On indigestion : its pathology and treatment by the local application of uniform and continuous heat and moisture : with an account of an improved mode of applying heat or cold in irritative and inflammatory diseases / by James Arnott.

ARNOTT
ON
INDIGESTION

With the Author's best regards.

ON

INDIGESTION:

ITS PATHOLOGY; AND TREATMENT

BY THE

LOCAL APPLICATION OF UNIFORM AND CONTINUOUS

HEAT AND MOISTURE.

WITH AN

ACCOUNT OF AN IMPROVED MODE OF APPLYING HEAT OR COLD IN IRRITATIVE AND INFLAMMATORY DISEASES.

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LONDON:

JOHN CHURCHILL, PRINCES STREET, SOHO.

BRIGHTON: H. S. KING, 1, NORTH STREET, & 44, EAST STREET.

1847.

BRIGHTON:
PRINTED BY J. FRANCIS, CHARLES STREET, ST. JAMES'S STREET.

PREFACE.

THOUGH a powerful remedial agency is possessed by local or partial applications of both Heat and Cold, they have hitherto been of comparatively little avail in the treatment of disease. Like the power of steam, before modern invention had controlled it, the virtues of these agents, except in some rare instances, have been wasted or misapplied. They are in the situation in which mercury and opium, or any other powerful medicine, would be, if we had no means of apportioning their doses to the exigencies of the case, but were obliged to leave the quantity to be administered entirely to chance. There have hitherto existed no means of regulating the degree of Heat and Cold, in their continuous application; and the consequence has been, that while acknowledging their efficacy when they *chance* to be properly used, many prac-

titioners have ceased employing them in an efficient manner, because of this uncertainty, and because of the injury which has so often been the result of their improper application.

It is a principal purpose of this publication to show that the dose of temperature (if the expression may be used) can be regulated with precision; and I conceive that the means which I have described for accomplishing this, will be as great an addition to the art of healing, with respect to one remedial measure of great power and excellence, as the invention of the steelyard, or other means of determining the quantity of substances, would have been with respect to either of the medicines mentioned, were it possible to conceive that its medical virtues could have been known before the art of weighing it, or otherwise apportioning its dose had been invented. For, excepting bloodletting, there is no remedy of greater efficacy amongst the measures directed against vascular excitement, than Heat and Cold, if their action be under perfect control; and the means which have accomplished this, have raised these agents from a very humble grade amongst auxiliary measures, to rank with remedies of the first class—with the lancet, mercury, antimony, and opium.

Having thus obtained possession of what, from so

great an alteration in its qualities, may be termed a new remedy, I have employed it extensively, because I found that it supplied a great desideratum in therapeutics, viz.: an expedient having sufficient power to reduce vascular excitement without the hazardous effect of debilitating the general system, or causing local irritation—an antiphlogistic measure, characterized as much by its safety as by its power. I have applied heat, combined with moisture, in irritative and inflammatory affections of the great cavities; and cold, combined generally with fluid pressure, in diseases of the skin, and of the joints, in ulcers and in external inflammations. But the disease in which I have principally used the former application, is Indigestion. It is the most common of all the affections to which this expedient is applicable, and stood more in need of improvement in its treatment. Being, moreover, the least under the remedial influence of other measures, the efficacy of heat and moisture in curing it has been more unequivocal than in other diseases of the same class. And I have confined myself on the present occasion almost exclusively to the consideration of indigestion, from the idea, that, if the practitioner become familiar with the proper use of the means which I have recommended, in a disease of such frequent occurrence, and respecting the cure of which he must

be daily conscious of the present insufficiency of his art, he will be prepared to extend its use to other analogous affections. He will not, as respects its employment in dyspepsia, find any opposition on the part of his patient on account of the nature of the remedy, for none can give the patient less trouble or be more agreeable to his feelings; nor will he be impeded, by the use of this external application, in the employment of whatever internal remedies may be required, either for the disease of the stomach itself, or for any of the numerous sympathetic affections which arise from it.

I have not deemed it necessary to increase the size of the volume, by giving the details of cases of dyspepsia in which I have employed this remedy. For, every practitioner in medicine is acquainted with the virtues of the application of heat and moisture in irritative and inflammatory diseases, to which class most will now acknowledge that indigestion belongs, at least in the great majority of cases; and he knows, also, that these agents have often been applied, with a certain degree of advantage, in diseases of the stomach. Now, if it be clearly explained, that by the application of a means which I have termed the Current Apparatus, their virtues can be increased ten-fold, while the hazards attending former means are obviated, nothing more

can be required. In my recent publication, "On the present state of Therapeutical Enquiry," I have explained why detailed reports of cases occurring in private practice, must always prove unsatisfactory; and, though I have been connected, for some years, with a public institution affording great opportunities of observation, as respects this disease, it does not furnish the several requisites for drawing up medical reports, which I have mentioned as essential to their utility.*

Though well aware of the extreme difficulty of introducing any medical improvement into general practice—even such a one as vaccination, which, but for the untiring energy of Jenner during a period of twenty years, might have fallen into oblivion—I was not prepared for the fact, that what I regarded as so obvious an improvement on former means, should have made so little progress in the course of the five years which have elapsed since its publication. I conceived, that, in hospitals, at least, where it is an important object, not only to remove inflammation, but to prevent its occurrence after operations, wounds, and other acci-

* The late Dr. Todd, a physician of deservedly high reputation, was connected with the same Institution at Brighton, when he wrote the elaborate and able article, "Indigestion," in the Cyclopedia of Practical Medicine.

dents, the means I had recommended would be speedily brought into use; and though the delay may have proceeded from the reluctance that has always been exhibited in the adoption of any instrument or apparatus which has the appearance of complexity, or the use of which cannot be learned without a little trouble—of which the stethoscope and auscultation form a notable example—I am willing to attribute it, to my having failed in properly describing the measure, in my original brief communication on the subject.*

My first announcement of this improvement was

* The late rapid introduction of etherization, as a preventive of pain in surgical operations, is hardly an exception to the above statement. If the matter be investigated, it will appear, that, amongst other peculiarities attending the introduction of this invention, there was the exertion of a little "pressure from without;" and that patients, quite as much as practitioners, had credit from its speedy adoption. For what patient obliged to undergo a painful operation, would not have insisted upon the employment of such a measure, had he received tolerable evidence of its utility? And what evidence could be more certain, or more easily obtained?

Unfortunately, etherization is a good not unmixed with evil. That it is often injurious, and has sometimes proved fatal, is unquestionable; and it is much to be desired that a safer plan could be substituted. Is there nothing that will effect the same valuable purpose by local action, or without so seriously involving the whole system? Where the incision of the skin is the principal source of pain, would not the benumbing application of aconitine be of advantage? Or, now that, by means of the current apparatus, we have a perfect control over the application of cold, and can gradually lessen, and as gradually restore the temperature of a part, so as to avoid excitement from re-action, might not the well-known benumbing effect of cold be often turned to similar account?

Would cold thus applied be of advantage in certain cases of tic douloureux?

premature; the Apparatus was then comparatively in an imperfect state, and I could not speak of its superiority to other measures, with that confidence which more experience in its use would have enabled me to do; but I had already had sufficient evidence of its value, and I was desirous of establishing by publication my right to its invention. I had not forgotten the seizure, many years before, by a French Surgeon, of the improvements which I had published, and partly contributed, in the treatment of contracted canals; nor the care with which MM. Le Roy and Civiale, the reputed inventors of Lithotrity, had, in their several publications, avoided any allusion to my previous labours in the same field. And I well knew how exceedingly difficult, if not impossible, it is, when once an improvement has been thus appropriated, to have the property restored.*

* Although a leading English medical review (*British and Foreign Medical Review*, April, 1842,) has declared that the improvements alluded, to were "shamefully pirated by M. Ducamp,"—of which my work on the Urethra contains conclusive evidence—I very much doubt whether the case containing the instruments, which he said he had invented, is not still conspicuously exhibited in the Ecole de Medicine in Paris, as a trophy of French Surgery. And, although a writer in the same review has, on another occasion, (October, 1841,) stated that "the entire subject of lithotrity took its origin from Ducamp, who in his turn derived his ideas from the literature of England, particularly from the two publications of Dr. James Arnott," M. Le Roy, the friend and associate of M. Ducamp, has never yet thought proper to explain how it

Previously to entering upon the subject of dyspepsia, I have explained, at some length, and in a preliminary Section, the nature of the remedy recommended in its treatment; and though some of the disquisitions in this part of the work may appear rather foreign to its subject, their importance will be an apology for their insertion. It is very necessary that the practitioner should be made acquainted with the character of the means in which he at present con-

happened, that in his work, professing to give a reference to every attempt that had been made to extract stone from the bladder without cutting, no allusion was made to the operation of the kind, at which I had myself, a little while before, assisted, and an account of which, as I have likewise shown in my work on the Urethra, was in the hands of M. Ducamp. This operation was the first in modern times by which stone had been extracted without cutting, and the publication of it immediately preceded the introduction of Lithotrity into France.

As far as general interests are concerned, the appropriation of these improvements was, perhaps, useful. The unfinished work was taken up by fresh and, unquestionably, ingenious hands; and the hope of securing all the credit of the improvement must have been a powerful stimulus to exertion. But the work was unfinished, not from my abandonment of it, as a matter in which I could make no farther progress, but from the want of the opportunity of advancing. Having been appointed superintendent of the Medical Establishment at St. Helena, I was deprived, by my residence abroad, of the means of prosecuting the enquiry. Whether the great alteration that was made by the French Surgeons of the plan recommended in my publication, viz., their excluding the dilatation of the canal, and only retaining the reduction of the size of the stone—be judicious or not, this is not the place to examine. I believe the change to be any thing but an improvement; and I confidently expect, that the recently-published account by an Italian surgeon, of his extraordinary success in extracting stone by dilatation alone—a success much greater than any on record—will lead to the restoration of the operation as originally proposed.

fides for the production of high and low degrees of temperature; and the test of the thermometer, (which, strange as it may appear, does not seem to have been applied before,) will leave no doubt on the subject. It will remove the error of supposing that cold lotions, as they are called, produce a degree of cold that can have any effect whatever on acute inflammation; and that the small quantity of heat which can be retained in poultices, is capable of exerting any continued remedial influence.

If the practitioner be thus convinced of the inertness of these practices, while he fears the re-actions and other occasional bad effects of different plans likewise employed at present for the same purpose, he must either altogether abandon one of our most powerful and extensively useful remedies, or adopt a proper mode of applying it.

Brighton,
Oct. 18*th*, 1847.

ON

INDIGESTION;

ITS PATHOLOGY AND TREATMENT,

&c.

SECTION I.

GENERAL OBSERVATIONS ON THE LOCAL APPLICATION OF HEAT AND COLD IN THE TREATMENT OF IRRITATIVE AND INFLAMMATORY DISEASES.

Heat and Cold, though so contradictory, apparently, in their nature, have similar remedial effects; and another singularity is, that, with this agreement between their respective agencies, they not only, severally, have a different operation according to the manner in which they are used, (like other powerful remedies, of which antimony and mercury may be adduced as examples,) but both may be made to produce directly contrary effects. Each may be made to exert a stimulant, and each a depressive or lowering action; and much of the error that has prevailed in the use of these measures, has arisen from this double agency not having

been always clearly understood. It is to the latter of these qualities, or to what may be termed the antiphlogistic properties of heat and cold, that our attention will be chiefly directed in the following preliminary observations.

These remedies are distinguished by their antiquity, and by having steadily maintained their ground from the origin of the medical art to the present time. On a marble tablet, which was found in a temple of Œsculapius at Rome, it is recorded, that the person who erected it, was cured of a pleurisy by the application to his side of a mixture of wine with hot cinders taken from the altar of the god;* and Van Swieten, who relates the fact, thinks that the knowledge of this and similar cures may have been the cause that Hippocrates, who had collected these ancient observations for his own use, was in the practice of beginning the treatment of inflammatory affections of the chest by hot fomentations, even before having recourse to bloodletting. We learn, likewise, from a passage in the Old Testament, that two hundred years before Hippocrates, a hot topical application was used for the recovery from illness of one of the Kings of Israel.†

The application of cold had a conspicuous place assigned to it, among the therapeutical measures employed by Hippocrates; and although it has varied somewhat in estimation in the course of ages, according as it has

* Commentaria G. van Swieten in H. Boerhaave Aphorismos, vol. III. p. 43, 4to.

† Book of Kings, ch. xx. ver. 7.

opposed, or coincided with, the reigning medical theory of the day, it has always been acknowledged to possess considerable remedial agency.

