

On the remedial agency of a local anaesthetic or benumbing temperature, in various painful and inflammatory [i.e. inflammatory] diseases / by James Arnott.

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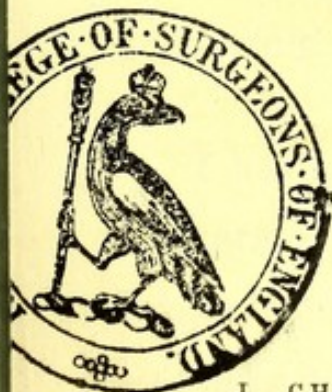
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ON THE
REMEDIAL AGENCY
OF A LOCAL
ANÆSTHETIC OR BENUMBING TEMPERATURE,
IN VARIOUS
PAINFUL AND INFLAMMATORY DISEASES.

BY
JAMES ARNOTT, M. D.,

Formerly Superintending Surgeon at St. Helena.



PRESENTED
by the
AUTHOR.

LONDON:
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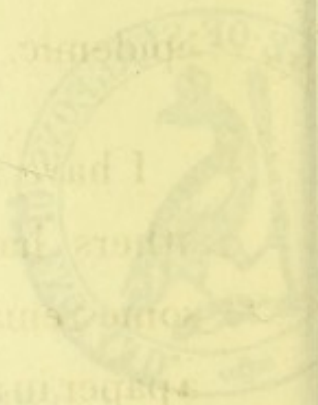
1851.

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The following essays were originally published separately, and to prevent repetition, reference was made from one to the other respecting particular points. As this reference, however, was not so convenient, the following corrections have been made in some instances, of those who have used the essays, as far as they are justly attributable to their not understanding it, as to their not having attained the results expected in its application.

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The following essays were originally published separately; and to prevent repetition, reference was made from one to the other respecting particular points. As this reference, however, cannot always have been convenient, the failure, in some instances, of those who have used the remedy recommended, may as justly be attributed to their not understanding it, as to their not having attained the requisite expertness in its application. To rectify this, the whole subject is now placed in a connected form before the reader; with the exception of some papers in the *Lancet* and *Medical Gazette*, reporting the excellent effects of a very low temperature applied to the interior of the stomach in Cholera, which were published two years ago, when the disease was epidemic.

I have not deemed it necessary to repeat what others have written on the matter, excepting some remarks, in my *Essay on Neuralgia*, from a paper in a french journal, describing M. Velpeau's

use of an anæsthetic temperature in place of chloroform; and I have translated these, both because they supply a want in my own observations which have been limited as respects this employment of the agent, and on account of the celebrity of the writer. It is a rare instance of good fortune that a therapeutical expedient of considerable pretensions, and opposed in no slight degree by common errors and prejudices, should so soon have been adopted by the leading Surgeon of Europe.

3A, Baker Street, Portman Square.

10th, July, 1851.

INTRODUCTORY NOTICE.

It is the purpose of the following pages to place before the public, more methodically and completely than has as yet been done, an account of a physical agent which constitutes both a powerful remedy in many important diseases, and a safer mode than any hitherto in use of producing insensibility in surgical operations. This agent is severe cold, produced by the local application of frigorific mixtures, (as of ice and various salts) which, in dissolving, reduce the temperature to 30 or 40 degrees below the freezing point of water; or to such a degree as will immediately benumb the part to which the mixture is applied, arrest the circulation of blood through it, and even congeal the fluids contained within it. There are other important but more concealed effects of severe cold or congelation connected with its medical virtues, which will be noticed hereafter.

The first and principal section of this little work relates to the treatment of headach by congelation. The reason why this is now more minutely described than the treatment of other diseases by the same means, will be afterwards explained.

The next article contained in this publication, is on the treatment of erysipelas by congelation. For this common and dangerous disease, there has hitherto been no remedy in which any confidence could be placed. I am certain that much suffering and many lives will be saved by the adoption of that which is here recommended.

In the third and concluding part, the comparative advantages of severe cold as an anæsthetic are considered, as well as its

employment in certain diseases, particularly eruptions or affections of the skin, characterised by the pain or suffering which they occasion. Owing to the circumstance of the two latter of these essays having already appeared in periodical works at different times, there will be some deficiency of system in the manner in which the various subjects are treated; but care has been taken to insert everything, either in the text or notes, that ought to be known for the full understanding of the medical uses of congelation.

Although headach must be reckoned a very distressing malady, it is seldom of a dangerous character. It may lead in some instances to apoplexy and other fatal cerebral affections, or to lasting disease of the digestive organs, but, generally speaking, its worst evil is the suffering it occasions, and the interruption which it causes to the usual occupation or mental exertion of the persons who are subject to it. It imbitters, but it rarely shortens life.

Such being the case, it may appear singular, that claiming, as I do, a very high station amongst therapeutic measures for the new remedy of severe cold or congelation, I should place its use in a disease of comparatively so little importance, so prominently in view. The desire to see it introduced at once into the practice of medicine, is the reason. I have singled out headach from the diseases to which it is applicable, because, as there is no other remedy for this ailment upon which the least reliance can be placed, medical practitioners will, notwithstanding any prejudice they may entertain on the ground of its novelty or other causes, be, in a manner, obliged to have recourse to congelation in its treatment; and after having thus obtained a familiar acquaintance with the mode of applying frigorific mixtures and their remedial power, they will not hesitate to extend their employment. The reason of my having first published an account of their use in erysipelas is of a different kind. I had to contend with a stronger prejudice than that

against the novelty of the remedy. The common but most erroneous notion that congelation or freezing must endanger the life of the parts subjected to it, had to be removed ; and I thought that this could not be done more effectually than by publishing the details of its successful use in a disease, in which, of all diseases, it would, were there any foundation for this notion, be the least appropriate. If congelation, instead of being dangerous in erysipelas—a disease where there is a proneness to gangrene—prove, on the contrary, by far the best remedy of it, what can be feared from its use in other cases where no such tendency exists ? When this prejudice has been removed, and a familiarity has been acquired with congelation from its frequent use in headach, it will soon be employed in other forms of neuralgia ; and wherever inflammation is accessible to this remedy, advantage will be taken of the celerity and efficiency of its action. The majority of obstinate skin diseases will be subdued by the combination which it possesses of anæsthetic and anti-inflammatory virtues ; and the dangerous mode of producing insensibility by the inhalation of chloroform and other intoxicating gases, will, in most instances, be superseded by it.

I have another reason for thus early bringing forward the use of congelation in headach. As every practitioner is in the habit of applying cold to the head in a variety of diseases, and is well acquainted with its utility, there will, on that account, be less opposition to the new remedy. For, congelation and cold as commonly applied, may be considered as closely allied in their nature. They are arrows made of the same material, and shot at the same mark ; but congelation reaches the mark, while the minor degrees of cold hitherto used, fall far short of it.

The prejudice against the congelation of the animal textures, springing from the notion that it must cause mischief by destroying their vitality, is a very natural prejudice ; and a similar objection has at first existed against most of our most efficient

remedies. They were dreaded as poisons, or as otherwise destructive, long before physicians learned, by limiting or controlling their action, to use them medicinally. A person exposed to intense cold in a severe winter or high latitude, and a person exposed in a manufactory to the fumes of mercury or arsenic, are both exposed to danger. Powerful agents are operating upon them uncontrolled. But if the intense cold be limited in duration and extent, and small quantities of the mercury or arsenic be exhibited in the form of blue pill, or Fowler's solution, instead of being hazardous to life, they will constitute valuable remedies. To condemn short and limited congelation because persons have lost their limbs or their lives by long exposure to cold, would be as unreasonable as to condemn the therapeutical agents of leeches or the lancet, because persons have bled to death from wounds; or the exhibition of laudanum in sleeping draughts, because those who have swallowed large quantities of it have been poisoned.

It is, surely, unnecessary to insist at greater length on the absurdity of being prejudiced against powerful physical agents, merely because they are dangerous when they are uncontrolled; but another objection may be started against congelation, arising from the error of not discriminating between the application of a frigorific mixture reducing the temperature to zero of Fah^t, and the application of ice, or a temperature of 32° of Fah^t. The application of ice in disease, though sometimes useful, is frequently a cause of irritation and mischief. Instead of immediately benumbing the part to which it is applied, as congelation does, it causes pain or aching, and consequently excites irritation. "Do not (says Sir Astley Cooper, in his Lectures on Surgery,) put ice itself to the inflamed part; it irritates, and is apt to produce gangrene." And this eminent practical surgeon spoke correctly in so advising. Ice, or a minor degree of cold, will often irritate and increase inflammation; whereas congelation soothes, and immediately checks inflammation. In the same way, a small dose of laudanum often excites the patient

and keeps him awake ; whereas a larger or sufficient dose calms him and produces sleep. There is no resemblance between the means. Most medicines or remedial measures differ not in the *degree* but in the *quality* of their effects, according to the doses or degrees in which they are employed. Sulphate of zinc, in small doses, is a tonic ; in large doses, it is an emetic. Mercury in minute quantities, is an alterant or purgative ; given in greater doses, and so as to cause ptyalism, it exerts apparently a specific power in checking inflammation. To object to congelation or a temperature of zero because the application of ice is often injurious, would be as illogical as to refrain from an adequate dose of bark in ague, because in smaller doses it may only disturb the stomach. There is, as it were, a contention set up between the powers of life and the depressing agency of ice, when it is locally applied, the result of which is injurious reaction and irritation ; but the greater energy of congelation at once subdues all opposition. It permanently depresses the vascular and nervous energies, and at the same time, probably, modifies the vital actions.

The cases which I have introduced in the following paper to illustrate the treatment recommended in headach, have been selected not as being the most favourable which might have been chosen, but as furnishing a fair sample of the results of the practice. Some of these exhibit congelation as being not only a certain remedy of this disease, but also a most speedy one ; others shew that were it fails of affording a complete and permanent cure, it gives greater relief than can be otherwise obtained ; and an example is given of its complete failure in a case, probably, of organic affection. These cases are taken exclusively from those occurring at a public charitable institution, for reasons which, in my remarks on reporting medical observations, I have stated in my essay "On the Present State of Therapeutical Enquiry."*

* Had the cases of headach related, occurred at a public hospital instead of a dispensary, and been reported as I have recommended in

The three dissertations contained in this publication mutually illustrate each other, and the reprinting of the two latter affords

the above Essay, it would have been more satisfactory, but such cases are not often found in hospitals, and such reports are not yet in use.

