penetrate deeply, a stronger frigorific should succeed the application of the common one of ice and salt. These are points which must be determined by future experience; but any uncertainty respecting them does not prevent our availing ourselves of the useful truths which have already been discovered respecting anæsthesia from cold.

Just as in most other surgical proceedings, there will probably always be considerable differences in opinion respecting the best mode of producing anæsthesia by cold, though these differences may be of no essential importance. This might be inferred from an interesting discussion on the subject in the Surgical Society of Paris, reported in the recently published bulletin of its proceedings. M. Desormeaux and M. Larrey, in mentioning their successful employment of a frigorific mixture in operations, spoke of the redness of the skin produced by actual congelation as a disadvantage; and one gentleman even recommended that, in order to prevent such "*alteration des tissues*," the cold should not be carried beyond the first stage. In an early communication on the subject (*Lancet*, Sept. 1849), I expressed a similar opinion; but I now think that this slight and temporary change may be of importance as a preventive of inflammation. At all events, admitting that a prolonged benumbing of the part would be sufficient to prevent inflammation, this alteration has certainly no injurious consequences. If it does not promote, it certainly does not retard the healing of the wound.

During this discussion the question was considered, whether, when the quick evaporation of ether upon the skin produces insensibility, this is the effect of the cold so produced, or an

exertion of that narcotic power which ether possesses in common with chloroform. M. Richet thought there was a combination of both agencies, but the general opinion, as expressed by M. Follin, was, that "ether only produces a cold differing in degree from that caused by the mixture of ice and salt, so usefully employed in France by M. Velpeau." It can hardly be doubted that, when the cold vapour of chloroform is projected upon a part, it acts in the same way as the evaporation of ether, and that is only another and very imperfect mode of diminishing its sensibility by lowering its temperature. A stream of cold air from a nozle bellows, has often been used as a remedy; and though the relief afforded by Dr. Hardy's ingenious chloroform douche in cancer and other painful diseases, may be greater and proportionate to the increased degree of cold, it is little in comparison with that procured from any of the various means of causing intense cold or congelation; and the slight anæsthesia, which it only occasionally produces, cannot be depended upon for surgical operations. For the relief of pain, fomentation, or a moderately warmed stream of air projected from a gardener's bellows, whether this be accompanied with medicated vapour or not, is generally more useful than only a moderate degree of cold, applied either through the medium of air or vapour, or, as is usual, through that of a refrigerating lotion.

As respects the credit of the two anæsthetics in the deeper operations, not their real character or merit, chloroform has this advantage over cold, that whereas, from the obscure expression of pain during the patient's unconsciousness from chloroform and his forgetfulness of it afterwards, it is generally, though erroneously, supposed that he suffers none; so, on the other hand, there may be greater complaint made in such operations under cold than is justified by the degree of pain felt, owing to the patient's disappointment (if the matter has not been

explained to him beforehand) in experiencing any degree. It is certain that in the majority of operations, or those only involving the skin, the insensibility produced by cold is greater than that produced by the ordinary dose of chloroform ; and this is one reason why Dr. Wood thinks that it ought, in all suitable cases, to be preferred ; but such an advantage is small compared with its perfect safety, and the power it possesses of preventing dangerous inflammation. To its superiority in these important respects must be added the facility with which it may be administered—the retention of the patient's consciousness, and the absence of his dread of sudden death, as well as of the sickness and headache that generally follow chloroform—the freedom from embarrassing hæmorrhage—and the assistance which the patient may give to the operator in assuming convenient postures, instead of its being necessary, as in using chloroform, to have one or more assistants to repress his involuntary movements and struggles