An obvious explanation of the antiquity of these remedies and of the permanent station which they have maintained, is, that they are expedients to which persons suffering from disease must have been led by instinct. The sensation of burning, which is a symptom of many inflammations, has its natural remedy in cold; and the immediate relief and permanent advantage thus obtained, would soon recommend the use of the same means in other cases of analogous character, but where the painful heat that indicated the appropriate remedy might not be so prominent. Where cold was a distressing symptom of disease, the desire to remove it by the application of heat would be equally natural and urgent; but the use of the latter agent, in many of the diseases in which it has been employed, is not so obvious as that of cold, and must have been the result of more accurate observation than would appear necessary in the other instance. Like cold, it has been more or less esteemed according as its use has squared with prevalent hypotheses; and, unfortunately, from being too much and too frequently employed at certain times, in consequence of this agreement, it has, at other times, when these hypotheses have been abandoned, partaken in some degree of their disgrace, and fallen below its proper station.

The knowledge of the nature of disease, to which accumulated experience and much reflection have led,

affords another explanation of the estimation in which these applications have generally been held. They are both, if properly used, powerful in subduing inflammatory action. Now, the most important discovery which has been made in pathology, (and made principally by investigations in morbid anatomy, and the observation of the action of remedies of easily understood operation,) is, that the great majority of diseases are originally of an inflammatory nature; and that of those which are not so, the majority become dangerous in their course chiefly by the accession of inflammation. Even tuberculous diseases scarcely form an exception to the latter class. A sense of debility is a common symptom of inflammation; and real debility, which was long supposed to indicate a morbid condition the very reverse of that which exists in inflammation, is now admitted not only to be a state compatible with it, but as very much predisposing to it. And the abstraction of blood, while it is universally acknowledged to be the most expeditious and certain mode of checking violent inflammation, is now seldom had recourse to without some fear of an increase of debility, and a reduction, consequently, by the loss of the vital fluid, of the restorative power of nature,—a result which too often renders the abuse of this justly high-prized remedy, the direct cause of death.

The present opinion of the remedial powers of heat and cold in inflammation may be learned, and, perhaps, in the most satisfactory way, from the following quotations from popular works, which are deemed amongst

the best guides to the practice of medicine, and are to be found in every medical library.

"Of the local remedies applied directly to inflamed parts," (says Dr. Thomson, in a passage of his celebrated work on Inflammation, which is quoted in Cooper's Surgical Dictionary,) cold is undoubtedly one of the most powerful. In reducing the temperature, cold diminishes the morbid sensibility and pain of inflamed parts; and probably, in consequence of this, the action also of the vessels, by which the inflamed parts are supplied with blood."*

The next quotation expresses the opinion of the present distinguished Professor of the Practice of Physic in the University of Edinburgh. "When inflammation is once near the surface of the body, we have a powerful means of repressing it in the application of cold, which, by causing constriction of the dilating vessels, prevents those congestions and stagnations of blood which seem to be essential to the inflammatory effusions."†

"The partial application of heat, (says the writer of the article Inflammation, in the 'Cyclopædia of Practical Medicine,') in the form of fomentations is often a powerful mode of reducing inflammatory action, and at the same time of relieving pain. We have an illustration of this in the beneficial effects arising from warm water in various forms of external inflammation. Warm fomentations, properly applied, often prove a valuable

* Thomson on Inflammation, p. 180; and Cooper's Surgical Dictionary, edit. 6th, p. 757.

† Library of Medicine, vol. I., p. 109.

application also in internal inflammation. We have often observed excellent effects from them in pulmonary inflammation after general or topical bleeding, and in abdominal inflammation the practice is so beneficial that it is seldom if ever omitted."*

And it is observed by Professor Thomson, that "Fomentations or embrocations with warm water are often a very powerful means of abating internal inflammation. This effect is very apparent in some of the deeper-seated inflammations, as in the inflammation of the urinary bladder, intestines, or other viscera contained in the cavity of the abdomen."†

Quotations to the same effect, might be made from almost every writer on the subject of Inflammation, but it is unnecessary to multiply them, or to refer to other authors than those whose works are in greatest circulation.

The depressive quality of cold is exhibited on other occasions, and in a more striking and unequivocal manner, than in the removal of inflammation. The story of Dr. Solander's hazardous situation in Tierra del Fuego, related in Cook's voyages, has often been quoted as an illustration of the well-known fact, that torpor, sleep and death, are often caused by long exposure of the whole body to cold. Very recently, the newspapers contained an account of the death, from this cause, of two travellers in the Highlands of Scotland; and numbers

* Thomson on Inflammation, p. 188.

† Cyclopædia of Practical Medicine, vol. II., p. 807.

more have been destroyed by the same means. Such striking effects would have soon, even had there been no instinctive tendency to its use, directed the attention of medical practitioners to so powerful an agent on the animal economy. Nor are the effects of topical applications of cold less remarkable. The sudden check, so often given, to alarming hemorrhage in childbirth, by pouring cold water on the abdomen; and the speedy assuagement of violent delirium, or the arousal from apoplectic or congestive stupor, by the same means applied to the head, as in the instances recorded by Dr. Abercrombie and M. Foville;* are remarkable illustrations of the power of cold. It may be doubted, however, whether the great power of the last-mentioned proceeding is yet fully appreciated. Dr. Abercrombie states, that he is in the habit of using it in the convulsions of children; and in the excellent and lately published work on the Diseases of Children by Drs. Evanson and Maunsell, this is mentioned as the "mode of applying cold now universally adopted in cases of convulsion —a stream of water being poured on the head from a vessel held at a little distance over it, and continued until the attack subsides." After Dr. Abercrombie's statement, that "under the operation of this remedy he had seen a strong man thrown, in a very few minutes, into a state approaching to asphyxia, who immediately before had been in the highest state of maniacal excitement with morbid increase of strength, defeating every

* On Diseases of the Brain and Spinal Cord, 2nd edition, p. 163.

attempt of four or five men to restrain him"—after such a statement, it may be questioned, whether, as a general rule in the convulsions of children, a milder treatment might not be preferable at first, and this powerful remedy be reserved as a last resource.

When facts are so well established as the remedial efficacy of Heat and Cold in inflammation, it is of comparatively little importance to be able to give a satisfactory explanation of their mode of action. The theory, however, of the action of cold is tolerably satisfactory, and may be understood without entering far into the interminable discussion on the nature of inflammation. That there is excitement or increased action in acute inflammation cannot be doubted; and it is probably this excitement, which, if not the principal morbid circumstance, constitutes one essential to the existence of the morbid state, and one, upon the removal of which, the disease would cease. Now, heat, which is the most general stimulus in nature, is evidensly in excess in parts acutely inflamed, and if it be not the sole cause of the excitement, must materially tend to maintain it. This excess of heat and stimulus is abstracted by the remedy under consideration; and of the four circumstances usually constituting inflammation, viz., redness, swelling, pain, and heat, the last is that which is most amenable to remedial measures. But the application of cold would appear to be a depressant of vascular action independently of this; and perhaps it is so in one or more of the ways, briefly alluded to in the above extracts from the works of Drs. Thomson and Alison.

The explanation of the operation of Heat and Moisture (for they are usually employed in conjunction) is not so satisfactory. Part of its action, when applied, at least, to deep-seated inflammation, is probably due to revulsion; and part, when the disease is superficial, is, probably, mechanical. Much, however, remains to be ascertained respecting it; and we may yet be as ignorant of the *modus operandi* of heat in the treatment of inflammation, as we are of the mechanism of the operation of mercury, quinine, or colchicum, in the diseases to which they are severally appropriate, all of which we nevertheless employ with great remedial advantage. The following passage from Sir Astley Cooper's lectures, contains his views of the subject, and testifies, at the same time, the opinion of that great practical authority of the power of the remedy. "Heat and moisture in combination produce relaxation, open the pores, give rise to perspiration, thereby removing congestion, and occasioning all the beneficial effects that would arise from the application of leeches. The sedative effects of heat and moisture are well exemplified by what happens when a person takes a warm bath; a man for instance with a pulse at 75, goes into water heated to 100 degrees, his pulse soon rises to 100; presently he perspires freely, his pulse becomes less frequent, yet soft; great relaxation follows, and if he were not removed he would absolutely die, so extensive is the exhaustion that it occasions. Here, then, is direct proof of what heat and moisture can do when they are applied generally; and

when used locally, their action on the part is precisely the same."*

Notwithstanding, however, this united testimony in favour of these remedies; established though their remedial efficacy may have been by the universal consent of practitioners through a long succession of ages; it is nevertheless true, that, as they have hitherto been employed, they have been regarded, particularly in later times, rather as auxiliaries to other measures, than as holding a high place themselves. Their operation has been too uncertain to admit of more than a limited reliance being placed upon their use. Though frequently to a certain degree useful, it has only been on rare occasions, and almost as if by accident, that very striking benefit has been produced by them. These occasions, however, have been sufficient to prove their great value; and some practitioners may have employed them more with the view of making those decided impressions on disease, than for their more easily attainable but moderate advantage. We have a similar instance in a remedy much employed in the diseases of warm climates. It is difficult to produce mercurialization of the system in some of these; yet so great is the benefit of this, when it can be quickly effected, that practitioners

* Sir Astley Cooper's Lectures on Surgery; *Lancet*, vol. I., p. 75, 4th edition.

very properly persist in exhibiting mercury in such cases notwithstanding the moderate chance of attaining the desired end, and the hazard from certain injurious effects of the medicine, when it fails in attaining it. If, as is probable, the mode of administering mercury will admit of such improvement as shall remove this uncertainty of action, the illustration it affords of the point under consideration would be more complete.

This uncertainty of effect, and other circumstances attending the use of these remedies which have tended to prevent their rising to their proper rank amongst therapeutical measures, are not inherent and irremovable defects, but proceed from defects in the manner of administering them. These have often been commented upon, and injunctions have been given (injunctions, unfortunately, which cannot be complied with) to avoid the errors by which heat and cold are so often rendered inert or only slightly efficacious, and sometimes even are converted into instruments of mischief. An extract or two from the popular works already quoted may be adduced as examples of these, with respect to the use of cold.

The first is a continuation of the passage already given, from Dr. Alison's paper on Inflammation, (page 13.) In order that the application of Cold may be effectual, "it must be applied either uniformly, or very frequently and assiduously, for many hours together; otherwise, the inflammation will start again, as if with renewed vigour, on each cessation of the application, as long as the general strength of the circulation continues, and

the remedy will, on the whole, rather retard than hasten its decline."*

Dr. Forbes observes, in the "Cyclopædia of Practical Medicine," that "In local affections of an inflammatory kind, in which very cold lotions are used as a refrigerant, as in cerebral affections and in phlegmon, the result is frequently different from what is intended, from interruption in their application. The renewed application of the cold fluid, after a temporary suspension, frequently gives rise to a series of reactions in the part, which are calculated much more to aggravate than to relieve the disease."

The next and last extract, which is taken from the same valuable work, is so little in commendation of Cold as a remedy of inflammation, that, but for the explanation which has been given, it might appear inconsistent with preceding observations on the subject. "Either in ophthalmia, or in any other local inflammation," says Professor Jacob, "the advantage to be effected from cold applications is the reduction of the temperature of the part, and consequent diminution of vascular action; but this object is very rarely attained, *and the real effect of Cold, in abating inflammation, has as yet scarcely been ascertained.* The attempt is made in conjunctival inflammation, by repeated applications of cloths wrung out of cold water; but these cloths became so speedily of the same temperature as the part, that nothing more is effected than a temporary

* Library of Medicine, vol. I., p. 107.

cooling, followed, perhaps, by greater heat and vascular reaction." "To obtain the advantage," he adds, "of cold applications, these cloths should be changed by a nurse, sitting at the bedside of the patient, twice in a minute."*

These remarks and directions refer to the principal defects in the present modes of using Cold, viz.—the want of uniformity, and the stimulus, or reaction, from the repeated applications. When the inflammation is severe, the sensations of the patient are a sufficient guide to the truth in this question: he rarely obtains relief; and is generally sensible that the momentary mitigation, on the application of the cold water, is no compensation for the increase of heat and pain which soon follows. But in all cases the point can be accurately ascertained by the thermometer. With a view to this publication, I lately made the following observations:—

In a case of sprained ankle, attended with considerable pain and swelling, and to which a saturnine evaporating lotion had been applied for twenty-four hours without relief, a linen rag, dipped in water just drawn from a well, and of a temperature of 56°, was applied to the inflamed part. A thermometer placed between the rag and the skin rose, after two or three minutes, to 90°; the heat of the atmosphere being then 67°. On the same day, in a case of acute rheumatism of the ankle, a piece of lint, dipped in water of 62°, was applied over a thermometer resting on the joint. The mercury was

* Cyclopædia of Practical Medicine, vol. I., page 247; and vol. III., page 209.

lowered to 77°, but soon rose again, and while the lint continued quite wet, to 89°: the atmospheric heat being 65° at the time. The thermometer used on these occasions was that with a cylindrical bulb, which is usually placed in the urinometer case; and it was kept close to the skin, but not pressed so as to indent it, which would make a difference of between three or four degrees in its rise.