It is much to be regretted that the principal or metropolitan hospitals of this country are not made more subservient to the progress of medical science. In this respect there is a great contrast between them and the similar institutions of France. In England, if any one who has been fortunate enough to make a practical improvement in medicine, is not connected with a large hospital, his introduction of it must be exceedingly slow and unsatisfactory, and his perseverance, if his endeavours be successful, must be beyond what can be generally expected. After the trouble I have had in making generally known the mode of regulating the temperature of morbid parts with precision, and of combining uniform temperature with equable pressure, I am not very sanguine in my expectations that the new remedy, congelation, will be very speedily adopted, unless more facilities are afforded than I have possessed in the introduction of that other great improvement. But besides the "current apparatus," the Essay on Therapeutical Enquiry, published four years ago, contained about thirty other practical suggestions of more or less importance, which, while I wait for the opportunity of introducing them, I have the mortification to observe, are, one after the other, brought before the public by other parties as their own discoveries. To go no further back than the last three months: I have observed within that period (and not being a reader of all the periodical medical literature, I have, probably, only partially observed) no less than six claims for improvements described in the essay referred to. One in the *LANCET*, last published, (7th April) for a mode of inhaling the powder or dust of nitrate of silver in diseases of the respiratory passages; three claims, by three parties, for a method of suppressing uterine hæmorrhage after delivery (see the *LANCET* for January 13th and February 3rd, and the *PROVINCIAL MEDICAL JOURNAL* for January 24): another claim, by a writer in the *MEDICAL TIMES*, for injecting the uterus to facilitate turning in cases of difficulty: and another, for a simple and efficient mode of applying a continued stream of water in amenorrhœa and other cases of uterine disease, (in the *LANCET* for February 17th). Considering that my Essay on Therapeutics originally appeared as a series of papers in a medical journal of wide circulation, and that it was noticed, on its second appearance, in terms calculated to draw attention to it, by the leading medical reviews, these claims are not a little extraordinary.

When speaking of disputed inventions, I may take the opportunity of expressing the opinion that the harsh accusation which has just been preferred against Professor Simpson, of Edinburgh, by one of his former pupils, respecting the suggestion of an air-pump tractor as a substitute for the midwifery forceps, has been very unnecessarily made. The credit of the mere substitution of an air-pump for the originally proposed sucker, is hardly worth contending for. Many years ago, I

the opportunity of making certain additions in the form of notes. In all of these papers I have studied to be brief, but I trust, that I have not sacrificed perspicuity to conciseness.

had a tractor upon this principle constructed for me by Mr. Neaves, a philosophical instrument maker, of Broad Street, London; the cup was made to unscrew from the tube; and the exhaustion was effected from time to time by the small double-action syringe that is usually affixed to the nipple glass. Although I took some pains in constructing this air-tractor, I did not use it—not from any distrust in its power or utility, but merely because I had not the opportunity of using it. The few cases under my care requiring artificial assistance of this kind, were better suited for the use of the fluid dilator which I have described in the above essay, and which, in many cases, is calculated to effect the principal purpose of the forceps with greater safety in another way, namely, by removing the obstacle to extrusion instead of augmenting the extruding force. Dr. Simpson was probably the first who actually applied the air-tractor; and whatever may be said of the value of his peculiar practices, and particularly of his extensive use of etherization in midwifery, it is impossible to deny him the rare merit of turning the excellent opportunities of observation which he enjoys to the best account, both as respects his own original views, and the acknowledged suggestions of others.

London, 48, Dorset Street, Piccadilly,

12th April, 1849.

ON HEADACH, &c.

Aching or pain is an attendant, more or less constant, on the greater part of the numerous and diversified diseases of the brain or its coverings. But the term headach, when used to denote a distinct malady, has been usually restricted to those pains of the head which do not proceed from morbid conditions connected with inflammation or organic change, or which, though united generally with giddiness, a sense of heaviness, and an incapacity for mental exertion, are not commonly accompanied (though sometimes followed) by other more serious symptoms of cerebral derangement, as convulsions, coma, paralysis, or delirium.

Some systematic writers have taken another view of the subject, and have included under the term, various affections producing alterations of structure discernible by the anatomist on post mortem examination. This latitude of the name is objectionable as leading to errors in diagnosis. Organic diseases of the pleura or peritoneum might, because accompanied by pain, with as much propriety, be termed chest-ach or belly-ach; but such terms would be as little distinctive of the diseases of these cavities respectively, as the application of the name body-ache to every affection attacking the human frame which is attended with pain, would be distinctive of diseases generally.*

* Dr. Copland, in his Dictionary of Practical Medicine, after criticising what he terms Dr. Good's superficial view of the pathology of headach, and stating that "every practitioner of experience must

Other writers have followed the opposite course. Cullen has not even given headach a place in his "Nosology," considering it, in every instance, to be merely a symptom of other disease; and a deservedly popular systematic author of the present day, Dr. Watson, has admitted into his catalogue of diseases only one species of headach, namely, hemicrania or brow-ague, which he considers to be a species of neuralgia.

The error of Cullen is great and manifest, and has been generally commented upon: and it will hardly be denied that if hemicrania be a distinct malady, and a species of neuralgia, other kinds of headach, equally well marked, ought to find a place in the list of diseases, whether they are regarded as neuralgic affections or not.*

have met with, if he have not actually experienced in his own person, headachs which at one and the same time possessed all the characters Dr. Good has enumerated as marking five distinct species," presents his readers with a long list of eleven varieties, certainly not more perfect than the various classifications which he condemns. Two if not three of these varieties are only so many kinds of symptomatic headach, while all the others are excluded; one includes two different diseases; and the variety named *cerebral* headach, comprehends every disease of the brain and cranium. With reference to the descriptions of the varieties of this and other ill defined disorders to be met with in medical works, it must be confessed that they too often appear to consist of a few symptoms grouped into various fanciful or arbitrary arrangements, just as an unlimited set of new forms are made in the kaleidoscope by shaking together a few bits of coloured glass. This kaleidoscope symptomatology, no doubt, impresses a certain class of readers with profound reverence for the writer's power of discrimination; but it confounds and disgusts the student of more intelligence.

* The employment by writers, of the same term, headach, to denote both a particular disease, and the pain that is only a symptom of diseases bearing other names, has led to confusion on this point. Many other terms, such as fever, dropsy, jaundice, and hæmoptysis, are likewise often employed in both of these senses, and often with similar consequences. When pathology shall have so far advanced as to enable us to name every disease according to its nature or proximate cause, the confusion from this source will cease, and not till then. In the mean time there is no security against error in diagnosis, but in correct artificial classification; and whoever would aid the junior practitioner's remembrance of resembling or associated diseases, by adapting such a classification to some of the expedients devised by writers on "memoria technica," would well deserve his gratitude.

The necessity of ascertaining the particular affection which causes aching or pain in disease of the head, is too obvious to require being insisted upon. The treatment suitable to what are usually called nervous headaches, or to sick headaches, or brow-agues, or rheumatic headaches, is very different from that which is appropriate to pain arising from inflammation of the brain or its membranes, tumours within the skull, or disease of the bone or periosteum. Nor is it of less importance to ascertain, in the symptomatic kinds of headach, the particular disease which causes it, in order that the proper remedies may be applied for the removal of this; taking especial care, however, not to commit the too common error of treating as a mere symptom of stomach or of uterine affection, that which is really an idiopathic or original disease, either producing the concomitant disorder of the stomach or other viscus, or being altogether unconnected with it. The error and danger of considering most kinds of headach as being mere symptoms of stomach affection, have been forcibly commented upon by Dr. Parry and other writers;* nor has the important truth been unnoted, that the headach which, at first, is merely symptomatic, often becomes, from long continuance, an idiopathic disease, and persists independently of the original or parent affection.†

What is the pathology or nature of the more usual kinds of headach, evidently closely allied in character, and known under the names of nervous headach, sick headach, and hemicrania or brow-ague? This is an important question, as our opinion thereon will lead to a rational selection amongst the very numerous and diversified means that have been recommended as

* "Of the same nature (as the sick headach) is the common headach which afflicts nervous patients, without sickness; and which, also, is usually and erroneously attributed to the alimentary canal, and therefore aggravated almost to madness by the improper means, whether of regimen or medicine, which are generally ordered for its relief."—Elements of Pathology and Therapeutics, by C. H. Parry, M.D.

† Cyclopædia of Practical Medicine, vol. 2, article "Headach," by Dr. Burder.

remedies ; or to the substitution of other means better fitted to remove the disease.

It is very certain that the pain in headach of this description, arises generally, if not always, from an irritation or inflammatory affection of the nerves of the coverings of the brain—the membranes, bone, periosteum or scalp—either alone, or in conjunction with a similar affection of the bloodvessels. The scalp is often hot and tender to the touch ; in hemicrania it is often swelled. The pain is felt in, or referred to, the external parts. It has often been relieved for a while by external applications acting only on the surface, or to a very limited extent beneath it. And it is known that the brain itself is insensible ; cutting or tearing it producing no uneasiness. M. Jolly and other French writers, have, with reference to this last fact, supposed, in their explanation of the nature of headach, that the nerves of the coverings of the brain are the organs of its sensibility, just as the nose and the eyes are the organs by which it perceives odours and light.*

Now, of the immense host of remedies that have been proposed and employed for the cure of these headachs, which can be chosen as being likely to fulfil the indication of cure, or capable of accomplishing the required alteration in the condi-

* Dictionnaire de Médecine et de Chirurgie, Vol. V.

In an ingenious, though obscurely written paper on headach, in the Medical Gazette of December 1844, by the late Mr. King of Guy's Hospital, it is contended, not only that headach is an affection of the parts exterior to the brain, according to the common opinion, but that pain is never produced by disease of the substance of the brain unless its exterior membranes or coverings are at the same time affected. He supports this opinion by the well known fact that many severe and fatal diseases of the brain, are sometimes unaccompanied with pain ; and by the analogous instances of the existence of other deep seated visceral inflammations without pain, when their investing membranes are not implicated.

It may be well to remind the reader, when adverting to this question, of the close connection subsisting between the inside and exterior of the cranium by means of the fifth pair of nerves, the branches of which are very numerous on the forehead, and spread over the whole scalp, excepting a small portion behind.

tion of the nervous and vascular system of the morbid part? Their very number would at once impress the enquirer with doubts of their efficacy; and his further investigation would convince him that not one was to be relied upon as a remedy, or even as a general alleviative of the disease. If the exciting and predisposing causes of headach are known and can be removed, much good may, of course, result from attention to this point; and benefit to a certain amount may also be derived from altering certain faulty conditions of the system; as by the administration of tonics where there is debility, or, by detracting blood where there is an inflammatory condition.* But no remedy that had hitherto been proposed, would appear to be calculated to remove the proximate cause of the disease—the morbid irritability or excitement of the nerves and arteries in the deeper seated tissues exterior to the brain. Anodynes may blunt the sensation for a while by their influence on the sensorium, or on the superficial nerves when they are locally applied; but they cannot be supposed capable of producing any permanent effect on those nerves that are farther from the surface; nor would the influence of cold or warm lotions, or of stimulating embrocations promise to be of much greater extent. The truth is that the remedies of headach, with the exception of those directed against that variety of the disease which is periodical, are generally inefficacious. The use of them, one after another, may administer partial and temporary relief, and by keeping alive the patient's hope of cure, may in that way also prove of service; but too frequently he is obliged to find consolation in a knowledge of the fact

* Some years ago (see *British and Foreign Medical Review*, 1837) bleeding from the nostrils was recommended as a new and efficacious remedy of headach. It had however been suggested about seven years before by a French writer, M. Jolly; following (as he informs us) a proposal of M. Cruveilhier, to employ the same expedient in inflammation of the brain. M. Jolly was probably not aware that the same practice (“*sanguinem ex naribus detrahere*”) is mentioned by Celsus amongst the remedies of obstinate headach.

mentioned by Heberden, that time alone, after a course of years, will generally mitigate or vanquish his disease.