There are still some misapprehensions existing on the subject of anæsthesia from cold, which require to be noticed. Dr. Wood, who has employed congelation very extensively, states, that although it has, in most instances, fully answered his expectations. it has at other times disappointed them. If it be expected that the whole of the pain of a deep operation, as the amputation of a limb, or the excision of a large tumour, is to be thus prevented, the expectation is unreasonable. Unless the frigorific were applied after, as well as before, the incision of the skin (and it often may be so with advantage), or unless it were employed of much greater strength, or for a longer time, than has been usual, and, after measures have been taken to suspend the circulation through the part, this could not be effected ; and the patient ought himself to decide whether, in such an operation, he shall endure the com-

paratively slight degree of pain caused by cutting the deeper parts, for the advantage of perfect safety, or undergo the risk of chloroform, in order to have the benefit of that degree of insensibility (for it is seldom complete) which the ordinary dose of this substance is capable of producing. This risk might indeed be lessened were he to have such a moderate dose exhibited as is usually given in midwifery, after the severe pain from the cutaneous incision has been prevented by cold ; and this would probably be adequate to the purpose ; but as fatty degeneration or idiosyncrasy cannot be foretold, there is danger in every dose. A death from chloroform in midwifery was lately reported in an American journal ; and, in the nearly fatal case, occurring in France, alluded to in a preceding note, the dose was small, and was intended, as in midwifery practice, to produce partial insensibility without suspending the consciousness. It is satisfactory to know, that at some of the hospitals the old practice of administering wine to patients on the operating table has been revived ; and it is not improbable that the lesser degrees of pain might be thus more safety assuaged than by intoxicating them with chloroform, or ether.

It may reconcile the patient to the endurance of a slight degree of pain, to be made aware, that sensation in deep-seated operations is of so much importance in directing the surgeon's proceedings, that death has been the consequence of its suspension by chloroform ; and we know that the sensibility of internal parts is comparatively dull. The greater part of the pain in the most dreaded of all operations—that for stone in the bladder—proceeds from the common faulty and dangerous mode of performing it. In his recent interesting publication on Lithotomy, Mr. Allarton mentions it as one of the advantages of substituting properly executed dilatation for internal cutting, that the patient complains only of the first thrust of

the knife, or, in other words, of the incision of the external parts.

If congelation, as at present practised, will not prevent all the pain arising from deep-seated operations, it will, as respects some of these, confer a much greater benefit by preventing their necessity. By destroying the independent vitality of the germes of cancer, whether these be cells or the constituents of cells, it will, I trust, make it an infrequent question whether the knife should be resorted to in malignant disease ; and many inflammations of the joints, at present resisting all the common remedial measures, and eventually rendering amputation necessary, may also, perhaps, be subdued by intense cold.

But because we have not yet succeeded in making the deeper textures insensible by a *quickly* executed congelation (for if time were allowed there would be little difficulty), it by no means follows that it is impossible to do so. The essential point being determined that cold will certainly produce insensibility and without injury, the quick extension of this insensibility may be said to be only the office of adaptation.

Whether chloroform is used or not in operations, I am confident that congelation will soon be considered indispensable in every one of importance, as a preventive of erysipelas and phlebitis. The fact ascertained by Dr Fenwick and other statistical inquirers, that one-third of the amputations of the limbs prove fatal from inflammation, leaves no doubt on this point. If the cold cannot be used so as to reach a sufficient depth before the operation begins, it can afterwards be applied to the surface of the wound.

Others of Dr Wood's failures can be differently accounted for. When the part to be operated upon is inflamed, or the circulation through it is vigorous, "a degree of cold only a little above the freezing point of water," which, he says, will produce anæsthesia, is far from being sufficient. A frigorific of

greater strength than 5° below Zero (the strength of ice and salt) may then be required, and it must be kept in contact with the skin until the desired effect is produced. There ought to be no failures in this respect, as there are in the use of chloroform. If the part be sufficiently refrigerated, insensibility of adequate degree and continuance will be certainly produced.

It has been mentioned as a disadvantage of cold, that its application is painful. In parts which are naturally very sensitive, or have become so from disease, there may be considerable smarting when the third effect, or actual congelation, is suddenly produced ; although even then what the patient feels is little when compared with the headache and sickness often caused by chloroform. Under these circumstances, congelation should be gradually produced ; but, ordinarily, there is no occasion for graduation of temperature. At first, and while participating the prevailing opinions respecting the action of intense cold, I thought that the "current apparatus" would on all occasions be required to ensure the gradual increase and decrease of temperature ; * but I have, of late years, rarely used this expedient at the commencement of the process.