The writers just quoted give no satisfactory information how their injunctions to apply the cold uniformly, are to be carried into effect. Dr. Jacob, indeed, speaks of applying the cold cloths twice in a minute. This no doubt is physically possible; but that it would be done, and for several consecutive hours or days, is much more than can be expected, unless a number of assiduous and conscientious attendants could be procured for each case. But, granting that a renewal of cold could be made every half-minute, this, after all, is not uniformity. The intervals and reactions would, indeed, be of comparatively short continuance, but still there would be intervals and reactions. Nothing like this, however, is attempted in practice. The usual direction of practitioners to nurses, is, (in the words, and with the sanction, of Dr. Thomson,) that "the cloths are to be repeated as often as they became warm."* Under such a system of proceeding, the wonder is that the application of cold should have met with so much favour by the profession, and been so long the established routine of practice. It it only in superficially seated and slight

* Thomson on Inflammation, p. 180.

degrees of inflammation, and where a moderate degree of cold is used, that any benefit can be derived from this mode of applying the remedy; but such cases must be carefully distinguished from those where the quick and energetic generation of heat, or the depth of the inflammation, requires some measure of great power to repress or reach the morbid action.

Other attempts have been made to correct this cardinal defect of want of uniformity; but they have only partially and occasionally succeeded. Bladders, or bags containing ice, have been used with this view; but, besides that their weight is objectionable, the temperature has been found too low to be employed with safety, excepting in a very few cases of deep-seated inflammation. "Ice," (Sir Astley Cooper has remarked,) "applied to parts in a state of inflammation, irritates, and is apt to produce gangrene."* The use of ice has been almost confined to the head; but the advantage the ice-bag undoubtedly would be of here, if the trouble were taken to keep it always of a low temperature, or with a portion of the ice undissolved, is generally frustrated by no means having been contrived for retaining the surface of the bag in contact with the whole or greater part of the scalp. However strict the injunction may be, given to the nurse, to keep the bag cold, and always covering the head, the physician generally finds, on entering the sick chamber on his next visit, a bag of warm water resting and pressing on a small part

* See Sir A. Cooper's Lectures on Surgery; *Lancet*, vol. I., page 74, fourth edition.

of the crown of the patient's head. The ice will probably be renewed in his presence; and he may thus be furnished with the opportunity of witnessing the injurious shock produced by a sudden application of extreme cold to the head. Bags of ice applied to other parts of the body are liable to the same objections, and too frequently, by remaining unchanged, resemble the cold applications in menorrhagia, so well described by Dr. Locock.*

What has been termed irrigation, or the constant dripping of water upon the affected part, is another expedient that has been recommended to secure uniformity of Cold in the treatment of diseases of the extremities, to which alone it is applicable. Amongst the objections to this plan are, the spreading of the wet beyond the seat of disease, causing great discomfort to the patient as well as exposing him to the hazard of the various bad consequences on the system, that proceed from cold; and the very imperfect uniformity of temperature, which, after all, is thus attained: some portions of the cloth on which the water drips, or to which it is otherwise conveyed, differing materially in temperature from other portions.

On those parts of the body which may, without hazard, remain uncovered, and when the disease is of so slight a nature and so superficial as may be influenced

* "After placing cloths dipped in cold vinegar and water to the pubes, they (the nurses or attendants) often cover up the patient with bed clothes, *warm* and *comfortable*, soon converting the wet linen into a hot and reeking fomentation."—Cyclopædia of Practical Medicine—Article, Menorrhagia.

by slight degrees of Cold, a pretty uniform degree of this,—to the extent of 6° or 7° below the heat of the part,—may be usefully maintained by the combination of this exposure with the evaporation of water. And, when the skin is not abraded or diseased, and will bear the application of alcohol or other volatile substances, these may be added to the water, with the effect of increasing the cold from the evaporation two or three degrees further. A greater uniformity can be thus obtained whenever this method is applicable, as in diseases of the head and extremities, than by any other of the usual means; but the slight degree of cold thus produced, is almost or altogether inefficient in acute or deep-seated inflammation. On a block of stone, which can only be moved by a man's strength, the force of a child's arm is totally unavailing. If the cold does make an impression, it is only such as would be made by the abstraction of an ounce of blood in cases requiring that pounds should be taken before the remedial object is attained. Of what advantage would be the loss of so small a quantity in acute inflammation of the brain or lungs? Such a measure may amuse the patient; but while the patient is amused, the physician must not be deceived, and by placing confidence in an useless expedient, be prevented having recourse to others of real efficacy. If so volatile a substance as ether were used, and the expense were no objection, a greater degree of cold could be produced than by the ordinary evaporating lotions; but ether so rapidly evaporates that it would be necessary to apply it at intervals too short to give

this plan any material advantage over an equally constant application of cold water.

In consequence of the difficulty or impossibility, by any of the above means, of applying an efficient degree of cold with uniformity, some practitioners have altogether abandoned the attempt. Among others are the teachers of surgery in the schools attached to the great metropolitan hospitals, St. Thomas's and Guy's. "Although the sensation of cold (says Mr. Travers) is most agreeable to an organ under acute inflammation at the moment of its application, it is generally followed by increase of heat and pain; and in familiar instances, the pulsatile action of the vessels is so increased as to evince its stimulant effect, and the reaction thereby induced." On this account, he "decidedly prefers a tepid application as a general practice in the painfully acute stage of inflammation."* And Mr. Bransby Cooper, in a course of lectures on Surgery, now in course of publication in the *Medical Gazette*, expresses himself on the subject as follows:—"I usually apply tepid lotions to inflamed surfaces, at a temperature of about 96°, so that there is no reaction necessary to restore the equilibrium."†

This abandonment of efficient degrees of cold in the treatment of acute inflammation, is a remarkable change in medical practice; and must, doubtless, have been resolved on, after mature deliberation, by individuals holding the responsible offices of the two gentlemen

* Travers' Synopsis of Diseases of the Eye, p. 256.

† *Medical Gazette* for 1747, p. 1015.

whose sentiments have just been quoted. But when we consider the uncertainty of the present mode of applying cold, and the effects of that stimulus or reaction which is adverted to by these writers, we cannot be surprised at their resolution. That cold has a powerful operation in subduing inflammatory action, those who oppose its use in the cases under consideration would probably freely admit; it is not probable that their opinion on this point would oppose that of the whole profession through a long succession of ages and revolutions of theories; but if it be true, that our means of applying cold are just as likely to cause heat, and to aggravate, instead of repressing, the morbid condition for which they are used, how can the practice be condemned that throws them aside? If opium, by an improper, yet the only known manner of exhibiting it, were as likely to increase pain and prevent sleep as to produce the opposite effects, who could blame the practitioner who should abstain from its use? Admitting the power of any medicines, as opium, quinine, or antimony, to produce the most salutary operation, he would still be justified in rejecting them if he knew not how to exhibit them so as to secure these and not produce the opposite effects. In recommending, however, their rejection to others, it would be proper that the practitioner should explain his reason for doing so; otherwise he would, so far as his influence extends, prevent endeavours for rectifying, in the exhibition of the drug, the defect that has made it so uncertain in its operation.

On this account it is to be regretted that Messrs.

Travers and Cooper, in abandoning practices that have been so long in use, should not have distinctly stated that their reason for doing so, was the want of means of applying an efficient degree of cold so as to avoid reaction or other injurious consequences. Fortunate has it been for mankind that, bleeding, opium, antimony, mercury, &c., were not similarly laid aside before the proper means of using them were discovered. The whole of these had to rise through progressive steps to the state in which they now exist, and it is far from certain that we yet know the best means of administering them; we can only hope that we have now so fully ascertained their value as to prevent the possibility of any such imperfection being the cause of their abandonment.

This disinclination for employing Cold as a remedy of inflammatory disease has probably been recently increased by the abuse of this expedient in the empirical practices known under the name of hydropathy. Yet what remedy of any power would have held its station if the abuse of it had been deemed a sufficient reason for its disuse? Almost every remedy of any value has been thus improperly used, and generally, as Cold has been abused by the empirics alluded to, viz., by being exclusively and indiscriminately employed.*

Several of the preceding paragraphs relate exclusively to the employment of cold; but the want of uniformity

* It could scarcely have been supposed that it would have been deemed necessary, by a teacher of Surgery of the reputation of M.

of temperature in a continued application, is likewise the great defect in the manner of using heat as a local remedy; and, as has happened with respect to cold, this defect appears to have led several practitioners quite to abandon heat in the treatment of cases in which it has generally been employed. If any attempt be made to approach uniformity or the continuous operation of heat, by frequently renewing cataplasms or other similar means, great annoyance and discomfort are caused to the patient and much trouble to the attendant. On these accounts the attempt has rarely been made.

Jobert, to assure his auditors, in lately recommending the application of cold in the treatment of burns, (a practice, by the way, recommended long ago by Sir James Earle and others,) that he had not borrowed the idea from the hydropathists.—See *Medical Times*, Nov. 8th, 1846.

Such an assurance betrays a dread of any seeming connection with quackery that is quite ridiculous. As well might a recommendation to use purgatives in any particular disease be prefaced by a declaration that it was not borrowed from Morrison, who averred that his purgative pills are a cure for all diseases; or directions to pay strict attention to regimen and diet, in order that nature may not be impeded in her restorative operations, be defended from the imputation that they were taken from homœopathy—that boldest yet most successful test of the credulity and folly of mankind.

The writer will take this opportunity of observing, that if the attention of the profession be recalled by the rough and reckless practice of the hydropathists, to the question whether or not it is right that Dr. Currie's practice of exciting reaction in fever by cold affusion should be allowed to fall into complete disuse, some good may result from them. Many years ago he had recourse to this plan, (or rather was forced to it by the burning heat he experienced,) for the cure, in his own person, of Batavian fever, and with the effect of thoroughly and at once checking the disease. Being then, however, only a medical subaltern in the public service, he did not feel himself authorized to employ, in the cases of others confided to his care, a practice which was discountenanced by the authorities in the profession. Many suppose that Currie's practice still obtains, though in a modified degree; but shock and reaction from affusion of cold water, and depression from cold or tepid sponging, are two very different remedies, and appropriate to very different states of the system, or stages of disease.

Poultices have generally been allowed to remain on the part to which they have been applied, for hours after they have lost the remedial degree of heat which they at first contained. Few patients could endure their renewal every quarter of an hour, nor where quiet and especially sleep are desirable, could so frequent a change be made without injury that might not be counterbalanced by any advantage from heat. Most medical writers, conscious of this, yet willing to inculcate the necessity of endeavouring to keep up a proper degree of heat, have avoided giving any more particular instructions than that the poultice should be frequently changed; but others have been more explicit in their directions. Dr. Fergusson, for instance, in recommending the use of heat and moisture as a substitute for bleeding in certain obscure cases of puerperal fever, directs that "the whole of the abdomen should be covered with a large linseed-meal poultice, sufficiently thick to retain warmth for four hours; at the end of which time, if the symptoms are alleviated, a fresh poultice should be prescribed."* If Dr. Fergusson supposes, as may be inferred from this passage, that a remedial degree of heat is retained by the poultice during four hours, he is much mistaken. Probably such a degree is not retained above half-an-hour, nor is any degree beyond the natural heat of the part retained, under ordinary circumstances, (as I have ascertained by the thermometer,) beyond an hour. But Dr. Fergusson is by no means singular in enter-

* See Dr. Watson's Lectures on the Practice of Physic, containing quotations from Dr. Fergusson's Work on Puerperal Fever.

taining this erroneous notion of the capacity of poultices to retain heat; it is a very general opinion; and a higher idea of it than this of Dr. Fergusson, has been expressed by other writers on the subject. In the best French systematic work of reference which has been published, it is stated, amongst other directions for the management of poultices, that "il faut renouveler l'application du cataplasme, au plus tard, au bout de douze heures."*

It would seem as if it had been forgotten that the heat of poultices is conveyed away, not only by the solid texture of the part on which it is placed, but by the blood which circulates through this. Instead, therefore, of its being surprising that the heat should so soon be lost, it is extraordinary, that, with so ready a means of escape, it should so long be retained.

The truth is, however, that if cataplasms were capable of retaining their heat so long as has been supposed, they would not be more useful applications. They are placed on or near morbid parts for the purpose of *communicating* heat, and consequently there must be limits to their *retaining* it. When the subject is investigated with that care which its importance demands, it will be found that the retaining capacity of poultices, moderate as it is, must often mislead the practitioner. The poultice may be as warm as can be borne immediately on its application, and yet, as soon as the temperature of its

* Dictionnaire de Medic. et Chirurg. Pratiques, vol. I., p. 33.

inner surface has been reduced by contact with the body, the warmth communicated may be next to nothing, while the inside or heart of the viscid mass continues nearly of its original heat. This proceeds from the same quality on which its power of retaining heat depends, viz., that of being a bad conductor of caloric. Medical practitioners have been satisfied by finding that the interior of the poultice continues warm for some time; and they have not reflected that so small a quantity of heat as a poultice is capable of holding, cannot, if communicated to the body in a degree that can be of any service, last beyond a very moderate period.