Congelation, or a benumbing and permanently depressing degree of cold, the therapeutical agent which it is the purpose of these pages to bring into notice, is of a very different character from the remedies hitherto employed in this disease.

It has been proved, by numerous trials, to be efficacious in the various headaches not arising from organic affection; and its nature or operation appears exactly suited to effect the object desired. A morbid irritability or inflammatory condition of nerves and often of bloodvessels, at a certain distance from the surface, has to be removed. The severe cold penetrates to the depth required; it immediately benumbs the painful nerves; it permanently lessens their sensibility; it produces a lasting depression of the vascular system of the part; and probably otherwise modifies the vital actions. By the time that this depressing or sedative influence of the cold has ceased, the morbid condition will be removed, or so much lessened, as to require only a few repetitions of the same remedy to complete the cure.

It is not only in the more common kind of headach that congelation would be pointed out by our knowledge of the disease, as the appropriate or best adapted remedy; the same agent is obviously equally suitable to the rheumatic and periosteal species, of which vascular excitement is probably the principal morbid condition.

If the doctrine that, in headach it is the nerves or bloodvessels upon the exterior of the brain that are morbidly affected, required confirmation, it would be amply afforded by the results of the use of congelation as its remedy. Therapeutics have on many occasions thrown light on pathology, but in none more strikingly than in the present instance. Judging from a considerable experience of its use in dispensary and private practice, I should say, that of every ten cases of headach, using the term in its least restricted sense, more than half the

number may be immediately or very speedily cured by congelation; and that of the remaining cases, the greater part are susceptible of much alleviation by repeated applications of the same means, while other appropriate measures are employed. A tenth part, arising probably from organic disease, within the cranium, or from hysteria, will receive no relief from congelation.

The efficacy of congelation is only another instance of the sufficient and efficacious application of a remedy which had already been in use, but which had been employed insufficiently, and consequently uselessly, or only with limited advantage. For cold in a minor degree has long been included in the list of remedies of headach, and none has been more frequently resorted to for temporary alleviation. It has very lately been announced that an improvement of analogous character has been made in the use of quinine employed as a remedy of yellow fever. In the small doses, which have until lately been exhibited, its remedied effect is hardly discernible; but when given in large doses and so as to produce the state that has been termed cinchonism, we are informed by Dr. John Davy, that it cures yellow fever with as much certainty as it cures the ague. And how often does mercury fail from not being exhibited in sufficient quantity to produce its specific effect! I at first entertained the erroneous idea that congelation, though it might give immediate ease in headach by benumbing the over-sensitive nerves, would fail of any permanent effect; and the observation of the short duration of the insensibility produced by cold used for the purpose of rendering surgical operations painless, was not likely to correct this impression. But the discovery that the numbness caused by holding a finger in a frigorific mixture a few instants, will continue in some degree for several days afterwards—that irritable ulcers and nodes are permanently relieved of pain by the same means—that congelation is perhaps, with the exception of extraction, the most certain and lasting cure of toothach, and that complete and durable relief is also obtained by this

expedient in the most distressing cases of prurigo, altered my opinion, and induced me to make trial of it in headach. The result has been, that of the common forms of this disease, it has proved to be as efficacious a remedy as bark is of intermittent fever. When I speak of the common forms, I ought not, perhaps, to exclude the headachs proceeding from rheumatic affection, or from inflammatory disease of the periosteum; for to these it appears as well adapted as to those of a more nervous character.

Many of the remedies used in headach, while they have been of little or no avail, have not been altogether innocuous. The constitution will not bear with impunity, a long course of aconite, veratria, prussic acid or the other narcotic poisons; nor can arsenic and other remedies termed alterants, be taken for a long period without some fear of injury. But from the action of congelation nothing can be apprehended; not once in the five hundred instances in which I have employed it in this and other diseases as well as for anæsthetic purposes, has any injurious effect followed its use. I conceive that this is a point of great importance in the treatment of a disease of which the nature is often obscure, and in which it has often been necessary to try various remedies of opposite qualities. Under such circumstances, it is much to be desired that whatever is tried, shall produce no harm if it fail in bringing advantage. But who will say this of the copious bleedings, the mercurializations, and even the trepannings that have been tried in headach? Congelation is a powerful remedy of other diseases affecting the head;—and if the pain supposed to be common headach, should really proceed from inflammation of the brain, we have in the application of intense cold a remedy, perhaps not inferior to any we possess.*

* A minor degree of cold, such as is used in common headach, may be supposed equally applicable to that proceeding from the cause adverted to; and, certainly, if an efficient degree of cold could be uniformly applied, the supposition would be right; instead of this how-

There is another great advantage in the employment of any therapeutical agent that will certainly remedy one class of diseases, and will not aggravate different though resembling diseases in which it may be used. Such an agent becomes an excellent means of discrimination. If congelation properly applied prove of no permanent service in headach, it may be concluded either that the disease is symptomatic of some affection remote from the brain, or that the pain is caused by some morbid condition of the brain or its coverings, requiring very different remedies from those suitable to common headach. Many affections of the latter class, which have been allowed to gain ground and ultimately prove fatal under the routine administration of the remedies of common headach, might, doubtless, have often been arrested in their course by the timely application of appropriate treatment. But the aching or pain accompanying such affections often may, and ought to be relieved at the same time by the remedies of common headach; just as dropsy, which is generally the symptom or effect of other disease, demands relief not only for the alleviation of the patient's sufferings, but in order that the disease which causes it may not be aggravated and the danger increased by its presence.

The return of headach after congelation has been used is not, however, always to be considered evidence of the existence of other disease of which it is symptomatic. For headach, like

ever, the usual mode of applying cold (as I have shewn in the introductory chapter of my late work on Indigestion) must frequently be pernicious by exciting a series of reactions, and on this account such applications have been discarded from practice by several practitioners of authority. The application of ice is free from this objection, but the pain caused by it, soon becomes intolerable; and the irritation thence proceeding, must detract seriously from any advantage the ice possesses. This irritation, however, might perhaps be prevented by the occasional benumbing application of a frigorific mixture; and another objection that has been made to ice, and which alone prevented the late Dr. Armstrong from employing it (see his Lectures on the Practice of Physic,) namely its weight, can easily be removed by the employment of a "supporter" as described in the work just referred to.

catarrh, rheumatism, sore throat, and many other diseases, is liable to return upon a reapplication of its causes. Nor is the tendency to slight occasional achings, that often remains after the removal of a severe headach, to be deemed any proof that this removal has not been permanent. These trifling aches may arise from different causes, and in general they disappear of their own accord, especially if due attention be given to the patient's regimen.

It now only remains to give some practical illustrations of the use of congelation as a remedy of headach, with some prefatory remarks on the proper mode of using it.

In my several communications on the subject, I have used the term congelation rather to express the degree of cold capable of congealing the animal fluids, than this effect itself. Such a degree immediately benumbs the nerves of the part to which it is applied, and speedily arrests the flow of blood through it. These effects may be more complete when actual congelation or freezing is produced, but this may not be always, or even generally, necessary. There is a degree of smarting or tingling accompanying the congelation of a part, which though seldom complained of or cared for by patients, may as well, in many cases, be avoided; and where there has been no actual congelation, the redness that generally follows this effect and lasts sometimes for twenty or thirty hours, is not produced. The momentary uneasiness, however, attending congelation of the animal textures is not so great as the uneasiness produced by the application of ice, and is indeed so trifling that it ought not to be made a regulating circumstance; and where mere benumbing is insufficient, congelation in the usual sense of the term should be used instead. For, there may, in this effect of cold, be a difference of quality as well as of degree.

The frigorific that I have usually employed in the treatment of headach and other diseases, is the common mixture of pounded ice and salt; which, if properly prepared, reduces the temperature to a few degrees below zero of Fahrenheit's ther-

mometer. In applying this frigorific to the scalp when the hair has not been shaved, but only closely cut, I have occasionally rendered it more powerful by the addition of a little powdered sal-ammoniac and nitre.

The most convenient and efficient mode of applying the frigorific mixture, is to put it into a small net made of thin silk gauze tied to a ring of gutta percha; and to allow more or less of the net, according to the space to be congealed, to rest upon the part; the brine being absorbed as the ice and salt dissolve, by a sponge or a piece of moist flannel. If a thin or prepared bladder be used, or a vessel or cup with a bottom consisting of thin membrane, the frigorific will often require to be of greater strength, and means must be adopted, as by the addition of a short tube, for the constant removal of the brine, in order that the temperature may be maintained at the requisite low degree.

Other minute circumstances will be better learned by attention to circumstances related in the reports of the following cases:— and it is important that they should be noted, as the success of the treatment may depend upon due attention being given to them. “There is a vast difference,” says Dr. Graves, in his excellent work on “Clinical Medicine,” “between a thing being done, and its being well done.” He is speaking of the careless or unskilful application of cold lotions to the head in fever; but the same remark may be applied with equal force to the subject now under consideration.

CASE I.—M— A— T——, aged 27, 14, George Street Gardens, admitted a patient of the Brighton Dispensary, 12th February, 1849. Had severe pain of the head, principally over the left eye. It was seldom absent, but usually became greater about five o'clock in the afternoon. Often accompanied, when very acute, with vomiting; and at such times there was generally swelling and heat of the forehead and tenderness to the touch. After having tried other means with little or no relief, congelation was applied to the forehead—the frigorific

mixture being kept in contact with it until the skin became white and hard. Immediate ease was afforded; but as the pain returned next day to a certain degree, the application was repeated after an interval of three days, and was longer continued. From that time until the 1st of April, when I last saw the patient, there had been no return of headach. She was taking, latterly, no other medicine than what was required for the regulation of the bowels.

This case of hemicrania or brow-ague, being accompanied with disorder of the digestive organs, was at first treated as proceeding from this cause, but the immediate relief and speedy cure, from the remedy applied directly to the head, was evidence that the stomach affection was the effect, and not the cause of the headach.

I have at present under my care a case resembling the above in respect to the seat and periodic nature of the pain, but as this is much more severe and of a lancinating character, the disease would be more properly termed *tic-doloureux*. This morning (April 9th) I applied, for the first time, a frigorific mixture over the temple and part of the forehead, while the patient lay in bed moaning with pain. The whole of this surface was congealed in half a minute, and the congelation was continued, with occasional intervals of a few seconds, for about three minutes, by which time the pain had entirely ceased. On removing the frigorific mixture, the small net containing it was dipped in a basin of cold water in order to remove the salt, when the ice was again reapplied for the purpose of maintaining a considerable degree of cold for a little while afterwards, and preventing any smarting that might follow the congelation. There was no return of pain during the hour I remained with the patient.

In this severe case of neuralgia, the assistance of quinine or other medicines of the same class, will probably be necessary to prevent the recurrence of the paroxysms. The cause of the local nervous, and perhaps vascular affection, is probably too

powerful for the *complete* prevention of the periodic pain by any application to the part in which it is felt. Such a neuralgic affection resembles, in this respect, the local inflammation in erysipelalous fever, to be treated of in the following paper. But it is of great importance to have a means in our possession by which the agony of the patient may be instantly relieved on its recurrence, while appropriate measures are being adopted for removing its persisting cause.