The opinion that short and limited congelation would endanger the vitality of a part, being no longer entertained by any one in the least acquainted with the subject, it is hardly necessary to advert to it. The fact alone, that congelation has been applied during the last five years, some thousands of times, without, so far as I am aware, the slightest effect of this kind in any case, has shown how unfounded the opinion was, and has proved that the circulation can be as safely arrested for a short period by this measure as by the pressure of a tour-

* See the Author's "Treatise on Indigestion: with an Account of an Improved Mode of Applying Heat or Cold in Irritable and Inflammatory Diseases," Preface, page viii.

niquet.* Nor is it requisite to take much more notice of another objection (similar to that of certain French surgeons above alluded to), that the redness of the skin produced by congelation is symptomatic of inflammation. The truth is, that this redness proceeds from an altered state of the blood-vessels incompatible with inflammation. No spreading or persistence of this redness, no pain, no tendency to suppuration—in short, none of the concomitants or consequences of inflammation follow the application of intense cold ; and the speedy healing of the wound is conclusive evidence that this morbid condition certainly does not exist. On the contrary, so far from having this consequence, there is little doubt that, however valuable intense cold may be as an anæsthetic, it is as an antiphlogistic that it will be chiefly prized, or as a means of preventing or immediately subduing, with perfect safety to the patient, every inflammation within its reach. I have elsewhere adverted to the importance of this remedy in military surgery; and shall now merely observe, that its promptness of action will not only render it of great value after gun-shot wounds and other me-

* If there be still, amongst English surgeons, any believers in the old doctrine on this point, I would refer them to a very interesting report just published of the highly beneficial use of frigorific mixtures in diseases of the uterus and skin by M. Aran, Physician to the Hôpital St Antoine, in Paris. In the course of this report the following apposite remarks occur:—L'école contemporaine tend à abandonner de plus en plus les idées anciennes sur les dangers de l'emploi du froid. Les expériences physiologiques ont déjà fait justice des craintes chimériques conçues à cet égard. Ici encore nous voyons un froid intense, de 20° au-dessous de zéro environ, agir sur une surface malade pendant un quart d'heure, au delà duquel des compresses d'eau glacées sont encore appliquées sur elle. Que se produit-il à la suite ? Une gangrene ? Nullement. Une réaction très intense, dangereuse par son intensité même ? Pas davantage. Quelques heures suffisent à dissiper l'orgasme local excité par l'application du froid.—'Gazette des Hôpitaux,' Nov. 16.

chanical injuries, but will enable the surgeon speedily to quell various other inflammatory affections to which soldiers are subject, and which at present render them long unfit for duty.

The objection to congelation, that it is not a complete or perfect measure, is the weakest that has been offered, and can refer only to the deeper incisions of the surgeon. To refuse to employ congelation in any operation because, in some, the insensibility produced by it is incomplete, or not to employ it in those that are deep-seated when chloroform is rendered unusually dangerous by the presence of organic disease, would be very absurd. For what is there complete or perfect in medicine? Chloroform is, even in this respect, far from being complete, as is obvious from the struggles, under the knife, of the patient who has taken it; but would it be justifiable for this reason to exchange the stupor caused by this kind of intoxication for the complete insensibility caused by fainting, as suggested by Mr. Wardrop, or by concussion of the brain, as practised in the shambles? Is the danger of the patient to be deemed of no account?

There is nothing in the history of medicine more extraordinary than the common opinion on this point. Would the use of opium, or any other of our most valuable drugs, have been persisted in, if so many sudden deaths had been caused by it in so short a period as have been the effects of chloroform, notwithstanding that the objects of their administration are much more important than the prevention of what is often only a slight or endurable degree of pain? How are we to explain so strange an anomaly? The practice of giving chloroform having become so common, and habit or familiarity having reconciled us to it, as it will to the worst practices, the answer to this question does not immediately present itself; but it can hardly be doubted that this solitary exception to the humanity which pervades the medical art, has been the consequence of the rashly