It will appear, from these observations, that Professor Jacobs' remark respecting cold (already quoted), "that its real effect in abating inflammation has as yet scarcely been ascertained," may be applied with equal justice to heat. In the entire warm bath, indeed, the large quantity of water gives tolerable uniformity; and we know the important beneficial results in certain cases; but the action of this upon the whole body (to say nothing of the comparatively low temperature at which it can be used) is a great objection to its use in the majority of diseases in which the partial application of heat is indicated, and of which it constitutes, in fact, the best remedy. If, by the interrupted use of heat as at present employed, the disease gain as much ground during the intervals as it may lose while the remedial degree of heat lasts, what benefit could result; even

granting, which is not very probable, that so short an action would, in many cases, have any remedial effect at all?

In the medical use of heat, there has hardly been any other effort made to attain uniformity than by the frequent renewal of the applications communicating it. The attempt to preserve the heat of poultices, sponges, &c., by covering their outside with flannels, varnished cloths, or other non-conducting substances, while it has so ready a means of escaping inwards, must, obviously, be of very little avail. Almost all that can be thus effected, is, as in the ordinary use of warm clothing, to retain the natural heat of the body.

One injurious consequence of the rapid cooling of calaplasms and fomentations has been, that in order to retain a serviceable degree of heat for some time, they are usually applied at a temperature greater than is appropriate to the case, or than the physician would approve, could he otherwise maintain the heat. A series of pernicious excitements will often thus be produced, over-balancing, in many cases, the good that would result from a more moderate temperature; for too great a degree of heat is quite as hurtful in cases requiring this remedy, as a freezing temperature would be in cases in which cold is the appropriate application.

The difficulty in most cases, and the impossibility in others, of maintaining the appropriate remedial degree of heat by poultices or other similar means, appears, as we have said, to have caused the abandonment of the remedy to a certain extent. The only effort now made

by some practitioners, in cases in which they would have formerly applied a repetition of poultices, is to retain the natural heat of the part. They now substitute pieces of lint, or thin slices of sponge, dipped in warm or tepid water, and which, after being covered with varnished silk, are allowed to remain without changing for an indefinite time.* When moisture is an advantage and an increase of heat is not required, such expedients, or "water dressings," as they have been called, are very useful, and may be advantageously used instead of ointments or plasters. But, unfortunately, their nature has been much misunderstood. By many they are deemed equivalent to hot fomentations, and are sometimes, by a gross abuse of the term, even so denominated. As well might a glass of water be called a purgative draught. Hot fomentation implies, the use of a liquid of a temperature considerably higher than that of the part to which it is applied. The usual direction respecting the degree of heat which catalaplasms and fomentations should have, is that given by the President of the College of Physicians, viz., that the water should be "as warm as the patient's feelings will readily admit."† This may be somewhere between 110° and 115°‡—or

* Sponges of this description ("éponges fines, coupées en lames minces, au moyeu d'un couteau bien tranchant") were much employed in the Parisian hospitals, fifteen years ago. (Dictionnaire de Medicine et de Chirurgie Pratiques, vol. V., p. 34.)

† Paris's Pharmacologia, vol. I., p. 353, 5th edit.

‡ M. Londe mentions, that in his experiments on Bathing, he has borne an entire bath of a higher temperature than 115°.—Dictionnaire de Medic. et Chir. Pratiques, Art. Bain.

15°, at least, higher than the usual temperature of the water dressing. Now, although merely retaining or preventing the loss of the natural heat of the part may to a certain extent be useful, it would be absurd to expect from this the remedial effect of warm fomentations, either in kind or degree. It would be as reasonable to expect the sleep, and relief from pain, that are procured from the exhibition of twenty drops of laudanum, by a tenth part of the dose. Nor can such negative practice be called leaving nature alone, or trusting altogether to her restorative efforts. For, nature, as has already been observed, prompts the employment of these remedies; and the immediate soothing effects of warm fomentations, as well as their more permanent benefits, sufficiently attest the advantage of attending to her admonitions. The same objections apply to too low a heat, in cases where fomentations are indicated, that apply to tepid lotions where cold is the appropriate remedy. The practice is nugatory. The patient is deprived both of what would give him relief, and of what may be essential for his cure.

This pernicious error of expecting from applications that communicate no heat to the body, the advantages that are obtained from hot fomentations or frequently renewed poultices, has been more insisted upon in consequence of the erroneous opinions on the subject so commonly entertained. It is surely unnecessary to state, that the heat of these, after they have remained on the part for some time, can never exceed that of the blood, and it rarely amounts to this. On the removal of

a water-dressing, the patient's skin may feel warm to the colder hand of the surgeon; but the surgeon's hand is a fallacious thermometer. Nor is it otherwise as respects the sensations of the patient; yet we shall have occasion, in the course of the work, to notice the importance of attending to these in regulating the heat.

A recent and popular writer on Surgery has denominated the poultice an abomination, and has condemned it for its stench and its filth.* If the water-dressing which he recommends as its substitute, were equally serviceable in retaining heat, this ancient remedy, so highly extolled by Abernethy, would not, for the reasons alleged, be undeserving his censure. But it assuredly does not retain heat so well, and, consequently, wherever the application of heat is indicated, it does not merit the preference. Both, it is true, are, in this respect, very imperfect measures, but the poultice is less so than the water-dressing. There are worse stenches in surgery than those of poultices. There are stenches proceeding from suppurating wounds after surgical operations, and there are offensive discharges from organic diseases, many of which operations and organic diseases, poultices, when they can be frequently renewed, might often prevent. But the principal objection to the poultice, viz., its incapacity to retain and communicate the necessary degree of heat, the writer alluded to has omitted to mention, and has left the deficiency to be supplied by a reviewer of his book, who says, that he "cannot but

* See Liston's Practical Surgery.

wonder that Mr. Liston has not hit one more blow against the 'abomination' by asking, how many hours out of the twenty-four does a poulticed patient enjoy the benefit of a *warm* application?"* That this is really the principal objection of this eminent surgeon would appear from the fact, that so far from underrating the remedial value of heat and moisture, he recommends warm fomentations, "to relax and keep up a determination to the surface," as a remedy to be preferred, in certain cases of inflammation, to the cold applications with which they are usually treated by other surgeons.

It may be said, that as both expedients are acknowledged to be very imperfect, there cannot be much difference between them, and consequently that the least troublesome may be chosen. If the trouble were detrimental to the patient, or the injury from it overbalanced any benefit to be derived from the application, this argument would be good; but not so, if the trouble only affects the attendant. For, how can it be determined whether the advantage, little as it may be, of one over the other, might not in doubtful cases be enough to turn the scale in favour of the patient's recovery. It is the duty of the practitioner, when several expedients present themselves for his choice, always to prefer that which is best for his patient.

But simplicity recommends the water-dressing; and simplicity, irrespective of utility, has, with some, an irresistible charm. Doubtless one water-dressing is infinitely more simple and less troublesome than a suc-

* British and Foreign Medical Review, vol. V., p. 465.

cession of poultices; but why should the lovers of simplicity use an expedient even so complicated as the water-dressing? There is surely retrogression here from former simplicity. A vapour bath is usually considered to be of a temperature ranging from 120 to 130°; yet Richerand, about thirty years ago, proposed a local vapour bath—"une espèce de bain de vapeur"*—more simple even in its construction than the hot fomentation apparatus, which, in the opinion of some, is constituted by the water-dressing. There was no embarrassing complexity of wet lint required in his plan; he was more independent of art; he merely surrounded the part to be heated by a piece of varnished silk! Could anything be more beautifully simple, and more certainly useless?

Having now mentioned those principal defects of applying Heat and Cold which have so seriously interfered with their remedial powers as to have caused the virtual abandonment, by certain practitioners, of these powerful depressants of inflammatory action, I proceed to mention the method, by which, for some years past, I have been able to apply them with uniformity of action, and otherwise bring them under perfect control. A current of water of the appropriate temperature, is made to flow through a thin waterproof cushion or bladder in close contact with the body. The water runs into the cushion from a fountain reservoir raised above it, through a long flexible tube; and again escaping from the cushion, it passes through another

* Nosographie Chirurgicale, tom. III., p. 175.

tube into the waste vessel. The cushion is of a size and form suitable to the part of the body on which the water is to act; and, by a particular contrivance, any pressure from its weight is prevented. The part in contact with the cushion is kept moist either by previously wetting the cushion, or by interposing a piece of wet lint, flannel, or other bibulous substance.*

It is obvious, that by the use of this "current apparatus," there must be perfect control over the application of heat or cold. Fresh particles of water pass continuously over the surface of the body, abstracting or communicating heat—just as (with respect to its abstraction) the hand is cooled by exposing it to a current of cold air, or by holding it in a stream of cold water,—although there is rarely necessity for a quicker change of the particles of water than is occasioned by the alteration of their gravity, in consequence of their alteration in temperature. The intervening membrane or cloth makes no difference, or only that which a thicker scarfskin would cause, rendering a little higher or a little lower temperature of the water, or a quicker passage of it over the surface, necessary to produce the same effect.

The advantages of this method over those that have hitherto been employed, are as follows:—

First: it enables the practitioner to apply any determinate and appropriate temperature, uniformly, for any required period.

Second: cold can thus be applied to any part of the

* See Plate, Fig. 1st.—A more minute description, and various particulars respecting the management of the apparatus, will be given in the Third Section of this work.

body without risk from the exposure of other parts. And, allied to this, is, the power of confining, or limiting with exactness, the action of the remedy to certain surfaces.

Third: the ease and comfort to the patient with which the apparatus may be managed; and the little trouble which its working (when once thoroughly understood) gives to the attendant. No one having a knowledge of human nature, will consider the latter circumstance as unworthy of being noticed. Should the patient sleep, his rest will not be disturbed by a continuance of the process.

Fourth: the power which this method gives of gradually increasing or decreasing the heat or cold, in order to prevent stimulus or reaction, at the beginning or end of its action; or during the continuance of this, should circumstances demand the change.

Fifth: the possibility of thus applying equal pressure, with perfect regulation of temperature. This combination, hitherto impracticable, is of the highest importance in the treatment of most of the diseases in which pressure has been found of remedial value; and it has been extended to several, such as eczema and other obstinate diseases of the skin, in which pressure, probably from the heat that is caused by bandages, has never been applied. But there is more gained by this combination than merely the avoidance of an injurious circumstance. Besides that, compression by a fluid has a great advantage in its perfect equality, over the unequal and quickly-disadjusted pressure of a bandage, many diseases will yield to the united action of pressure and

cold that would resist either of these agents when employed alone. The only modification of apparatus required for this important combination, is, that the water cushion shall be confined to the part to be supported or compressed, and the reservoir raised to the height required to give the appropriate weight or pressure.

It would be great injustice to this mode of effecting a perfect control over the application of heat or cold, to judge of its effects by the usual results of these remedies as they have hitherto been employed. The history of bloodletting will furnish an apt illustration. Doubtless, before the expedients of removing the atmospheric pressure in cupping, and of obstructing the circulation and then opening a blood-vessel by a partial incision, were invented, (and the last appears an invention quite as far removed from common trains of thought as the much later and boasted invention of tying the vessel for the suppression of hemorrhage,) the advantage must have been remarked, which, in many diseases, followed the loss of blood, either by natural means or by the rude expedient of scarification. Yet, how imperfect and indefinite in operation was scarification, and what uncertainty must have hung over its effects, in comparison with the methods of abstracting blood at present in use! Now, there is, I conceive, in respect to adaptation of means, as great a difference between the usual methods of applying heat or cold and the current apparatus, as exists between these rude scarifications and the present methods of venesection and cupping; and my experience

in the use of this apparatus justifies the hope, that as much benefit will follow its general introduction as must have been the consequence of the latter improvement.

But these measures will admit of another and a more important comparison; I mean that which may be made between them as antiphlogistic remedies. When inflammation rages, and particularly where an important organ is affected, our principal reliance is justly placed on large abstraction of blood. Whatever danger it may bring of its own, must be hazarded for the removal of the greater and more pressing danger of the disease. No other remedy either acts so certainly or so promptly under these circumstances, and it must ever therefore hold a high place amongst therapeutical means. Mercury and antimony are comparatively slow in their operation, and are neither so powerful nor so certain in their effects; and the application of heat or cold, though occupying an important place among antiphlogistic remedies, has only (and very justly considering the very imperfect manner in which it has been made,) been deemed an auxiliary to bleeding in the treatment of such cases. It remains to be ascertained how much this measure will be advanced in importance by the improved manner of effecting it.