CASE II.—A— K——, 58 years of age, 35, Hanover Street, 15th February, has been affected for two days with a most severe and unceasing pain across the forehead, and occasional attacks of bilious vomiting. Has taken laxative medicines, and used cold lotions to the head without relief. She lies in bed with her eyes closed, and complains of the slightest noise. Congelation of the forehead—a pill containing calomel and opium to be taken immediately, and a laxative draught some hours afterwards.

16. Complete relief from headach since the congelation, and the sickness has much decreased.

17. A slight return of headach in the night, but of short duration. She is now free from pain.

On visiting this woman about a week afterwards, I found her sitting in her room, with blisters behind the ears, which she had applied of her own accord. She told me that she had had no return of the severe headach or sickness, but that a nervous headach, to which she had been liable for many years, had returned, and had brought with it a watery discharge from the eyes to which she was likewise, it appeared, very subject. She acknowledged the virtue of the congelation in her former headach, but thought that something different was required to *draw* the water from her eyes, and she had on that account made use of her accustomed remedy, which she termed a “drawing blister.” Finding that my patient was so confirmed a theorist, I did not press a repetition of the congelation, more especially as her headach was not distressing.

The case is a well marked instance of what is commonly called sick headach. The relief of the head preceded the operation of the medicine administered on account of the disordered state of the digestive organs.

CASE III.—E——— V——, aged 38, 30, Blackman Street, 19th February. Has been for some weeks in attendance at the Dispensary on account of ulceration of the neck of the womb, to which lunar caustic had been applied. As severe headach persisted after the cure of the uterine malady (of which I, at first, had deemed it symptomatic) it was now to be treated as an independent disease. She states that for three years she has been scarcely a single day free from headach, which, she thinks, originated from mental distress. The head often feels "as if screwed in a vice." It is generally the forehead which aches, but occasionally the pain is towards the occiput. Her countenance denotes continued suffering. Congelation applied to the forehead.

24. The relief from the congelation was considerable, but lasted only during the day on which it was used. The headach has now returned almost to its usual degree. A bladder containing a frigorific mixture at zero Fah^t was applied across the forehead for twenty minutes, but with the effect only of benumbing and not of freezing the scalp.

27. The head was again relieved by the severe cold, but the aching has returned. The congelation repeated as at first.

30. Congelation again employed, as the headach has not been permanently removed, though it is much less than at first.

3rd March. Pain of head now very slight, and only of occasional recurrence. She states that the weight over her eyes, that had so long distressed her, is now completely removed.

17th March. Has not had the slightest headach during the last week. Her looks betoken a greatly improved state of health.

This case of nervous headach is instructive, as shewing the advantage of repeated applications of the frigorific under un-

promising circumstances. I confess that the long continuance of the disease made me doubtful about the permanent advantage of the remedy; and had not the patient expressed much desire to have it repeated, I probably would not have persisted in its use after the first or second application.

CASE IV.—M— A— R—, 26 years of age, 18, Paradise-street, admitted 22nd February. Headach of four months' duration, almost constant, and aggravated by the recumbent posture, when the pain generally shifts from the front to the back of the head. It is worst in the morning on rising from bed, and she is then often attacked with vomiting. Frequent fits of giddiness. Incapable of following her usual occupation of sewing, and has suffered, thereby, great privation: her husband having no employment. The forehead and temples congealed—a vegetable tonic prescribed, with laxative pills to be taken occasionally on account of habitual costiveness.

28th. The headach was at once relieved by the congelation, and there has, up to this date, been not the least return of it.

I occasionally saw this woman for some weeks afterwards, during my professional visits at the house of a benevolent lady who had given her such work as she could execute, and thus enabled her to procure suitable nourishment. There had been no return of headach; but a recurrence of the same privations which, it may be supposed, were the original cause of the disease, will, in all probability, renew it.

CASE V.—F— P—, aged 40, 36, King Street, admitted 14th February. Has complained during the last month of severe and constant pain, with tenderness, in the back of the head. Has had rheumatism in her joints, but not of late years.

After removing the hair from the painful part, congelation was applied, and with the effect of giving immediate ease. The scalp continued hard, or frozen, for about two minutes.

About a week afterwards she called upon me at the Dispensary, to return her letter, and to state that she had had no return of headach.

The history of previous illnesses induced me to regard this as an example of rheumatic headach; and it depended probably on an inflammatory affection of a limited portion of the fibrous texture covering the cranium, which was at once removed by the continued congelation. If a rheumatic diathesis exists, there will probably be a relapse, but there were no existing symptoms to justify the exhibition of medicines merely with a view to prevention.

CASE VI.—L—— C——, aged 21, 3, Pym's Gardens; 3rd March. Has been subject to epilepsy for seven years; the fits recurring as often as two or three times in a month, and lasting on each occasion from one to two hours. Almost constant head-ache; the pains being confined to the forehead, and plunging from temple to temple. It is most severe for a day or two after an attack of epilepsy. *Emansio mensium*. Had the frigorific strongly applied to the forehead yesterday, and did not complain at the time of the application, but the skin smarted for a few hours afterwards. No redness of the skin perceptible to-day. No headach since the application of cold. She has called earlier than she was desired, to request that her sister, who is likewise a sufferer from headach, may have the same remedy applied.

14th. Had an epileptic fit on the 12th, followed by vomiting of blood, but there has been no return of headach since the 3rd instant.

23. Has slight headach occasionally, but it is comparatively of no importance.

This patient has been amongst the most constant attendants at the Dispensary for a period of years, and has gone through the remedial routine for epilepsy and amenorrhæa without much advantage. It is not likely that congelation will prove of permanent benefit, but the relief that one application has given, proves that she will have a valuable resource in it upon the recurrence of pain.

CASE VII.—C—— C——, aged 33—(the sister of the girl

whose case has just been related.) March 6th. Habitual head-ach during the whole of her life, or as long as she can remember. Scarcely a day free from it, and often obliged in consequence to remain in bed. Frequent giddiness and sickness. The pain is principally in the forehead and in the ears. Cupping, leeches, blisters, and other remedies have often been used with very little advantage. Congelation was employed five times in this case within a period of twenty days, with increasing relief on each occasion. As her hair grew low on the forehead and covered the greater part of the temples, part of it was removed. Towards the end of the month she was free from ailment. Congelation was used in this case exclusively.

CASE VIII.—E—— S——, aged 20, White Cross Street. 5th March. Has not, during the last twelve months, been a day free from headach, and is often confined to bed by it. Pain and weight across the forehead; the pain shooting backwards. Vertigo. The headach generally increases during the night, and is most severe in the mornings, when it is occasionally accompanied with sickness. Frigorific mixture applied to the forehead. She complained a good deal of the smarting over one temple, and the frigorific required to be renewed before complete congelation at this spot could be effected.

19th March. There has not been the least return of pain since the application of the frigorific.

This patient had two epileptic fits last summer, for which a seton was placed in the neck (the skin having been previously benumbed by congelation) with apparently beneficial effect as regards the epilepsy, which has not returned, but with no relief of the headach. The difficulty of freezing one of the temples arose probably from vascular excitement, and from its constituting the principal seat of the disease. After a long absence, she was induced to seek assistance again at the Dispensary, from the circumstance of one of her relatives then attending it having been relieved of an obstinate headach by congelation.

CASE IX.—J—— G——, aged 42, 42, Regent Street, Shoe-

maker; 7th March. Has been for years a sufferer from indigestion, for which he has repeatedly placed himself under medical treatment, and has generally, by medicine and attention to regimen, obtained relief. The symptom now principally distressing him, is headach, and it almost unfits him, from its severity, for following his occupation, which requires him to sit in a stooping posture. Congelation applied to the forehead.

25th. Occasional heaviness, but no pain of the head of any importance since the application of the remedy. He has continued taking medicines and using other remedial measures for the stomach affection, which is also much relieved.

9th April. Remains free from headach. Continues the remedies for dyspepsia.

The above case furnishes an illustration of a remark in the preceding observations, that although headach may at first be merely symptomatic of stomach affection, it is apt to become a fixed disease independent of the original cause, and is susceptible of cure by remedies addressed to it directly.

Another case occurring at the Dispensary about the same time, (the patient E—— S——, 26, Sun Street, complaining likewise of dyspepsia) afforded another similar illustration. But in this instance, three applications, with about a week's interval between each, were required to afford the same amount of relief.

CASE X.—Mrs. N——, aged 50, 5, Belmont Street; 12th March. Complains of severe pain at the crown and back part of the head, which intermits in severity but is seldom completely absent. Frequent pulse, thirst, and other febrile symptoms. Has had headach during the last two years; and about 10 months ago was attended from the Dispensary for continued fever.

Various remedies having been tried in vain for the relief of the head, congelation was now applied over the seat of the pain, the hair having been previously removed from this portion of the scalp. It was employed twice, and for several minutes

on both occasions ; but producing no advantage, not even temporary relief, I determined on not repeating the application.

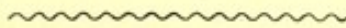
Indeed congelation may be said to have been used three times in this case without benefit as far as regarded the headach, for, about six months previously to its use for this purpose, I had employed it to produce local insensibility during the removal of an encysted tumour from the scalp ; and had the headach been relieved by it on that occasion, it is unlikely that this would have taken place unobserved. It was from no reluctance on the part of the patient that I discontinued the trials of congelation, for, in consequence of a singular combination of circumstances, she placed great confidence in this remedy. It had not only been employed before in her own case, as just related, to prevent pain in a surgical operation, but an obstinate impetiginous eruption had been quickly removed by it, about the same time, from her husband's hand ; and a few weeks before its second application to herself, it had, at once and permanently, cured a toothach from which her daughter had been suffering, and which, from the great decay of the tooth, could not be relieved by extraction.

There can be little doubt that the headach, in this case, proceeds from organic affection, and the patient is now under treatment appropriate to this, but hitherto without much advantage.

ON THE TREATMENT OF ERYSIPELAS,
BY SEVERE COLD OR CONGELATION :

WITH REMARKS ON THE SUPERIORITY OF THIS AGENT AS A
REMEDY OF EXTERNAL INFLAMMATION.

From the "London Medical Gazette," of the 9th of March, 1849.



The congelation or freezing of the animal textures produced by powerful frigorific mixtures, may be considered in its threefold character of a remedy, a prophylatic, and an anæsthetic, or preventive of pain in surgical operations.

Congelation is a remedy of many diseases affecting the nervous and vascular systems. Of external inflammation it is a certain, speedy, safe, and agreeable remedy.

Certain, because wherever congelation can be produced, inflammation ceases. The other remedies of inflammation, blood-letting, antimony, mercury, minor degrees of cold, &c. are more doubtful in their effects.

Speedy, because congelation instantly arrests inflammation. The congestive state which sometimes succeeds, has nothing of the character of inflammation, and none of its consequences. Where the degree or duration of the refrigeration has been insufficient, or where the cause of the disease continues to operate, the inflammation will, after a considerable period, return ; but a reapplication of the remedy will again immediately arrest it.