confident representations of the safety of chloroform made by parties whose interests were promoted by introducing it, and by those who, because they have not as yet had the misfortune of causing death by it, pride themselves on the fallacious supposition that *they* can wield with safety a weapon which is dangerous in other hands. It is said that patients are more anxious than their surgeons that chloroform shall be used, and, as they may have been assured that there is no danger from its use, the allegation is probably correct: but if they were told (and it is criminal to withhold the information), that although chloroform is dangerous, most operations can be rendered altogether painless, with perfect safety, by other means, and that the more acute and injurious portion of pain attending those deeper operations that remain, would be prevented by the same means, there can be no doubt about what their decision would be. They assuredly would not, by taking chloroform for so insufficient a reason, or no reason at all, yield up their consciousness or intellectual life for a period to be determined by by-standers, and with the uncertainty of ever regaining it in this world.

Nor is it probable that a conscientious practitioner, after he has become acquainted with the anæsthetic powers of cold, will unnecessarily place his patient in so unpleasant a condition, or expose him to so fearful a chance. The extraordinary argument so often brought forward, that only a small number of those who inhale chloroform are killed by it, will have no weight with him. Why should one person be thus needlessly sacrificed? Is the professed preserver of human life to be permitted to put it in jeopardy without sufficient cause, or without the apology that the hazard is necessary to ward off the evil of great pain. Were there no other way of avoiding this evil, it might be allowable to incur such a risk, for severe pain may produce exhaustion, and other injurious effects, but in those cases in which pain of this degree may be safely pre-

vented by cold, it would be extreme rashness to endanger life by chloroform.

If common humanity will not prevent the surgeon from thus needlessly hazarding the life of his patient, a regard for his own interests may be more effectual. His temerity would be generally condemned; and if he should cause death in doing that which he knows, or ought to know, can be otherwise done with perfect safety, he would subject himself to a very serious charge. That a surgeon could now, for the fifth time, cause death by chloroform in the extraction of a toe-nail, with impunity, is very unlikely; for it is impossible any longer to conceal the fact, that its exhibition is dangerous, and ought not to be had recourse to without necessity. The public are not to be deluded by the assertion that the fatal effects of chloroform have been the result of the want of care in its administration, for they have seen it fatal in the hands of the very parties who have told them this, as well as in those of the most skilful and experienced. The reported number of its victims already exceeds sixty, and there is not the slightest doubt that this list is far from being complete: of its many injurious consequences of a minor degree no record is kept.

Nov. 30*th*, 1854.

POSTSCRIPT.

SINCE the last sentence was printed, expressing the conviction that the list of deaths from chloroform is very incomplete, another has been reported as occurring in a London hospital on the 5th of December. Does not the extraordinary fact of five deaths having been reported as happening during the last seven months in the hospitals, while not one has been reported as happening in the private practice, of London (and the same observation is applicable to a much longer period and a greater number of deaths in these hospitals) prove that, as a rule, the fatal effects of chloroform are concealed whenever they can be concealed? In private practice it is neither the wish of the relatives of those who have died from chloroform, nor does it accord with the interests of the medical attendants, that the unfortunate circumstance should be generally known; but in hospitals it can, for obvious reasons, be rarely kept secret. Hence the pernicious and common delusion that the inhalation of chloroform is not attended with much hazard.

Corroborative of this view of the matter, is the curious circumstance, that several writers should mention their having had numerous cases in which, but for certain preventive measures that had opportunely occurred to them, chloroform would certainly have proved fatal, though not a word is said of their having witnessed an actually fatal result. M. Ancelon, for example, in a paper recently read before the Academy of

Sciences, in Paris (9th October), states that among two hundred cases, his whole experience in the use of chloroform, he would infallibly have lost seven, had he not fortunately succeeded in exciting vomiting.

The introduction of chloroform into the materia medica is an important improvement in therapeutics, as its uses are various; but if its inhalation as an anæsthetic is not, after the fact which has been adduced, subjected to a careful investigation, the omission will be little in accordance with the humane character of the medical profession.

One of the medical journals which report the last death from chloroform (*Lancet*, 9th December), refers also to another of its evils which has lately been the subject of judicial inquiry in America. This occurrence illustrates the remarks made above on an unnecessary and arbitrary suspension of consciousness.

ERRATUM.

Page 14, line 11, insert the words "of a" before the word "bellows."

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