The uniform application of efficient degrees of heat or cold, acts as promptly and directly on inflammation as venesection does; and if it be granted that it wants the power of bleeding in urgent cases requiring great power, it is likewise without its dangers. It effects a local change

without general loss of strength; whereas, the local change from bleeding is part of the general depression caused by it. With the loss of the vital fluid by venesection, there is too often the loss of that restorative power which may be absolutely necessary to repair the damage caused by the inflammatory attack; or necessary, at least, to repair this so speedily as to prevent the patient falling a victim to some fresh incursion of disease, during the weakened condition and functional disturbance that may have followed it.

It is difficult to account for the great change that has recently taken place in professional opinion upon the subject of bloodletting; which is not now practised to a fourth part of the extent that it was twenty years ago. It has been said that there is a fashion in physic, and the history of many articles in the *Materia Medica* would show that the saying is not altogether devoid of truth. But better reasons, I think, can be assigned for the recent decline of bloodletting in public estimation, some of which may be here adverted to, though it would be foreign to the purpose of this work to enter into the subject with any degree of minuteness.

Two opinions have recently become prevalent, which, it might have been supposed, would not only have prevented this decline, but greatly increased the estimation in which bloodletting was held. The humoral pathology has again revived under better auspices from the progress of animal chemistry; and it is now generally admitted, that if diseases do not originate in inflammation or vascular excitement, (as a great number

of them unquestionably do,) they become dangerous, principally from the inflammations of vital parts, and consequent disorganizations, that spring up in their course.

If the blood be deteriorated, there are remedies, probably, amongst the many powerful agents with which chemistry has presented us, of power sufficient to supersede the necessity of removing what is replaced with so much difficulty; and as respects the inflammatory character of disease, it is evident that the abstraction of blood is not now so much, or so exclusively confided in, as the remedy of inflammation, unless it be of an acute and urgent character, attacking important or vital organs, and occurring in a vigorous constitution of body. The sounder opinion entertained upon the predisposing causes of inflammation, already alluded to, that debility constitutes one of the principal of these, will go far to explain this want of confidence. This opinion, which is singularly opposed to that advocated by the late Dr. Barlow and others, of the widely spread influence of plethora, rests principally on the result of statistical researches, or an "experience on so large a scale," to use the words of Dr. Alison, "as to be much less liable to fallacy than the observations of individuals."*

* Library of Medicine, vol. I, p. 71.

During my residence at St. Helena I had frequent opportunities of observing the influence of inanition and debility in the production of inflammation amongst seamen admitted into the General Hospital, from ships where there had been great scarcity of provisions, and the crews of which had been further exhausted by fatigue. One of the most remarkable cases was that of a sailor, who had been carried to the

Another fact, which has, doubtless, materially influenced opinions on this point, is, that diseases, for the cure of which bloodletting had been mainly confided in, have been observed to decline as certainly and almost as rapidly without the loss of blood, as when it has been abstracted to a great extent. And to these cases must be added the diseases, not essentially of an inflammatory nature, in which, it has now been ascertained, that bleeding was often practised unnecessarily, and often carried to a hurtful excess. Certain kinds of apoplexy, and certain diseases affecting the cerebral system in children, are of this class.

But the principal cause, I conceive, of this change in the sentiments of medical practitioners, in regard to bloodletting and other violent artificial measures, is, the greater confidence that is now placed in the remedial powers of nature, or in the natural decline of disease. They now appear to be more impressed than formerly with the idea that, if machines, planned by human ingenuity, have contrivances given them by which errors in their working may be rectified, or dangers threatening their destruction avoided—and there are several, besides the safety-valve, in the steam-engine,—it would be strange indeed if the human body, the workmanship of the Divine Architect, should be deficient in similar provisions. We have witnessed the effects of this

Hospital in a state of extreme debility and emaciation. The day after his admission, he was attacked with violent destructive inflammation of the eye that resisted every remedial means.

Magendie has illustrated the same principle, by experiments on dogs and other animals.

reliance on natural resources amongst our continental brethren; and though some have ridiculed a practice which they have considered inert or nugatory, others may have profited by its observation. It must be acknowledged, however, that, true as this description of the French practice may be, generally speaking, the remedy of bloodletting formed a singular exception to it during the prevalence of the doctrines of Broussais; and we were then more likely to receive a useful lesson from the observation of the consequences of its abuse, than from witnessing its neglect.

The present, and, I believe, justly-founded, opinions respecting bleeding, are, that though it is our best remedy in violent and sudden inflammation of important organs, as being the most certain and expeditious, it is not the remedy to be preferred in cases of less violence and longer duration; that it is seldom to be had recourse to without fear of its own consequent evils; and is to be desisted from as soon as the inflammation is reduced to the degree which may be safely treated by less hazardous remedies. Among these remedies, the application of Heat or Cold has always held an important station; but now that it can be perfectly made,—that it can be used in any degree, and to any extent, it must be looked upon as a measure of much higher character. My own conviction is—and it is founded on no very limited experience—that from the extensive applicability of this improved remedy, its power and its safety, it deserves as high a place amongst curative measures as bloodletting. Nor can I doubt that, by its general adoption, there

would be a considerable decrease in the number of those organic affections, the result of unchecked vascular excitement and inflammation, which now resist every means of cure; and for which all that the art of medicine can do (if surgical operation be inapplicable), is slightly to prolong life, and alleviate suffering during its continuance.

There are many chronic diseases of internal organs and membranes, consisting essentially of subacute inflammation, over which bloodletting, either general or local, appears to have little control; while it is of the greatest importance to husband the patient's strength, as the principal means by which the cure is eventually to be worked out. In the treatment of these, Heat and Moisture constitute a most valuable remedy.

There are numerous other cases, in the treatment of which it often becomes a most difficult thing for the physician to determine whether blood-letting is advisable or not. The urgency of the symptoms demands prompt and energetic treatment, yet he dreads the permanent weakness which may follow the loss of blood. The patient may already be much debilitated, and there may be great doubt whether the morbid affection be of a nervous or a vascular character,—spasmodic or inflammatory. In these perplexing circumstances, a means that will effectually depress without debilitating, or exposing the patient to any other hazard, will furnish the practitioner with a most acceptable substitute for the lancet, and give him the opportunity of escaping from, perhaps, the most painful state of

hesitation to which he is exposed in the course of his professional avocations. Allusion has already been made to a case of abdominal disease belonging to this category, in the remarks made on Dr. Fergusson's substitution of a warm cataplasm for the lancet; and there are several affections of the cerebral system, of the same character, and of which Cold is the appropriate remedy. Delirium tremens may be mentioned among these, and the delirium from hemorrhage or inanition, or that which follows severe injuries, or which occurs in the course of typhoid and other fevers.

It is not my intention, however, in these preliminary remarks, to enter into any detailed account of the application of uniform Heat and Cold, in the treatment of the various diseases in which they have been used. In the Appendix to my lately published "Essay on the present state of Therapeutical Enquiry," I have specified various external inflammations and injuries, diseases of the joints, ulcers, &c., in which Cold has been employed alone, or in combination with pressure; and in the succeeding Section I shall have occasion briefly to notice the application of Heat and Moisture in pulmonary consumption, chronic catarrh, and other affections of the great cavities.

Before concluding this division of the work, it may be expedient to notice an objection that has been made to the current apparatus, viz., its complexity, and the difficulty experienced in its management.

Having had ample experience of the difficulty of introducing into general medical practice whatever requires nicety of construction or management, in my exertions to recommend a more efficient and less hazardous apparatus for dilating contractions in the various canals, than the wedge-acting instruments in common use—I am prepared to meet with opposition on the present occasion, and on a similar account. But there is this material difference between the two cases: in that of the cure of stricture, there is a substitute for what I have proposed, in the instruments commonly employed; which, though tedious and only partially efficient in their operation, are yet capable of giving present relief and of warding off, for a considerable period, the fatal effects of the disease on the neighbouring or associated organs; but in the instance before us there is no substitute. The common modes of applying Heat or Cold in most cases of inflammation, is as complete a delusion as was the recent practice of administering "antimonial powder"—a totally inert substance—through the whole course of fevers; and the repeated applications of an efficient degree of Cold, is, according to the united testimony of the best writers, just as likely to stimulate by producing Heat, as to depress by producing Cold. Practitioners, therefore, will be reduced to the alternative of learning to use this apparatus, or of altogether rejecting one of the most powerful, and by far the safest, means in our possession, of repressing inflammation—the most common and most fatal form of disease.

But the apparatus in question is not what is usually termed, complicated. One form of it, which I have called, "the intermitting current apparatus," is the reverse of this; and I have had no difficulty in instructing the nurses or relatives of the sick, how to use that which is more perfect. Amongst the poor attending the Brighton Dispensary, the obstacle has been, not the incapacity of nurses to understand its use, but, in many cases, where warm water was required, the want of a sufficient quantity of this, and the want of an attendant of any description—although in using the simpler modification just alluded to, there is no absolute necessity, in milder cases of disease, for any attendant. But granting that there was more difficulty than really exists in understanding the use of the apparatus, and in adapting its application to different cases, (and assuredly there may be more difficulty in these adaptations than can always be left to nurses to surmount,) this would not be a sufficient objection to its employment. It surely requires no argument to show, that it is the duty of the practitioner to study his patient's advantage, at whatever trouble and inconvenience to himself. This may be illustrated by extending the observations that have been already made respecting the measure under consideration, as compared with the several operations by which blood is abstracted. There can scarcely be a comparison, as respects ease and simplicity, between extracting blood by a few incisions or scarifications of the skin, and the greater number of operations by which this object is usually attained. The most common of these, venesec-

tion, is the only surgical operation which Benjamin Bell, in his System of Surgery, says, he had never seen perfectly well performed; yet who would now dare to substitute a few gashes with a scalpel for venesection, or for arteriotomy, were the latter the appropriate remedy? Who would venture to prefer what might cause too little or too large a flow of blood, to the plan by which its flow may be regulated with precision, because more care and a more complex apparatus is required for the latter? If it were as safe and caused as little suffering to amputate a limb by a single stroke, and to stop the subsequent hemorrhage by red-hot irons or boiling oil, as to have recourse to the complicated measures now in use, there could be no hesitation about preferring the ancient and more simple practice. It is, again, a much easier matter to get rid of a diseased joint, or a dangerous ulceration, by amputation, than watch for months over its cure by rest, careful bandaging, and the proper application of other general and local remedies,—yet what conscientious surgeon would prefer the former course because the less troublesome? But it is surely unnecessary to insist more on the proposition, that simplicity should be preferred to complexity only when equally useful; and what has already been said, may be deemed an unnecessary enforcement of so obvious a truth. The difficulty, however, above alluded to, of introducing remedies for the cure of contractions, which, though acknowledged to be safer and more efficient, and much more expeditious in their operation, than those

usually employed, are still (in this county at least) rejected for their complexity, would show, that, however readily the principle may be admitted, it does not always regulate the practice.

SECTION II.

ON THE LOCAL AND UNIFORM APPLICATION OF HEAT WITH MOISTURE, IN THE TREATMENT OF INDIGESTION.

Having explained the general principles of the application of Heat and Cold in disease, as remedies of a depressive or antiphlogistic character, I proceed to speak of the use of the former in those affections of the stomach which have been included under the term, Indigestion or Dyspepsia.

This term has been applied to certain symptoms denoting impeded or deranged digestion; of which, irregularity or loss of appetite, and various morbid sensations, as nausea, heartburn, sense of load or distension after meals, pain, headache, lassitude, depression of spirits, and other nervous symptoms, are among those of most usual occurrence.

These symptoms indicate disease of the stomach, which may be the only part of the body affected; or some other organ concerned in digestion, may likewise be disordered; or some more distant organ, totally unconnected with the chylopoetic function. When other parts of the system are affected, it becomes of essential importance to ascertain whether or not they are so in consequence of the affection of the stomach, or whether, by having preceded this, they are to be regarded as its causes. It must be borne in mind, however, that the several affections may exist quite independently of each other.

From the number and complexity of the organs concerned in digestion, the great diversity of predisposing and exciting causes of disorder to which these are exposed, and the close sympathy existing between the stomach and most other parts of the body, it has resulted, that indigestion, either primary or sympathetic, is one of the most common of diseases; although appearing to be more so than it really is, from the circumstance that it has been found one of the most obstinate under the various kinds of treatment that have hitherto been employed for its cure.* When, in addition to this frequency of occurrence and obstinacy of duration, the various and close connections and

* In proof of this I may notice the result of an enquiry, which I made to day (Oct. 4th), of the patients affected with dyspepsia, who applied for relief at the Brighton Dispensary, about the duration of their respective maladies. The whole number of applicants on this occasion was forty-three, and of this number, the large proportion of eleven were cases of dyspepsia; though in two of these cases, the patients had sought

sympathies of the stomach with other organs are considered, and that the perfection of its function is necessary for the formation of the proper quantity and quality of the blood—conditions essential to the health of all other parts of the body—it will be readily conceded, that, notwithstanding the many treatises that have been written on the subject, the attention of medical men cannot be better engaged than in its further investigation.