Safe, because in no instance, of hundreds in which it has been employed, has congelation been productive of any injury or untoward

effect. Bloodletting often proves destructive, by prostrating the vital power required for reparation; and the other remedies have all their respective evils or dangers. Still, as every other potent remedy may be abused, so might congelation prove prejudicial, if too long continued, or if produced by frigorific mixtures of greater power than is required. And in certain cases it may be proper, in order to obviate reaction of the deeper tissues, that congelation should be followed by the application, for some hours, of the means which I have introduced, for maintaining an uniform degree of cold.*

Agreeable, because it instantly benumbs the part, and relieves the pain accompanying inflammation. Excepting a slight tingling when the congelation commences, and for a few minutes after its cessation, this therapeutical agent causes no unpleasant sensation; such as the pain from the operations by which blood is extracted, or the fainting thus produced; the nausea and vomiting from antimony; the soreness of the mouth from mercury; the pain from scarification in phlegmonous erysipelas, &c.

* The "current apparatus" here alluded to, is not yet well understood by the profession. The writer of the notice of my work on Indigestion, in the British and Foreign Medico-Chirurgical Review, April 1848, after stating that the apparatus perfectly supplies a great desideratum in practical medicine, and at last enables us to use with efficiency two potent therapeutical agents, regrets that it must necessarily be bulky, and consequently hardly portable. Now the truth is, that all which the practitioner has often to provide, viz., a bladder and two long flexible tubes, may be packed into less bulk than an 8oz. phial; and since the invention of gutta percha, need not cost half-a-crown. The *fountain* reservoir supplying the current, may consist of a wash-hand basin, with three or four quart bottles of water inverted in it. As to the apprehended difficulty of using this expedient, there is at present under my care a patient with deep-seated disease of the leg, whose servant not only applies it every night, in order that her mistress may sleep in consequence of the relief from pain which the constant current procures, but who renews the bladder from day to day, or as often as is necessary; and a late patient of the Dispensary (residing at 16, Sun Street), with the assistance only of her daughter, kept up a current for three days and nights for the cure of ulceration of the leg, that had resisted every other means for a period of nine years. The servant alluded to was well practised in the use of the current apparatus previous to this application of it, for she herself was cured by it, about two years since, of an obstinate disease of the skin, and her case is mentioned in the last page of the Treatise referred to.

The prophylactic virtue of congelation is the power which it possesses of preventing inflammation of parts which have been subjected to its influence. Wounds produced by surgical operations (as already stated in my paper in the *MEDICAL GAZETTE* of December 1st), have invariably appeared to heal more speedily after the application of congelation, than under the usual circumstances, and probably on account of the absence of any injurious degree of inflammation. Indeed, it was the observation of this effect of congelation in preventing inflammation, which led to its use as a remedy of the same condition; and conversely, had it been first used as a remedy, its preventive power would probably have been as soon discovered. This property of preventing injurious vascular excitement ought alone, and independently of its anæsthetic virtues, to render the use of congelation a preliminary to surgical operations, for even the smallest of these occasionally proves fatal in consequence of inflammation. A sad illustration of this has recently been afforded by the lamented death of a distinguished statesman, who fell a victim to the consequences of a very trifling operation performed to remedy an inconvenience so slight that it could scarcely be called disease.

The third medical property of congelation, is its power of preventing pain in surgical operations. Its excellence in this respect, compared with ether or chloroform, consists, first, in its power of producing local anæsthesia, while the consciousness of the patient remains undisturbed; and secondly, and especially in its perfect safety. Since the publication of my former remarks on this subject, other *sudden* deaths from chloroform have been reported by the press: of *eventual* fatal consequences and other mischiefs there is no record.

The remedial powers of congelation in inflammation are proved by the following cases of erysipelas, in which it was employed.

To the philosophic physician, acquainted with the history of the treatment of erysipelas, the announcement of a new remedy for it, will probably at first appear only as another example of the common fallacy of attributing the cure of a disease to the use of a medicine or remedial means, merely because the disease ceases after it has been administered. But there is this essential difference between the means now recommended, and the numerous and diversified expedients hitherto resorted to in erysipelas, that the former has in almost every instance in which it has been employed produced an immediate and

very obvious beneficial effect ; whereas the latter, it will be generally admitted, have just as frequently appeared to be inert or injurious, as to be efficient and useful.

Congelation, in respect to its use in erysipelas, is what is termed a rational remedy. Its analogies with other acknowledged remedies of inflammation would recommend its employment in this disease. Much of the danger of the erysipelas which affects the face and neck, unquestionably proceeds from extensive and severe inflammation of the skin ; and to the suppression of this the efforts of physicians have been directed. Now, as cold is a remedy of inflammation of admitted efficacy, it is reasonable to suppose that by subjecting the diseased tissue, and this alone, to a short application of a much greater degree of cold than has hitherto been employed, a greater depressing or anti-phlogistic power may be exerted. Again, as experience would show that bleeding when it produces syncope is a more certain mode of checking inflammation than when it does not produce that effect, so severe cold or congelation, which, like fainting, checks the circulation of blood through the part subjected to it, may likewise be useful, for the same reason, and under the same circumstances.* The morbid action of the bloodvessels being thus arrested for a time, the healthy circulation may, by the efforts of nature, be immediately afterwards restored. Such reasonings, however, are of little importance in comparison with the following facts :—

CASE I.—Charlotte Shepherd, 10 years of age, living at 17, New Dorset Street, became a patient of the Brighton Dispensary on the 15th of November, 1848. When I first saw her, two days afterwards, there was much swelling and redness of the face, and the eyes were closed. Considerable fever was present, and occasionally, delirium. She had been purged, and had taken antimonial and saline medicines without any mitigation of the symptoms. I applied a mass of pounded ice and salt, by means of a flat sponge, to each side of the face, for about a minute, or until large patches of the skin had become white

* Trials have lately been made in the Paris Hospitals of a method of effecting the above purpose more safely and directly in inflammation of the extremities, by the application of a tourniquet. There can be no doubt of the excellence of the principle, but the difficulty is to limit the effect of the compression to cutting off the supply of arterial blood.

and hard, or, in other words, frozen. She did not complain of the application, but on the contrary appeared to obtain immediate relief. The salt was washed off the face, and the saline mixture ordered to be continued.

17. The erysipelas has extended to the neck, and has returned to one side of the face and the ear. Increase of delirium and of the general febrile symptoms. The frigorific was again applied as before to the inflamed surface, and with the same immediate beneficial result. To take a laxative, and to continue the mixture.

18. The fever and delirium subsided towards the evening of yesterday. The swelling has now quite left the face, and nearly the neck.

From this period the convalescence was rapid. Little medical treatment, besides attention to diet, was deemed necessary during the remaining period of attendance.

A younger sister of this girl was attacked with erysipelas about a month afterwards, and died after a fortnight's illness. The fever was typhoid, and she gradually sunk from exhaustion. She was judiciously treated by moderate antiphlogistic remedies in the first, and by tonics and stimulants in the latter stage. My opinion was requested towards the end; but I did not think that congelation could then be of service. I now regret that it was not employed, as, without putting the patient to the least hazard, it would have removed or lessened one cause of asthenia, and diminished one source of suffering.

CASE II.—W. Mansfield, aged 47, residing at No. 1, Leicester Street, admitted a patient of the Dispensary, with erysipelas, on the 12th January, 1849. Was seen at first by the house-surgeon, who prescribed a laxative, and a saline mixture containing antimony. When I took charge of the case on the 14th, I found him labouring under the disease in its severest form. He had been very delirious during the night, and continued to be excited, and at times incoherent. The face was much swelled and distorted, and the eyes closed. He complained of a very painful sense of burning in the inflamed parts. There was much fever. I applied pounded ice and salt in a piece of thin silk gauze, to the whole of the inflamed surface, by shifting the bag from place to place, and with the effect of freezing large patches of the skin. Each application may have lasted nearly two minutes. There was a little smarting during and immediately after the congelation, but this was succeeded by complete relief. To continue the medicine already prescribed.

15th. The inflammation on the face hardly perceptible, but it has extended all round the neck, and the pain is severe. Passed a restless night, and the fever, which had subsided for about twelve hours, again rose to its former height. The frigorific was again repeated, and kept in contact with the different portions of the inflamed skin, until nearly the whole had become white and frozen. A mixture containing quinine to be substituted for the saline medicine.

16th. Little appearance of inflammation on any part of the face or neck, and no uneasiness. Slept better in the night, though occasionally incoherent.

The fever has decreased. To continue the tonic, and to take wine.

From this time, and under the same tonic remedies, he recovered rapidly.

CASE III.—Harriet Tree, aged 4 years, residing at No. 16, New Dorset Street, (next door to the residence of the girl whose case has been related) was admitted a patient of the Dispensary, with fever, on the 15th January, under the care of Mr. Smith, who obligingly transferred the case to me when the inflammation of the face had betrayed the nature of the disease.

On the 16th, inflammation was perceptible on both the cheeks and the forehead. I applied to these parts in succession a solid bit of ice, covered with salt, and which had been slightly hollowed into corresponding shape, by being held for a few seconds in contact with a jug containing hot water. The refrigeration thus produced was not sufficient to blanch the skin, though the application was made for more than a minute. A saline mixture containing antimony and hyoscyamus to be continued.

17. The inflammation has spread over the face, and the eyes are opened with difficulty. Pulse febrile; restless, and apparently in much pain. A mixture of ice and salt was applied over the inflamed surface, but with little more apparent effect than on the former occasion, owing, probably, more to the insufficient quantity of the frigorific employed, than to the violence of the inflammation. A mercurial laxative to be taken night and morning, and the fever mixture continued.

18. Much ease appeared to have been afforded by the applications of yesterday, as she slept soundly for some time afterwards, and had immediately ceased complaining. The uneasiness, however, returned

in the night, and she is now (3 P.M.) very restless, and raising her hand incessantly to her face, on which there are several vesications. The frigorific was reapplied for about a minute, and had the effect of freezing portions of the skin. After the skin had been washed, she was placed in bed, and almost immediately fell asleep.

19. Better. The face is still swelled, and the eyes shut; but there is less heat in the inflamed part, and less fever. To continue the medicines.

20. The neck now much inflamed, as well as both sides of the face, and both ears. The fever has increased. Tongue dry, with a brown fur in the centre; and the mouth appears inflamed. In the evening the frigorific was again applied, and much more effectually than on former occasions. About a pound of ice having been coarsely pulverized, (in a small canvass bag placed upon the hearth stone by means of a flat iron) and quickly mixed with about half the quantity of salt, was put into a thin silk gauze bag, and applied for upwards of a minute over the face and neck, a third or fourth portion of the surface at a time: the frigorific being renewed for the last applications, and the melting ice being absorbed by cloths placed close to the bag or net containing it. The whole surface was thus frozen, and continued hard and white for half a minute. A mixture of acetate of ammonia and soda prescribed, to be taken at intervals.

21. Much relief was given by the congelation, as on the former occasion, and the swelling of the face and neck had nearly disappeared, excepting the eyelids, which continued closed. Tongue dry, and more furred. Pulse more frequent, and much restlessness. The sensorium continues unaffected. Refuses to take food, and has evidently pain from what is forced upon her, and a difficulty of swallowing it. The breathing is not embarrassed, but there is a frequent hacking cough. To have wine and beef-tea.

22. The inflammation has not returned to the neck or face, but appears to have increased in the mouth and fauces. Tongue very foul and dry. Pulse quick and weak. Occasional incoherence. To continue the wine, and to take a mixture containing carbonate of ammonia every four hours. An opiate at bed-time.