Although a knowledge of the pathology, or nature of any disease, may not be essential for its cure, inasmuch

advice for other diseases with which they were affected, in combination with dyspepsia. The ages of the patients and the duration of their diseases, were as follows :—

	AGE.	DURATION.		AGE.	DURATION.
1.	22 years,	2 years.	7.	61 years,	1 year.
2.	55 "	10 "	8.	31 "	2 "
3.	39 "	7 "	9.	20 "	1½ "
4.	44 "	3 "	10.	49 "	8 "
5.	36 "	2½ "	11.	53 "	5 "
6.	67 "	15 "			

This Table, however, is far from being satisfactory ; for although the patients stated that they had not been quite free from the disease during the periods of duration marked, it is probable that, in several, there had been cures effected and subsequent relapses. But the poor (or that portion of them, at least, who do not sink under the complications of dyspepsia), are likely to labour longer under this malady than the rich. They attend for relief, at public institutions, only during the severity of the symptoms ; and when they have so far recovered as to be able to resume their ordinary occupations, they relinquish the prescribed regimen and medical means, which, if continued, might complete the cure.

Amongst the forty-three applicants above-mentioned, were six cases of chronic rheumatism, the majority of which were likewise of great duration. Many of the remarks just made respecting dyspepsia, are equally applicable to this frequent and intractable disease.

as its remedies may be discovered by accident or by empirical trial, still, it is important in cases where these have not been discovered, to ascertain whether or not its nature be similar to that of other diseases, of which the cure has been discovered, as a determination in the affirmative leads, of course, to the employment of the same or analogous remedies. This is a sufficient reason for briefly entering, on the present occasion, into some investigation of the proximate cause or nature of indigestion; for pointing out the errors that formerly prevailed on the subject, and are still far from being extinct; and for stating, with more precision perhaps than has yet been done, the essential morbid circumstances that constitute the disease. For, much of the bad or inefficient treatment of indigestion has proceeded from false or confused notions of its pathology.

It is obvious that each of the various tissues of which the stomach consists, may be affected exclusively, and differently at different times, or a greater or less number of these may be affected simultaneously; but to attempt, as some have done, to found a classification of species upon these differences, is what the present state of our knowledge does not authorise. There may be weakness of the muscular tissue—a deficiency or excess of the gastric juice and other secretions—a perversion of the quality of these—various affections of the different coats of the stomach, and various affections of its vessels and nerves; but it is very difficult, if not impossible, to distinguish the existence of most of these conditions by the symptoms. Despairing of this, most writers and

practitioners have only been solicitous to determine whether the symptoms indicate, on the one hand, excitement, irritation, congestion, or any degree of inflammation, with or without debility of the organ; or, on the other, debility, or want of tone, alone; for on this determination must the choice of two very different kinds of treatment be founded, which are severally appropriate to one or the other of these conditions.

Previously to the recent minute investigations in pathological anatomy, the opinion was general, that dyspepsia was essentially weakness of the stomach, and a condition of its tissues very different from that which constitutes inflammation, and demanding, therefore, very different, if not opposite, remedies. Various circumstances led to this conclusion. The feelings of the patient were supposed to indicate debility and not excitement, notwithstanding it was known that great prostration of strength is one of the most remarkable symptoms of acute inflammation of the stomach. Several of the causes, too, of indigestion, more especially the mental affections, are of a nature likely to debilitate; and, as has already been mentioned in the preceding section, debility and inflammation, instead of bearing the relation of cause and effect, as they often do, were supposed to stand in antagonism to each other. There are, besides, many cases of dyspepsia unaccompanied with pain, and the notion was prevalent that, where there is no pain there can be no condition of an inflammatory character: a notion contradicted by our daily observation of disease in other parts, as in the

brain, heart, lungs, and intestines. It is now generally admitted, that the necessary concomitance of pain and inflammation is a position only true as respects certain textures.

The authority of Cullen, who first collected the various symptoms of gastric disorder under the general term dyspepsia, had great influence in establishing this idea of debility being the sole cause of the disease; yet, if all the opinions of this eminent writer on affections of the stomach be examined, it will appear that greater stress was placed on his doctrine of debility than ought to have been. The disease which he called erythematic gastritis, is characterised by the symptoms of what is now, by many, called inflammatory dyspepsia, and must have been treated by him on antiphlogistic principles, while he restricted the term, dyspepsia, to affections of another kind. His error was, making so marked a distinction between dyspepsia and gastritis, though acknowledging, at the same time, the obscurity of the subject. In a note to his Nosology, respecting gastric and intestinal inflammations, after expressing his conviction that there are two species of these, and admitting that the symptoms of the less acute kind, either of the stomach or bowels, are often obscure and uncertain, he concludes by a passage which is remarkable in connection with the important discoveries on this point by French pathologists of later times—"De his vero monere volui ut diligentius inquirant posteri."*

* Synopsis Nosologiæ Methodicæ, Ord : II., Gen. Gastritis.

The proximate cause of indigestion is not a single affection, but a chain of morbid elements. The change in the quantity or quality of the gastric juice, or solvent liquid of the stomach, is probably the circumstance in dyspepsia on which the disorder of the function of digestion principally depends; but it is not the circumstance of most importance in regard to the treatment of the disease. The treatment must be directed against the cause of this change in the secretion, which, doubtless, in the great majority of cases, if not in every case that has continued for some time, is what may be termed an inflammatory, or rather a phlegmonoid, irritation, of the mucous coat of the stomach. This irritation, again, though it may often be the original affection, may often arise from muscular or nervous weakness—and it frequently increases into a state of low inflammation. If the phlegmonoid irritation has not originated from or been preceded by debility, it may cause, coexist with, or be followed by debility. The change in the gastric juice may arise from debility alone, or other causes yet unknown; but that it does so frequently, or that debility and such a change in the secretions should continue long without superinducing irritation, is very improbable.

Much of the confusion that exists on this subject, has arisen from the different meanings that have been affixed to the term, dyspepsia. Some, with Cullen, restrict it to mere weakness of the organ, and call the inflammatory state, which they admit is often superinduced on this, chronic gastritis; while others, adopting

the views of Dr. W. Philip, regard debility as the first, and inflammation as the second stage of dyspepsia. But the distinction between the varieties or stages of this disease, is one more of degree than of kind.

That vascular excitement or phlegmonoid irritation of the inner coat of the stomach, is one of the principal morbid conditions present in dyspepsia, appears evident from the following facts and arguments.

Many of the causes of the disease, and especially excess in eating or drinking, are calculated to excite inflammatory action; and many of the symptoms, such as the sense of heat, pain after meals or upon pressure, vomiting, thirst, and even the sense of debility, would indicate the same condition. The products of the fermentation of the aliment which takes place in dyspepsia, and the perverted, and probably acrid, secretions, would likewise irritate the mucous membrane.

A similar conclusion is arrived at by observing the effect of the *juvantia* and *lædentia*. The remedies most appropriate to pure debility often aggravate the symptoms of dyspepsia; whereas, speedy relief is obtained from the remedies of vascular excitement or inflammation. In a case lately under my observation, a natural remedy of this description was most effectual. A severe gastrodynia which had existed, with only short intervals of ease, during a period of two years, was immediately and permanently relieved by a hemorrhage from the stomach, so profuse as to have justified the most unfavourable prognosis founded on the loss of blood and consequent debility.

Various analogies lead to the same opinion. Most diseases which were formerly considered to be, essentially, debility of the tissues affected, have been ascertained to proceed from inflammation, although they do not all admit of its usual hazardous remedies. And in what other organ do we find so much disturbance as exists in the stomach of dyspeptic patients, without irritation being superinduced?

But the most satisfactory proof of the truth of this position, has been the inspection of the stomach of persons who have died while labouring under this disease. Not only after dyspepsia, but after a number of other diseases, has the mucous coat of the digestive organs been found inflamed; which, until late anatomical investigations, had never been suspected to be the seat of morbid affection, because there is seldom any accompanying pain to direct the attention to it. "Sur dix cas des maladies aiguës, (says M. Andral in his work on Pathological Anatomy,) qui ont leur point de départ ailleurs que dans le tube digestif, il en est huit à peu-près dans lesquels on observe un dérangement plus ou moins prononcé, soit dans la texture, soit dans les fonctions du canal intestinal. Dans les maladies chroniques, quelle qu'en soit la nature, il est infiniment rare que le tube digestif ne subisse pas quelque alteration." It would be a great mistake to suppose that typhus fever and some other diseases in which the digestive mucous membrane has been found inflamed, arose entirely from this affection, or that they would cease on its removal, but undoubtedly, their severity is much aggravated by

it, and their fatal termination may often be caused by it. In cases of dyspepsia, in which an inflammatory condition may not have been the first link in the proximate cause, but a consequence of debility or some other morbid change, it would still, as in many of the affections alluded to, demand the closest attention of the practitioner, on account of being the most dangerous circumstance attending the disease.

After the proof from dissections of the dead, that which has been afforded by what may be termed a vivisection, may be mentioned; and this is, perhaps, the strongest that can be adduced. I allude to the actual inspection, through a fistulous opening, of the inside of the living stomach, in the extraordinary case of St. Martin; and the opportunities thus afforded of ascertaining the effect on its lining membrane and secretions, of various circumstances connected with the ingestion of food and drink. "The observations of Dr. Beaumont (says Dr. Holland) under the singular facilities afforded in the case of St. Martin, in shewing to the eye the immediate effect of excess of food, as well as of wine, in producing an erythematous state of the mucous membrane of the stomach, render more explicit the influence of such excesses long continued; and the passage of slight and transient disorders to permanent diseases of texture. These living observations have a value tenfold that of any attainable in other ways." *

* Medical Notes and Reflections, by Henry Holland, M.D., p. 364, second edit.

Striking and most important as is this fact of inflammatory action proceeding from causes to which the stomach is constantly exposed, it is one that can hardly be discovered by dissection. Slight erythematic congestion would disappear very rapidly after death; and hence the error of Abercrombie and other writers, (an error into which, strange to say, they have been led by the very guide to our most valuable pathological knowledge,) who have denied the existence of inflammation in dyspepsia, because it has not been demonstrated in every instance, by morbid anatomy. *

The great variety in the symptoms, and especially in the histories or courses of different cases of dyspepsia, may be supposed to oppose the idea that irritation, or a minor degree of inflammation, constitutes the most essential circumstance of the disease. But, besides that much difference would result from the degree of this morbid action and its extension; as well as from its varying effects on the different secretions; it is exceedingly probable, that what has been called inflammation, is not so simple an affection as has generally been supposed. Several different kinds, have, indeed, been admitted, as the rheumatic, gouty, syphilitic, and scrofulous; and the stomach may be as subject to these as other organs are; but the varieties of inflammation that exist, are probably much more numerous. The immense host of dissimilar diseases of the skin would lead to this conclusion. Affections of the few tissues of which the

* Abercrombie on Diseases of the Stomach and other Abdominal Viscera.

skin consists, allowing that in each disease a different tissue is affected, would not be a sufficient explanation. Difference in the nature of the inflammation constituting these diseases, is a much more probable one ; and it is just as likely that similar differences occur in other parts or systems, but which cannot be seen as when exposed in the skin, nor be otherwise discovered. The great variety, occurring in different cases of catarrh, rheumatism, and diarrhœa, forcibly suggests such a variety in the inflammation constituting these cases. How little idea should we have had of the number of cutaneous diseases had they been concealed from the eye, and their only symptoms been the sensations of the patient, the disturbance of functions, and other usual effects of internal inflammation! That the capillary vessels could assume such a variety of action as to produce so many varieties of inflammation, will not appear improbable, when we consider the numerous varieties of the secretions in disease, and the number of morbid elements that are concerned in, or constitute the state which has been denominated, inflammation.

Although there may be great diversity of inflammation, it does not follow that each kind must require a different and appropriate remedy. In all the varieties, excitement or increased action is the principal circumstance of danger, and of this the remedies are known. Yet, as colchicum, mercury, and iodine, appear to have specific virtues in certain inflammations, so other specific remedies may not improbably be discovered in after-times, for other kinds, which may then

be distinguishable from each other by their symptoms, by chemical analysis of the blood and secretions, or other means. Though all cutaneous diseases are alleviated, in their earlier stages, by antiphlogistic measures, many of them yield to particular remedies, much more rapidly than they otherwise would. Should not these, or analogous remedies, have a fair trial in obstinate inflammations elsewhere situated, under the idea that an identity of morbid action may exist between such affections and the cutaneous diseases in which they have proved successful?

These observations on diversity of inflammation, are, to a certain degree, applicable to what has been termed, irritation. This word, which has been, perhaps, more vaguely employed than any other term in medicine, is used here in the sense in which it is generally used in this country, viz., to express an affection closely allied to, if not constituting, the first stage of inflammation.

In the cure of every disease, the attention of the practitioner is to be first directed to the removal of its cause, and of every circumstance continuing to operate, which is calculated to keep up the morbid action. An attention to the latter, is especially requisite in dyspepsia, on account of certain peculiarities in its nature. If a piece of gravel is projected into the eye and lodges in it, the first thing to be done is, to remove the foreign body; and afterwards care must be taken that the eye shall be kept motionless and shut, in order that the

stimulus of light, which might keep up the irritation or inflammation caused by the original injury, shall be excluded. It is precisely so with the irritation or inflammation of the stomach, that usually constitutes the most important morbid circumstance in dyspepsia. The original cause or causes may be no longer present, or, on the contrary, they may continue to operate injuriously, and may require removal; but, in addition to this, it is very necessary that whatever may tend to keep up the morbid condition of the organ so induced, should, as far as is possible, be carefully avoided. To exclude all stimuli from the stomach is, however, impossible; it cannot be protected from these by shutting the gullet, as the eye is protected from the light, by closing the eyelids; nor can it be kept, like the eye, in a state of rest. All we can do, is to carry out this indication, as far as possible, with safety to the general system. The body requires to be supported by a certain quantity of food; the blood is being constantly converted into the solid material of the frame, and requires, therefore, to be constantly renewed. We must, accordingly, supply the requisite sustenance, but in doing so, we must take especial care that it shall not exceed this quantity; and that it shall be of a quality the least calculated to stimulate the irritable or inflamed organ with which it comes in contact, either immediately on its ingestion, or during the time it remains in the stomach. If, from the disturbance of the vital energies that regulate the function of digestion, the ingested aliment undergoes those changes that would

take place amongst its particles, under the same physical circumstances of heat and moisture, when out of the body, irritation will arise from the acrid products of fermentation, as well as from the distension caused by the evolution of gases. These continually-recurring sources of irritation, and the additional source which exists in the acrid and perverted secretions of the stomach itself, constitute a very unfavourable circumstance in the diseases of this organ, as compared with similar conditions of other parts, and furnish another explanation of their usual obstinacy under the best medical treatment.

The removal of the original cause of irritation, and of the causes which may continue to operate, is often effected by attention to diet, and other parts of what is usually called, regimen; and this, undoubtedly, constitutes the most important part of the treatment of dyspepsia. Many of the milder and more recent cases would recover, although more slowly, perhaps, than if nature were assisted by art, by being let alone, or (to use a more correct expression) by being left to the sanative powers of nature, provided due attention were given to regimen. If this be given, recovery will often take place, even in spite of the exhibition of improper medicines; and hence it has happened that many drugs have been extolled as specifics in dyspepsia, which were either quite inert, or which absolutely opposed and retarded the cure. And hence, too, the immense farrago of drugs which have been employed, and still are employed, in this disease.

Abstemiousness and abstinence from certain articles of diet, may even be reckoned part of the natural cure; for a prominent symptom of dyspepsia (though not always present) is loss of appetite; and the pain or distension that follows the ingestion of improper articles of diet, or an excess of what is proper, is the loud admonition of nature to avoid the same error or excess in future.

An attention proportionate to the importance of the subject, has been given to the investigation of the subject of diet, as it relates to indigestion; and a code of valuable rules, respecting the quantity and kind of food, its comminution and admixture with the saliva, the times at which it ought to be taken, or rather, the intervals that should elapse between these times, and the relations which these times should bear to mental and bodily exertion—has been the result of this investigation. The practitioners who have been most successful in the treatment of this disease, are those who have most carefully studied this part of the cure; adapting to individual cases, the general rules alluded to; and enforcing, by some means or other, a compliance with these rules. It is to be regretted, that the undue importance which some medical practitioners have attached to particular articles of diet, as constituting the only safe aliment of the dyspeptic, or to some particular mode of cooking, as the only proper mode of preparing it, (distinctions, evincing, no doubt, wonderfully acute powers of philosophical observation,) should have tended to bring ridicule on this very

important department of therapeutics, and to lessen its value in the estimation of those who are to be benefited by its application.

Nor have other parts of regimen been less successfully investigated; although, as in the case of diet, there has been great difficulty experienced in persuading patients of the importance of an attention to the rules that have resulted from this investigation. Their compliance with these rules is often accidental, and proceeds from the confidence which they place in other measures of comparative insignificance. A striking illustration of this is afforded by the faith which is so generally placed by the public, in mineral waters as a remedy for dyspepsia, and all its train of sympathetic disturbances of the liver and brain, or of what are usually called, bilious and nervous disorders. That mineral waters are themselves frequently useful cannot be questioned, although often abused, and, generally, too indiscriminately employed; but, were it not that the search after these, obliges the dyspeptic to leave his home and his usual avocations, to breathe pure air, and find an occupation for his time in bodily exercise and various amusements, instead of anxious professional or other harassing engagement; many of the more valuable parts of regimen would never be attended to. The high estimation in which the remedial powers of sea-bathing are likewise held by the public, furnishes another illustration. How many sufferers from dyspepsia visit the coast for the purpose of bathing in the sea, for whom cold bathing is far from being advisable, and who yet derive the greatest benefit from the change of air and other cir-

cumstances connected with a temporary residence at a watering place! The operation of the causes of their disease may often be suspended during this absence from home; and if proper measures be, at the same time, taken for the removal of gastric irritation, the important indication of restoring the strength of the stomach and of the general system, will be thereby best fufilled.

It is very important, in undertaking the treatment of a case of dyspepsia, to ascertain whether it be the only disease present; and if there be others, to ascertain whether or not they are connected with the affection of the stomach. If dyspepsia be sympathetic, it will generally be much relieved, if not cured, by the removal of the disease which has induced it. But the parent disease, as far as human means are concerned, may be irremediable. Under these circumstances, it is still generally practicable to alleviate the disorder of the stomach; and it is very important that we should endeavour to do so; because the only chance of recovery from the original disease is, in the preservation of the digestive powers. If a considerable portion of general strength can thus be retained, and a tolerably healthy state of the blood preserved, nature may have sufficient time and material allowed her, for effecting a cure that would otherwise be hopeless.*

* "In morbis obscuris, aut incognitis, aut in quibus nullus locus est exinanientibus, et nulla certa remedia inventa sunt, nihil superest agendum, nisi ut corporis vires nutriamus, maxime per eas res quæ facultatem habent ventriculum reficiendi."

G. Heberden, Commentarii de Morborum Historia et Curatione. Cap 97.

It is better, perhaps, to regard constipation (a state so commonly attending dyspepsia, as to have been included in Cullen's definition of it,) as a sympathetic affection, than as only one of the symptoms; but in consequence of its much influencing the original disorder, it requires special attention from the practitioner, and the exhibition of those laxatives which experience has proved to be the least likely to aggravate the irritation at the upper extremity of the digestive tube. When the contrary morbid condition is present, or a lax state of the bowels, it is often noticed that dyspepsia is relieved by it, and caution must, therefore, be observed, when it is not in a dangerous degree, not to interfere too rashly in stopping what constitutes part of the natural cure. For, nothing in medicine is more sure, than that certain diseases springing up, relieve or cure other antecedent diseases; and, generally, on the principle of counter-irritation or revulsion. Nor is it altogether from a fanciful comparison, that the operations of our several remedies, have been denominated artificial diseases, removing natural diseases on the principle just mentioned, or as these often remove one another. The late Dr. Parry was of opinion, that dyspepsia itself affords an example of these salutary processes; and, undoubtedly, (though this is not his explanation,) where there is a tendency to apoplexy, gout, or other diseases, from repletion and plethora, safety may be ensured by a paralysis of the digestive powers cutting off the supply of nutriment. Dr. Parry's doctrine of a salutary reaction effected by

dyspepsia, is not so satisfactory as his other opinions on the nature of this disease. His reasonings on this subject, led him to nearly the same conclusions that the French pathologists subsequently arrived at, by their dissections.*—It is not my intention, however, to enter into any details respecting the treatment of diseases sympathetic with dyspepsia. The remarks which have just been made, appeared necessary for the illustration of the general principle; and I shall only add, that though they may sometimes relieve, at other times they re-act upon and aggravate, the parent disease.

We have seen that the milder kinds of dyspepsia will yield to strict attention to regimen alone; but other kinds are too severe, or have continued too long, to be conquered otherwise than by the interference of art. In the supposed case of injury to the eye, although the measures specified might be sufficient to restore its integrity when the injury has not been great, they would be inadequate for a greater task. Other and artificial measures are then required. If the inflammation be severe, it must be subdued by bloodletting, the application of cold, fomentations, blisters, or other antiphlogistic means. Similarly, remedies for the reduction of irritation or vascular excitement, must be had recourse to when this is the condition of the stomach; but should atony, without phlegmonoid irritation, be the cause of its derangement, different remedies would be indicated. If the disease be left to the unassisted powers of nature,

* Elements of Pathology and Therapeutics, p. 346, second edition.

it will continue to increase. The stomach itself, may, eventually, be irrecoverably affected with organic disease; the liver, intestinal canal, or other organs connected with the stomach in the chylopoetic function, may become permanently disordered; or the same fate may befall more remote organs, as the brain, heart, or lungs; or the functions generally of secretion and absorption become deranged, by nervous sympathy with the stomach, or in consequence of that deterioration of the blood which has been caused by depraved and imperfect digestion. The remedies which are at present employed for the cure of dyspepsia, are often successful in obviating these effects; but they also often fail; and many chronic maladies which have a fatal termination, may be traced to long-continued disorder of the stomach. When the bodies of such patients (as has been remarked by Dr. W. Philip) are examined after death, the patient is said to have died of disease of some of these parts, there being nothing in the appearance of the organs in such cases to distinguish the sympathetic effects of dyspepsia from diseases that originate in the organs themselves.*

* A Treatise on Indigestion, &c., p. 34.

It is extraordinary how long the more prominent and distressing symptoms of dyspepsia will mask the diseases which it has caused, when the organs which are the seats of these diseases, may be much affected without pain. I was consulted, sometime ago, by a lady who had laboured, more or less, for many years, under what was considered to be inveterate dyspepsia. I found, that with the usual symptoms of indigestion, there was dyspnœa, which, by means of the stethescope, I traced to disease of the heart; and there could be no doubt, from various circumstances related, that this disease had existed for a period of years, without being in the least suspected by her medical advisers. The dropsy which proceeded from it, was kept under by diuretic medi-

The remedies used in dyspepsia may be divided into two kinds, the external and internal. The first would naturally recommend themselves as being appropriate to a disease in which medicines intended to operate through the medium of other parts of the system, cannot be employed without coming into actual contact with the diseased organ; and experience has proved that they hold the first place in remedial value.

The two remedies of this description which have been principally relied upon for the removal of the irritation that usually constitutes the most important morbid condition in dyspepsia are, local abstraction of blood and counter-irritation. The first, in acute cases, is often so beneficial that patients will solicit its repetition upon any aggravation of their symptoms; and where the strength has not been much reduced by long-continued ailment, and the stomach itself is not especially debilitated, the repetition of this means from time to time has not been objected to. But, unfortunately, this is not generally the condition either of the stomach itself or of the system: the original debility, or that which may have caused or predisposed to the disease, has become increased by the general deterioration and impoverishment of the whole mass of blood; so that whatever immediate relief may be given by abstracting a portion of it from the neighbourhood of the diseased organ, is

cines; and it was hoped that life might thus be considerably prolonged with comparative comfort; but a sudden death, while sitting in her drawing room, at once revealed the principal cause of her complicated sufferings, and evinced how deceitful such hopes may be when the heart is the organ affected.

overbalanced by the injury which the already much-weakened system suffers from its loss, and by the enfeebling of the restorative powers of nature. Instead of debilitating, the restoration of the healthy vigour of the stomach and constitution is an important indication of treatment.

Counter-irritation by blisters, or antimony, has not this direct weakening tendency; and they are occasionally advantageous substitutes for the local abstraction of blood. Before I made use of a better means of somewhat analogous operation, I placed great reliance on long-continued counter-irritation in this disease, and I have witnessed the greatest benefit from it in cases that had resisted milder measures, particularly when produced by antimony, and the patient has submitted to an efficient application of this unpleasant remedy. Not unfrequently, however, whatever benefit might proceed from the derivation thus produced, is counteracted by the general irritation which these measures occasion; rendering them highly objectionable where much general irritability is present, whether this be constitutional, or in consequence of the disease for which they are applied as a remedy.