23. Better. Tongue more moist; less restlessness; takes nourishment more willingly. A laxative prescribed.

24. Recovering. When she was at last able to open her eyes, the

conjunctiva of one was observed to be much congested ; but there was no intolerance of light, or expression of uneasiness from this cause.

It will have been remarked in perusing the details of the above cases, that the beneficial effects of congelation were immediate, and otherwise so well marked as to prevent any doubt of its efficiency. In this respect it is strikingly in contrast with the remedies hitherto employed in erysipelas. The practice of scarifying the inflamed surface, or puncturing it all over with a lancet, may frequently be of some service, notwithstanding the irritation which the wounds themselves, and their exposure to the air, must necessarily produce ; but the painting of the part with lunar caustic, and the application of warm fomentations, or cold lotions, I am disposed, from my own observation, to place, with respect to efficiency, in the same category with the old practice of the application of flour.

The absence of all injurious or untoward consequence from the congelations that were used, will also be equally obvious. The cerebral disturbance was uniformly relieved, and had the patient whose case is last related been of more advanced age, so that a solution of salt of about the temperature of zero might have been easily applied to the mouth and fauces, her disease, I have little doubt, would have had an earlier termination. A stronger application of congelation to the face, might, perhaps, have had a similar effect, by preventing the extension of the inflammation to the mucous surface.

The applications of severe cold were generally slight, and I am inclined to think that they would have been more efficacious had they been less so ; or that there might have been less necessity for repeating them. But there is, probably, no great difference, as respects the safety of the patient, between at once removing the inflammation and the susceptibility of its renewal, and checking it again and again on its approach ; unless, indeed, the disposition to spread, just adverted to, be thus prevented. Some of the applications were milder than was desirable, on account of a defect in the means employed. If ice and salt be the frigorific resorted to, it is proper, where the skin is acutely inflamed, and consequently greater frigorific power is required, to employ it in the best or most effectual manner, as on the last occasion of its being applied in the third case. The greater expenditure of material now that ice can be everywhere procured at trifling cost, and in every season, is a point of no importance.

Although congelation may have no power in shortening the period of erysipelatous fever, or preventing it running through its several stages (and it certainly did not appear to have this power in the third case related), it will obviate the danger that would arise from the accompanying external or accessible inflammation. The danger from small-pox is, *cæteris paribus*, very much in proportion to the extent and degree of the inflammation of the skin, and particularly, in the opinion of Sydenham, of the skin of the face. It is this, probably, which makes the great distinction, in respect to danger, between the distinct and confluent species; and the same principle probably applies to erysipelas. A high and extensive inflammation must (as has likewise been remarked by Sydenham) necessarily increase the febrile action in this disease, or cause, as it were, a symptomatic fever in addition to that which is specific, and tend to exhaust the animal powers:—tend, in fact, to produce or aggravate the asthenia which in erysipelas is usually the cause of death. Inflammation of other systems or organs, occurring in typhus and other fevers, must for the same reason, and independently of any consequent disorganization, materially increase the danger of these diseases; but in all such cases, whether the skin or internal organs be affected, there is, in addition, the irritation or injurious influence proceeding from the disturbance of the function of the inflamed part. It is, therefore, not only in erysipelatous fevers that congelation will be found a remedy of great importance in subduing local affections; it will probably be also very serviceable in other analogous diseases accompanied with inflammation of superficial or accessible parts. The skin, mouth, and throat, are obviously under its control; the windpipe and cerebral membranes are probably not beyond its reach. If the latter do not admit of congelation, they may have their temperature reduced to a much greater degree than has hitherto been attempted, and with great remedial advantage. The point to be aimed at is, perhaps, not so much actual congelation, as that degree of refrigeration which will *permanently* depress the nervous and vascular energies, or depress them without causing reaction. This must be far below the degree to which any application of water or ice will reduce the temperature of the part.*

* In hæmorrhage, obstinate vomiting, and other morbid conditions of the stomach, the direct application to the irritable or inflamed mucous membrane of a fluid of about the temperature of zero of

The notion that certain external inflammations are, even in the high degree in which they often exist, necessary safety valves or emunctories for the materies morbi, or are otherwise essential to the patient's safety, is now, happily, nearly exploded. Physicians have become well aware that hypothesis or ill-founded theory, has formed the grand impediment to the progress of the art of healing; and in no instance has the superiority of observation to theory been more remarkable than in the modern treatment of erysipelas. Amongst other means of subduing the external inflammation, cold applications are now generally recommended; and in this improvement there is only a return to the practice of Celsus and of his successors for many ages. In confirmation of the downfall of the doctrine of metastasis from cold. the published lectures on the practice of physic of two distinguished professors in the colleges of the London University, and the lectures of the present occupants of the chairs of surgery in the medical schools of St. Bartholomew's Hospital and University College, may be referred to. "There is no hazard," says Dr. Watson, speaking of the use of cold in erysipelas, "such as you may read of, of the inflammation being repelled from the surface and driven in upon some vital organ." But, even granting that cold, as it has hitherto been usually applied, is dangerous in certain specific inflammations from its tendency to cause metastasis (and there is little authority in favour of its use in rheumatism or gout), it must be especially borne in mind that there is a wide difference between congelation and such applications of cold. At first it might appear that they differ only in degree, and that congelation being a greater cold than these, is therefore more dangerous; but in truth, it is much less a cooling application. If a physician wished to heat the limb of a patient, he would surely keep it immersed for half an hour in warm water, in preference to applying a red-hot iron for a few seconds to the skin; and he would

Fahrenheit, would be most beneficial. In a case of severe vomiting, symptomatic of dyspepsia, I administered dessert spoonfuls of a mixture of finely pounded ice and a small proportion of salt, with excellent effect—the patient swallowing the mixture before it had dissolved in the mouth. The common mode of using ice in dyspeptic affections is in reality only using cold water. There are also certain inflammatory or hæmorrhagic conditions of the large intestine in which a severe and benumbing cold would probably be more advantageous than any other means at present in use.

in cooling a limb make a similar distinction between continued cold and momentary freezing. Dangerous as plunging a limb affected with gout into cold water, according to Harvey's plan, may be, the same objection would not apply to the exactly limited and short application of congelation to the affected part; and the same observation would apply to the treatment of many varieties of rheumatism. Analogy, on the contrary, would point out such a remedy as one likely to be eminently useful in these complaints, in allaying suffering and preventing the disorganization of joints, while appropriate medicines were simultaneously exhibited as antidotes to, or evacuants of, the supposed *materies morbi*.*

The resemblance between erysipelas and the exanthemata or eruptive fevers, may have led to the unfounded fear of metastasis from cold; but although there are resemblances between these diseases, there are great differences as well: the frequency with which the same individual may be attacked by erysipelas is one of these, and the irregularity of the course of the disease (supposing that there is

* The injurious effect produced by plunging a gouty limb into cold water, may be owing to the sudden increase of blood in other parts of the system, in consequence of its repulsion from the part that is cooled; or the sudden shock may itself prove pernicious. It can hardly be that a small joint, such, for instance, as that of the great toe, can prove a safety valve or excretory organ for the poison in the blood. The reason why the joint of the great toe is more frequently affected than any other, is not because it possesses any peculiar excretory apparatus, but simply because, in consequence of constant pressure of the body on it in standing or walking, it is irritated and predisposed to disease. What is called metastasis in gout and other diseases, may be generally explained on the principle of counter-irritation. A fresh and more violent attack of a new part, necessarily removes, or very much lessens the morbid action previously existing in other parts, just as the high action of a blister relieves inflammation in its vicinity. If the articular inflammations in gout could be safely removed as they occur, the paroxysms would much sooner cease, and the intervals of ease would be longer; the parts not being weakened by lengthened disease, and so predisposed to fresh attacks. On three different occasions during my recent attendance on a case of gout (W—— L——, 35, Guildford Street, a patient of the Dispensary), immediate relief was given from severe torture, by congealing inflamed parts, of very limited extent, on the upper side of the first joint of the fore-finger, over the olecranon, and in the calf of the leg. Comparative ease with sleep were thus procured. He was under a course of appropriate medicines and regimen at the same time.

only one kind of erysipelatous fever) is another. I believe that much more importance is attributed to the cutaneous eruption in diseases of this class than there ought to be. If poison is to be eliminated, there are other emunctories for this purpose besides the skin. As there is frequently scarlatina without eruption, so probably, measles and the fever of erysipelas may exist without it. Nay, considering that cases of small-pox occasionally occur with scarcely a dozen pustules spread over the skin, it is not very improbable that even this disease (as was, indeed, the opinion of Sydenham) may likewise run its course, and the system be purged of its poison, without observable cutaneous affection. In the fever caused by vaccination there is no eruption of pustules; yet, if there be poison evacuated in the natural small-pox, it can scarcely be doubted that an analogous process takes place in cow-pox, which is only a modification of it. The immunity which many persons appear to possess from the contagions of the several exanthemata would thus readily admit of explanation; and more effort might be made (were this point established) to endeavour that the disease should run a milder or safer course, instead of "forcing the eruption out," or causing extensive and assuredly dangerous inflammation of the skin, and suspension or derangement of its important functions.

The necessity of repeating the congelations in the cases narrated above, may have been partly owing to the insufficient degree of many of the applications, and partly to the still existing cause of the inflammation—the exanthematous fever. While the cause of inflammation continues active, a great change indeed would be required in the organization or function of the part to prevent its return. I do not say that this cannot be effected by congelation, but when the application can be so easily repeated, with so little annoyance to the patient, such a change does not appear very important.* When congelation has been used to arrest the inflammation and suffering which arise

* In two cases of severe erysipelas of the leg, one from leech bites in an unhealthy constitution, and the other from accidental abrasion of the skin, instead of keeping the skin frozen for any time, I kept it for about a quarter of an hour at a temperature just above the degree required to freeze it, by shifting the silk net containing the frigorific from place to place, immediately on the appearance of the whitening of the surface. The slight smarting from complete congelation was thus avoided; and the beneficial effect was as decided as could be wished.

from mercurial ptyalism (and no remedy of this distressing state is comparable to congelation in efficacy and celerity of action) it has been usually necessary to repeat the application after an interval, on account of the persistence of the cause ; and as the application of the frigorific immediately benumbs, the patient has never objected to its repetition. In suppurating boils, carbuncles, and glandular swellings, when congelation has been used to put a stop to the suffering of the patient and procure sleep, it has been seldom necessary to repeat the application, notwithstanding the persistence of the cause, probably on account of the inflammation being thereby much subdued ; and the formation of pus being rendered much slower, the parts are more easily adapted to it—the fibres have become not only less sensitive, but they are less stretched. In some instances the matter appeared to have been absorbed, as the swelling gradually disappeared without breach of substance. It would generally, however, be a better practice in these cases, seeing that after a momentary congelation the abscess can be opened without pain, at once to liberate the purulent deposit and relieve the distended fibres by a free incision.

ON COLD

AS A MEANS OF PRODUCING LOCAL ANÆSTHESIA IN SURGICAL OPERATIONS, AND CERTAIN PAINFUL DISEASES.

From "The Lancet," Sept. 9th, 1848.

In the LANCET of the 22nd ult., I published some remarks on the production of partial insensibility, as a substitute for the general insensibility caused by ether or chloroform. The present paper, a continuation of these remarks, is intended, by communicating the results of future experiments and observations, to facilitate the general application of the local anæsthetic which I have recommended.

The old problem respecting the production of anæsthesia for medical purposes, to which the reputed feats of mesmerism have again drawn the attention of inquirers, 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 anæsthesia.

If the first thing required—the mere prevention of pain—were all that was necessary, there would be no difficulty of solving the problem. The body may be rendered insensible to pain by a great variety of methods. About twenty years ago, it was actually proposed by a writer on surgery of some eminence, that patients about to undergo painful surgical operations should be previously bled to syncope, 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. This was exceedingly bold; but if the avoidance of danger were to form no part of the problem, a more expeditious plan might have been resorted to. Had the patient been knocked down, the operation might have been completed before the stunning effect of the blow had ceased!

Apoplectic congestion of the brain 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 all possible methods of causing insensibility, but all so dangerous, uncertain, or otherwise objectionable, that medical men have generally been unwilling to use them. Amputation, however, has (as we are informed by Mr. Lawrence, in a paper in the *Medical Gazette*) been performed apparently without pain, while the patient was drunk; and I have myself witnessed what is usually a painful operation performed without pain during a fit of epilepsy arising from natural causes.

The inhalation of ether or chloroform is another method of producing insensibility, though probably not materially differing in principle from the exhibition of alcohol or opium. Does, or does not, this new anæsthetic belong to the same category in respect to danger as those just enumerated? The question must be answered in the affirmative. Etherization is undoubtedly of the same character; if it differs from the above in respect to danger, it is only in degree. It certainly is not so objectionable as some of them on this account, but it is still, as a common application, or when used indiscriminately, very objectionable. Many well-authenticated cases of *sudden* death from these agents have been published. Five or six fatal results, from the use of chloroform alone, have happened in the hands of English practitioners.*

* The fatal results in France have attracted the attention of the government of that country. In accordance with a requisition of the Minister, the question of the propriety of using chloroform was lately discussed at a series of meetings of the Academy of Sciences, and certain resolutions or conclusions favourable to it, were, after much opposition, passed by a majority of the academicians. Unfortunately as respects the influence or character of these resolutions in this country, the very same number of the English medical journal which published the Academy's report, contained also accounts of two more deaths from chloroform; one occurring in a large French hospital, and the other at Westminster. The coroner's jury who investigated the latter case, returned a verdict singularly contradictory to the recent decision of the French Academy, for they declared that the death occurred from chloroform "properly exhibited!" The attributing the deaths that have occurred from the use of chloroform, to errors in the mode of administering it, or, in other words, to the difficulty of admi-

The opponents of etherization are not satisfied that the fatal results published constitute the whole amount of mischief. They presume that a much greater number, both of sudden and eventual deaths from this cause, have not been published. They ask, "What practitioner is unacquainted with cases of violent disorder from chloroform, which have terminated, or may eventually terminate, in deaths, of which the coroner takes no cognizance?" And they declare it to be surprising that so many deaths from chloroform should have become generally known, considering how rarely, for obvious reasons, the fatal consequences of the use of other powerful medicinal agents are published.

The danger to the patient, from the effects of these agents on his system, is not the only objection which has been made to them. With the loss of his consciousness, he loses the power of guiding and aiding the surgeon under very important circumstances. He cannot, in this condition, prevent the surgeon's enclosing a nerve in the ligature which he places round an artery, or his seizing a fold of the bladder with the forceps, in searching for a stone. He cannot assume certain suitable postures at the bidding of the surgeon; and when convulsive movements are caused by the anæsthetic, (as is frequently the case,) the surgeon is obliged to proceed under great difficulties, or to suspend the operation until the anæsthesia shall have passed away.

With these opinions of the operation of this new anæsthetic agent, it is not surprising that its opponents should speak of it in no very measured terms. Etherization has been called "a compound of apoplexy and asphyxia;" and it has been denounced as a practice condemned not only by our knowledge of the effects of analogous substances, and by experiments on the lower animals, but by its numerous fatal results.

Those, on the other hand, who approve of etherization, attribute the mischief it has done more to a want of discrimination of the suitable cases on the part of the practitioners who used it, and to an improper mode of administering it, than to any inherent dangerous property. They acknowledge that there are many cases of disease of the heart and other organs in which it would be highly improper to

nistering it with safety, and not to any inherent poisonous quality of the substance, is, even granting the correctness of the explanation, hardly an answer to the objection, that its inhalation is an expedient, whose danger is not, in many cases, compensated by its advantage.

use ether or chloroform; and they contend that as much care is required in its administration as in that of other powerful medicines. Yet few, I think, would now, as in the first burst of their admiration, be willing to rank etherization as the leading medical discovery of the age, and to pronounce it the equal of vaccination in importance.

Without attempting to decide which of the extreme opinions advanced on this question approaches the nearest to the truth, it must, I think, be admitted that the problem, how to obviate pain without incurring danger, has not been solved by the discovery of etherization. It is undeniably attended with very considerable danger, both from its immediate or eventual effects on the system, and from the patient's loss of consciousness while under its influence.

The method which I have recommended for producing anæsthesia may not perhaps be found so effectual as ether or chloroform in removing the whole of the sensibility; but if it should remove so much of this as to render surgical operations tolerable, and consequently less dreadful, and prevent that portion of hazard attending them which proceeds from excessive pain, without adding any new hazard of its own, it would be entitled to a preference. The most strenuous advocates of etherization would not object to its use in cases in which, from some constitutional peculiarity, this condition cannot be produced, or where severe organic disease forbids the attempt at its production; while those, on the other hand, who think that ether and chloroform should be banished from surgery, would not, it may be presumed, hesitate about the substitution of an anæsthetic agent which, with the greater part of the advantages of these, has none of their dangers or defects.

The imperfection of this plan, in its only partially preventing the pain in some cases, is, when compared with ether or chloroform, more than compensated by its not affecting the consciousness, the loss of which, under the use of the anæsthetic agents at present employed, would be deemed a greater evil by many patients than the pain which these agents are capable of preventing.

In the month of November last, I suggested the substitution of local anæsthetic agents for the inhalation of ether. This idea has since been taken up by Professor Simpson, of Edinburgh, and Mr. Nunneley, of Leeds, who have both published the results of their experiments.

It happens, rather singularly, that the agent (chloroform) which one of these gentlemen pronounces to be anæsthetic when applied to the eye, should be declared by the other to be an irritant and heightener of the sensibility when so used. It is not difficult, however, to explain this seeming contradiction. As a general principle, it is probably true, that whatever highly stimulates the surface to which it is applied, will eventually, and in consequence of this stimulus, reduce to a certain degree its sensibility; but one would not have expected more from such applications than the very limited and practically useless effect which was produced in their experiments.

The more certain and effectual local anæsthetic which we possess in the application of cold has been generally described in my preceding paper. We have all had experience of this anæsthetic, to a certain extent, in frosty weather; and its artificial production in no wise differs from this natural agency, except in degree and the power we have of controlling it. Every minor degree of cold has probably a proportionate effect in diminishing sensibility, but a certain degree is requisite to render the anæsthesia complete. Fortunately, this is not below that point which may be applied with perfect safety,—for, as every one knows, very low degrees of temperature act injuriously on the animal structure, as well as very high degrees.

The degree and continuance of cold necessary to produce anæsthesia, will be in an inverse proportion to the heat of the part to which it is applied, or rather to its power of generating or transmitting heat. In the natural state, a temperature of the freezing point of the thermometer would in most cases be insufficient, unless of long continuance; but it would be otherwise if the circulation of blood in the part were very languid or obstructed. A temperature ranging between 5° and 25° Fah^t (which can be easily procured by the common frigorific mixture of pounded ice and salt,) will produce complete anæsthesia of the skin in two or three minutes. The sudden application of this degree of cold causes a slight tingling or smarting, but not any very unpleasant sensation of cold. It will be proper, however, not to depend upon the period elapsed, but to examine the skin from time to time, in order that the refrigeration may not be carried to an unnecessary extent. A degree or continuance of cold that, under natural circumstances, and without pressure, would solidify the adipose secretion under the skin, will generally be found greater than is required,

and ought not, therefore, to be produced.* Whether the several tissues require different degrees of cold to produce anæsthesia of them respectively—whether a short continuance of severe cold is more or less anæsthetic and useful than a minor and more prolonged degree—and whether the application of more than one degree might not be advisable in producing deep or extensive anæsthesia, are points remaining to be determined; but any uncertainty about these need not impede the immediate substitution, in many cases, of this anæsthetic expedient for the present dangerous process.

The anæsthesia of the skin, produced in the manner described, lasts for several minutes, and the only other consequence of the cold, is a slight and quickly evanescent blush.

In my former paper I described the mode of applying the frigorific mixture by means of a thin, or prepared bladder. It may be applied directly to the skin by means of a common wine or beer glass, containing such a quantity of ice and salt in their dissolving state, as will ensure a continuance of a sufficiently low temperature; but, in order that the skin may be examined from time to time, it is more convenient that the vessel containing the mixture should, like the shade or glass chimney of a lamp, be open at both ends; or that it should be removable by having a bottom, consisting of gauze or thin membrane. Cold may be applied to the whole circumference of a limb, by dipping it into the mixture, after covering the part which is not to be refrigerated; or the limb may have a sort of funnel slipped upon it, of a size or depth proportional to the surface intended to be rendered insensible. Other contrivances, suitable for particular purposes, will be obvious to every surgeon; nor will a variety of means of combining pressure with the cold be of more difficult attainment.

I am sorry that I cannot yet speak with certainty of the depth to which anæsthesia from cold can, when conjoined with pressure, be carried. The dissecting off a small portion of the skin without pain, (an operation which I have repeatedly performed, and which is by far the best mode of forming an issue,) shows that the anæsthesia of the skin, the most sensible of the animal tissues, is complete; and if the

* I have, latterly, instead of merely benumbing the part, generally employed cold, so as to produce congelation; under the idea that the effect may be thus rendered more complete, and that the trifling additional smarting so produced is undeserving of attention.

skin were deprived of its sensibility, there are few operations that would not lose half their terrors. It must not be forgotten likewise, that in some operations there would, as in the unconsciousness attending general anæsthesia already adverted to, be a disadvantage in producing complete anæsthesia of all the tissues concerned. Is the safety of the patient to be hazarded in these cases, in order that he may be relieved from a slight and very tolerable degree of pain?*

Before concluding these remarks, I may mention that the surgeon would do well, before employing it in operations, to make himself familiar with the effect of cold, by applying it, in the manner described, to his own arm. He will thus best learn how to regulate the degree and be immediately convinced of the essential difference that exists between such moderate and brief applications of cold, and those effects of it which happen from exposure of the body in high latitudes, or severe winters.

With the same view, his first employment of it may be in the minor operations. A French writer mentions, that he does not hesitate to employ chloroform to obviate the pain that would be caused by cauterization, or the application of the moxa; and there are many other similar operations in which we should be glad to save our patients from suffering, if this could be done without hazard.†

* In the deeper incisions of the common operation for stone, there could be no advantage from congelation; but it is to be hoped that this dangerous expedient will, ere long, be quite superseded. In the operation of lithectasy which I have recommended as its substitute, the small incision required to open a passage into the membranous part of the urethra, would be rendered painless by cold; and the subsequent opening of the neck of the bladder by the slow and continuous action of a fluid pressure dilator, is attended with little uneasiness. The operation of lithotrity (which, as I have shewn in the appendix to the second edition of my Treatise on Strictures of the Urethra, is only a modification of lithectasy, and originated from it,) has its own considerable risk enhanced by the use of chloroform, in addition to the inherent dangers of this mode of producing insensibility.

† Opening abscesses, formation of setons, removal of hæmorrhoids, scarification, and venesection, are examples of such minor operations. There are few diseases in which bleeding is required where the inhalation of ether, chloroform, or other intoxicating gases would be safe; and though the avoidance of so trifling a degree of pain as that caused by venesection can be generally of little consequence, it is sometimes otherwise in timorous or nervous subjects; where the operator is not expert, or the instrument he uses is not sharp; or where it may be

In the same work which contains the original suggestion of cold as an anæsthetic in surgical operations, it was proposed to employ it as a remedy in neuralgia. The unequivocal advantage I have derived from its use in one case, corroborates the opinion I had formed, and induces me to think that its influence would be deeper, and its effects more permanent, than the action of aconite and the other narcotics. If a finger be immersed for a little while in a frigorific mixture, a deep-seated numbness will be produced, and will continue in some degree for many days afterwards.

A degree of cold below the freezing point of water is, I believe, a new agent in therapeutics, which could, probably, be usefully employed for various other important purposes. A solution of salt, of a very low temperature, by acting on the exposed nerve, might at once, and permanently, remove toothach; and a frigorific mixture, contained in a bladder, or other waterproof case, would probably be a powerful means of checking hæmorrhage in accessible internal parts, or during surgical operations. The same principle might also be usefully applied in the treatment of cutaneous and other superficial diseases attended with distressing sensations. A minor degree of cold when long and uniformly continued by means of the current apparatus, I have found an efficient remedy in many such cases, but greater degrees of cold, carefully applied, might, under certain circumstances, prove successful, when a higher temperature would fail.

The two preceding articles contain an account of some of the remedial uses of congelation. A few brief remarks may be added to this paper upon the other applications of severe cold suggested in its last paragraph, and in the order in which they are there mentioned.

I have had few opportunities of employing congelation in facial neuralgia. One has been mentioned, in the remarks upon the first case of headach related. The subsequent history of that case is, that, although the pain did return next day at the usual hour, it was deemed

necessary, from the depth or small size of the vein, to cut down upon it with the shoulder of the lancet before opening it. In bleeding, the congelation may be conveniently effected by dipping a small bit of ice into salt, and pressing it a few seconds on the vein. If the incision be not quickly made, the feeling of the vein soon returns, in consequence of the blood re-entering it, but the skin above it continues insensible several minutes. In this manner a surgeon might, with a steady hand, perform venesection on himself.

unnecessary to have recourse again to the local application ; the pain was much less severe, and the cure was completed by the administration of large doses of quinine. I have used congelation in several cases of pleurodyne or obstinate pain of the side ; in some with much success, in others with only temporary relief. An illustration of the former is furnished by the following report from my Dispensary case-book. F— H——, aged 35 years, 17, Regent Street ; February, 1849 ; has been for fifteen years afflicted with pain of the left side, about the middle of the seventh and eighth ribs. It is seldom absent, and has often, by its severity, rendered her unfit for her duties as a servant. Every remedy which she has tried under various medical practitioners, has been of little or no service.

Congelation was applied twice, with an interval of a week, and for about eight minutes on each occasion. The second application entirely removed the pain ; and there had been no return of it when I saw the patient a month afterwards.

The pain in this case arose, probably, from local affection of the intercostal nerve, as it was increased by pressure between the ribs. In other cases of thoracic or abdominal neuralgia, the source of pain may be irritative or inflammatory disease of the spinal cord, and would (as well as many other affections arising from such disease) probably be relieved by congelation applied directly to the spine.

In the cases of toothach in which this remedy has been employed, it has, with one exception, given immediate and (so far as I have been able to ascertain) permanent relief. The exception was a case where the curious hole in the tooth appeared to be too small readily to admit the frigorific. Had this remained longer in contact with the tooth, the cold would probably have sufficiently penetrated its substance to prove effectual. A dentist informs me that he has applied congelation successfully, by means of a tube of gutta percha, to an aching tooth which had no opening in it. There appears, however, no occasion for such nicety in this application. A few tea-spoonfuls of finely pounded ice and salt may be placed in succession upon the diseased tooth. There is little or no pain produced, the nerves being immediately benumbed.

No case of hæmorrhage has occurred to me in which the use of this agent would have been appropriate. A simple mode of application like that just described, would probably answer very well in hæmorrhage. There is an advantage, from its preventing bleeding, when congelation is used to produce insensibility in surgical operations.

The cutaneous diseases "attended with distressing symptoms" in which congelation has been chiefly used, are prurigo and impetigo; and in no diseases has its remedial action been more certain and speedy, The severe itching attending prurigo, and the difficulty hitherto of curing it, are sufficient reasons for authorizing Dr. Elliotson's terming it "a most dreadful disease;" "the intense suffering from which (he mentions) sometimes causes imbecility of mind."

The three following histories of this disease, occurring in Dispensary patients, will illustrate its treatment by congelation.

Mrs. W——, 5, Blackman Street, was in attendance at the Dispensary in November last for another affection, when she was attacked with prurigo pudendi. For the greater part of several successive nights, she had been obliged, by the intolerable itching, to rise from bed and walk about the room. After the ineffectual use of a prussic acid lotion and other measures, congelation was applied, by placing a rounded piece of ice, covered with salt, between the labia. It was dipped twice in the salt, and retained in contact with the diseased part about a minute, during half of which time, probably, the surface was congealed. A considerable smarting succeeded the application, and continued for an hour. There was much relief from the itching, but as it was not quite gone two days afterwards, the congelation was repeated, and with the effect of entirely removing the disease.

M—A—P——, aged 34, 11, Great Russell Street; March 20th. Severe itching at the extremity of the rectum. The disease of nearly five years' duration, but much aggravated of late. The itching is most severe at bed-time, and generally interrupts her sleep. Congelation was applied for upwards of a minute; and at once removed the disease. The part continued tender for some days, but there had been not the least return of itching when I saw the patient three weeks afterwards.

E—P——, aged 21, Belmont Place, had had patches of large white pimples scattered over her back for upwards of three years. They were attended with distressing itching, particularly when she was in bed. Congelation was used for very short periods in the first instance, as a large surface was to be acted upon; but failing to produce much relief, it was applied on subsequent occasions, over small spaces for five minutes at a time. The longer congelation proved effectual wherever it was employed. She had been under a course of alterative medicines, including mercury and sarsaparilla without any benefit.

Minor degrees of cold have often before been used in prurigo, but they have only acted as palliatives.

The distress attending some cases of impetigo is not much less than what is caused by prurigo, and is almost as quickly removed by congelation. I have had many opportunities of using it in the latter disease, but a succinct report of one will be sufficient. This case, after the unsuccessful use of the usual remedies, was obligingly transferred to me by one of the surgeons of the Dispensary. The impetiginous eruption covered the greater part of both hands, and had (the patient assured me) nearly deprived her of sleep, from an incessant burning and itching, during several successive nights. This suffering was much relieved by congelation; and one repetition of it removed it entirely. To prevent any reaction, and the smarting that sometimes follows congelation, the patient continued pouring cold water upon her hands for about a quarter of an hour after each application. In the course of my professional life I have not heard a stronger expression of gratitude than from this poor woman, on the cessation of her suffering, and her being able to resume her usual occupation. Congelation has been used in many other kinds of chronic skin disease with much advantage. But when the disease has spread over a large surface, it is rarely that it can be beneficially substituted for other remedies, excepting in spots where the morbid action proves most obstinate, or where, as in eruptions on the face, it is desirable that it should be speedily removed, and without leaving any permanent mark or disfigurement. I have now under my care a case of syphilitic eruption on the forehead, in which congelation has proved of great advantage in arresting the progress of the local affection, while the constitutional remedies are effecting their sure but slow operation.

In many diseases of this class, the arresting of the existing inflammatory action, and the removal of the morbid sensibility, are not enough. There is wanted besides, a support to the weakened, and probably distended vessels; and this support is best afforded by the expedient which I have devised for combining perfectly equal pressure, with an uniform and appropriate temperature. I have already published cases of eczema so treated, in the work describing that apparatus; and the same principle, or combination of principles, is applicable with equal advantage to the treatment of the greater number of the varieties of ulcer. But, in curing these, it is sometimes of importance that the patient should be enabled to walk as soon as possible; and in two cases of this description, I have found congelation of much use in

at once removing the morbid sensibility, so as to permit the immediate application of Baynton's mode of treatment. The excessive sensibility in some kinds of ophthalmia may, in the same way, be relieved by congealing the eye-lid; and even the pain attending many cancers, will probably be assuaged by this potent remedy; while, by arresting from time to time, the morbid action in scirrhus tumours, it may produce other and more important beneficial effects.

Before concluding these observations on the remedial uses of congelation, it may be useful to advert to the time during which it ought to be maintained by continuing the application of the frigorific; and also to the most convenient mode of reducing temperature to the benumbing or congealing degree.

The period of congelation must, of course, to be appropriate, differ in almost every case, and be dependant on the disease and a variety of other circumstances; and the extent to which congelation can be carried with safety, is also equally variable.

When a part of the body has been congealed, (which, where there is no inflammation, can be effected by the common freezing mixture directly applied in about half a minute) a degree of redness or congestion continues for a few hours or days afterwards, according to the duration of the freezing, and other circumstances. In the treatment of thoracic neuralgic affections, I have kept up the congelation for ten minutes; and, probably, were there necessity for the proceeding, it could be longer maintained without injury; but I should be unwilling to apply it half so long to parts weakened by disease, or where the circulation of blood is not vigorous. When, by retaining the frigorific in contact with the skin, the congelation has continued for the time mentioned, about the same time elapses, after its removal, before the part has entirely thawed, or its vessels are again permeated by blood.

Ice, which forms the usual basis of freezing mixtures, is preserved for a long time by wrapping it in several folds of flannel; and a small lump, sufficient for one application, may be conveniently carried in a waterproof bag, or a handkerchief. When ice cannot be procured in its natural state, a small quantity could, on an emergency, be easily made, at no great expence, by means of frigorific materials to be found in every chemist's shop; and very little will be sufficient for most external purposes, provided it be economically used. The vessel

or net containing the frigorific ought to be frequently raised or shaken, to stir the mixture, and thus preserve its continuous solution; while means may be taken to facilitate the congelation by stopping or retarding the circulation of blood in the part. Direct pressure can sometimes be made upon it, by a thin metallic vessel of appropriate shape, containing the frigorific; or the same effect may be produced, by the application of a tourniquet, by position, or by measures calculated to enfeeble the heart's action. Recourse must be had to some of these adjuvant means, under every circumstance, when congelation of the deeper parts is desired.

ERRATA.

Page 16, line 17, for "remedied," read remedial.

Page 28, line 13, for "drughter," read daughter.

Page 42, line 5, for "future," read further.

Page 50, line 26, for "curious," read carious.