Impressed with a sense of the importance of the discovery of some means by which the duration of dyspepsia might be shortened, and greater assistance afforded to nature in her curative operations than can be given by regimen and the few medicinal substances that are really useful, I very soon, after ascertaining its value in analogous affections, made trial of the effectual applica-

tion of heat and moisture, as described in the preceding section; and the result of a very extensive use of this remedy in dyspepsia is, that I can recommend it as being by far the most beneficial and most generally applicable measure, that has been hitherto employed in its treatment. While it is powerful in operation, it is perfectly safe; and its use is compatible with whatever other means may be indicated by the presence of particular symptoms.

The great or characteristic quality of this local application is, that it represses the vascular excitement which constitutes the principal morbid element, without increasing the debility, local or general, which likewise forms an important part of the disease. In this respect it has a decided advantage, in the vast majority of cases, over the application of leeches or other modes of abstracting blood; and being a remedy which soothes instead of irritating, and yet operates in great part by revulsion, it has an equal superiority over counter-irritation as it is usually produced.

Heat with moisture is by no means a new remedy in indigestion. It was in use eighteen hundred years ago. In the works of Celsus, warm applications, or cataplasms, are mentioned as a remedy to be employed in inflammatory and other affections of the stomach; * and similar remedies have ever since been

* Celsus de re Medica, lib. IV. cap V. De stomachi morbis et curationibus. The means recommended by Celsus are described as, "Cataplasmata quæ simul et reprimunt et molliunt;" and as, "Calida ex farina Cataplasmata."

more or less in use. But the comparative inefficiency of these, arising from the very defective manner of applying them, has prevented their general employment, except where extreme suffering called for every available means. The observations that have already been made in the preceding section, render it unnecessary to explain the difference which exists in remedial power and safety, between heat and moisture as it has hitherto been applied, and as it may be applied by the current apparatus. The want of uniformity and continuance of the heat, and the trouble and discomfort of the application, were the great objections; there was comparatively little to be gained, and this was to be gained at great cost. The general or entire bath, which is more uniform in operation, although it certainly acts beneficially on the local disorder so long as it can be safely employed, is comparatively inefficient, on account of the short period during which a bath of the requisite degree of heat can be continued; and, were it used for longer periods, or more frequently, what would be gained in this respect would be counteracted by its general and pernicious excitement of the system, as well as by the debility that would result from its long-continued action on the skin.

On commencing the use of the current apparatus in dyspepsia, I limited its employment to the more acute cases, or those in which excited or inflammatory action was made manifest by the symptoms; but suspecting that very few cases of dyspepsia exist without vascular excitement to a certain degree, I extended its use to

most cases that occurred, under the idea, which experience has shewn to be correct, that if it failed in being advantageous, it was not likely to have an opposite effect. The result has proved (as far as the operation of a remedy can prove), that the opinion of the almost constant presence of vascular excitement in dyspepsia was correct; for in very few cases has this means of applying heat and moisture been employed without more or less benefit.

The following are the general rules which my experience in the use of this remedy, would authorize me to recommend as those by which its application should usually be governed.

The degree of heat must be regulated by the time of its continuance and the extent of surface to which it is applied. It must be in an inverse proportion to these; and should not be greater than what yields an agreeable soothing sensation to the patient. When the application has been continued for two or three hours, night and morning, over a moderate extent of surface, a temperature varying between 105° and 110° has been that usually employed. Patients, however, differ considerably in their sensations in respect to heat, and in their tolerance of its continuance; and it must be accommodated to these differences. Some find even 105° too high, if long continued; and others have declared that 115° has communicated the most agreeable warmth. So high a degree as the last would be improper as a continued application in dyspepsia, because the whole system would quickly become heated, and probably, with

an unfavourable tendency as respects the disease. To obviate this general effect on the system, it is usually advisable to cover the other parts of the body lightly, while the cushion is being applied, in order that any excess of heat may easily pass off.

The extent of surface to which heat and moisture have usually been applied, is covered by a water cushion three quarters of a foot broad and three times the length. The cushion, after having had its inner surface made thoroughly wet, is placed over the left side, and is kept close to it by a bent piece of covered sheet lead. Various circumstances, however, will render it proper that this size of the cushion should be altered. When the irritation has spread to the contiguous chylopoetic organs, it may be required of a larger size; but when there is much tendency to general heating of the system and perspiration, the cushion described ought to be made smaller by folding.

During the day, after the application, the patient has usually worn a broad flannel band, surrounding and supporting the body; for the purpose of keeping up, in some measure, the action produced by the cushion, and as a defence against the influence of cold.

The application ought to be continued day after day until the symptoms have subsided; and it should be resumed on any relapse. Relief is generally speedily afforded by it; and after a few days' application, a general amelioration of symptoms may, in cases of ordinary occurrence, be confidently expected.

The time during which these daily applications ought

to continue will vary, of course, according to the severity of the disease and other circumstances. When dyspepsia has been of such duration and severity as to have caused organic change in the textures of the stomach, no speedy effect can be expected from this, nor, in fact, from any other measure; but it is consolatory to know, that it often continues long and in an aggravated form, without any such change. I am at present (October 9) attending a young woman, a patient of the Dispensary, whose case furnishes an illustration of this remark. She has had stomach affection for four or five years, and during the last five months to so severe a degree, attended with hæmatemesis and other peculiar symptoms, as to excite the fear that disorganization had taken place. It was on this account, indeed, that my attention was directed to the case by the House Surgeon of the Institution; and I found that the severity of her sufferings, which had resisted all the remedies usually employed, fully justified this view of the case. But the very speedy and great relief she has received from the uniform application of heat and moisture, unaccompanied by any other measure excepting medicines required for a disturbed state of the bowels, would show that the disease had not yet arrived at this stage. Within ten days from the commencement of this application all uneasiness has been removed, excepting that which is occasionally caused by the pressure, or rather the tightness, of her clothes; the vomiting has ceased; her appetite has returned; and she can now take a moderate quantity of food without any consequent uneasy sensation.—

As a contrast, however, to this case, another may be briefly alluded to, which is likewise at present under my care. The patient had been recommended by her medical attendant at Hereford to try the effect of a residence on the coast, as every medical means, continued during a period of years, had proved utterly unavailing. She vomited after every meal, however scanty, and was suffering under an aggravated form of pyrosis. With other measures, especially indicated by the latter symptomatic affection, I directed the application of the current apparatus, but, hitherto, with very little permanent effect. It soothes during the time of its application, and is willingly resorted to by the patient on that account; but in the intervals, the vomiting and pains recur,—leaving little doubt of disorganization having taken place, and to a great extent. The sallow hue and peculiar expression of the patient's countenance, and her extreme emaciation, would confirm this unfavourable opinion.

Other instructions respecting the use of this apparatus will be given in the succeeding section: what has now been detailed, appeared necessary for the proper understanding of the principle of the cure.

Before concluding these general directions for using the apparatus, it may be well, in order to prevent the abuse in its employment which practitioners may commit who have not duly reflected on the subject, to add a few further remarks on the degree and continuance of heat that are usually the most appropriate.

The plan which I have adopted of limiting the applications as just described, is convenient, and affords the

opportunity, by the long intervals, of attending to points in the regimen which may be of great remedial importance; but I am by no means certain that a longer continuous action of heat and moisture might not often be a more efficient measure. Care must be taken, however, in the application of this remedy, that it shall not be carried to excess. The effects of the application of this apparatus are not to be judged of by those of common cataplasms and fomentations. To do this, would be to commit the absurdity of supposing that a great increase of power, and a difference in its mode of acting, would produce no difference of operation. The passage from Sir Astley Cooper's Lectures (page 17) describes the usual effects of heat combined with moisture; and surely, if these agents possess so much power when used in the common way, there must be a limit to the time of action when their power is so much increased, and rendered so uniform in its operation, as it is by the Current Apparatus. If this remedy be abused, it will, probably, be by its being employed to too great an extent in individual cases, under an erroneous estimate of its power. If applied as I have directed, it may be used with perfect safety. At least, I have known of no instance in my extensive employment of it, where any injurious effect has followed its application. In those very rare cases, indeed, where debility without vascular excitement or irritation, may constitute the essential morbid condition, the use of heat and moisture would not possess any curative power; but it would not, like many of the remedies usually employed in dyspepsia,

have any injurious tendency; and though it did not act as a remedy, it might be useful as a prophylactic, and prevent the phlegmonoid irritation which must so closely follow on such a condition.

After these observations on the external remedies of dyspepsia, the order of our subject leads us to a brief consideration of those that have been administered internally.

As remedies for the debility and irritation which constitute the more essential morbid conditions of dyspepsia, little faith can be placed in any internal means. Experience has not proved the utility of many, nor does theory recommend them. Inflammatory irritation elsewhere, is seldom to be relieved by the direct application of remedies to the affected part: there would be little contra-stimulant action from emetic tartar in opthalmia, if it were dropped into the eye. It may be said, however, that the treatment of the diseases of this organ—which has already furnished us with a subject for comparison—forms a contradiction to this position; and it is true, that nitrate of silver has been employed both in diseases of the eye and stomach. The difference, however, is obvious between the application of this to so small and well-defined a surface as that of the conjunctival membrane, and to the large and varying surface of the stomach; where, moreover, the caustic is mixed with, and acted upon by other substances. Yet it cannot be denied that nitrate of silver, whatever its *modus operandi* may be, has often been employed with benefit for the relief of certain symptoms in dyspepsia; and but

for its occasional unhappy effect in permanently changing the colour of the skin, it would probably have been much more extensively used. Similar remarks might be made on some other substances employed in stomach affections. Hydrocyanic acid is a remedy for some of these, as it is also for certain painful cutaneous affections, when directly applied to them ; but, to say nothing of the difference in the nature of the irritations, so large a quantity of the medicine taken into the stomach, as is used in diseases of the skin, would act as a virulent poison. When prussic acid acts beneficially in dyspepsia, it probably does not operate by its direct application, but through the medium of the nervous system. It is not unreasonable, however, to suppose that certain tonics and stimulants may have a beneficial local action on this disease, when they are exhibited in its decline, and for the removal of the debility which may continue after all phlegmonoid irritation shall have ceased. The analogous operation of stimulants, applied locally in other diseases, would countenance this view of the subject. But when inflammatory irritation is present, the action of these remedies, mnch employed though they may be, and constituting in fact, the routine treatment of indigestion, cannot but be prejudicial.* The irritation from the direct application of internal remedies, might be avoided

* "I give tonics and cordials (said the late celebrated Dr. Gregory) because others do, and the patients would think themselves neglected without them. I trust to the regimen. It is allowable to deceive them for their own benefit."—Notes on Dr. Gregory's lectures on Dyspepsia —*Medical Gazette*, vol. XII, p. 763.

If the medicines given for these reasons exert no influence whatever—

by exhibiting them in some other way than by ingestion; and from what I have observed in practice, I am inclined to think, that these may yet be found amongst the medicines which have been supposed to possess a specific quality in certain peculiar kinds of inflammation, as before alluded to.

If the essential morbid conditions of dyspepsia are seldom to be relieved by the medicines hitherto employed, it is otherwise as respects several affections, which, from often accompanying dyspepsia, have by some been reckoned symptoms of it, although by others they are regarded as separate diseases; such as cardialgia, gastrodynia, pyrosis, morbid sensibility, &c. These are much under the influence of internal means, judiciously administered; but, unfortunately, their most suitable remedies are not always the best adapted for the co-exist-

if they have no power of doing either good or harm—their exhibition can, of course, be of no importance, as not interfering with the remedial effects of regimen and external applications. But that it is allowable to deceive patients for their benefit, is a maxim of which the truth is very questionable. There can be no impropriety in occasionally so imposing on children, but when the reason is mature, it is surely better for the practitioner to address himself to it, than to practice deceit. It is better to confess our ignorance of what can do good, beyond what can be effected by the remedies we have already employed. Patients ought to be made to understand, that it is sometimes possible for them to recover, without always 'taking something.'—The other reason assigned for administering these medicines, "because others do," reminds one of Cowper's story of the boys robbing an orchard.

It is proper to state, that the quotation to which these remarks refer, is extracted from a pupil's notes of Gregory's Lectures; and it is probable that some explanatory matter may have been omitted. In the notes of these Lectures, which I myself took, I find an expression of want of confidence in the tonic power of such medicines; and a characteristic query, whether prize fighters could be prepared for the ring by quassia or gentian, in lieu of beef or mutton.

ing irritation of the stomach. It would, however, be irrelevant to enter further into the consideration of this subject: our attention is at present directed to the morbid affections properly constituting dyspepsia; and it must be confessed, that the internal remedies exhibited for these, have much more frequently disturbed and opposed the sanative operations of nature, than assisted them.

There is no disease, in fact, in the treatment of which there has been greater abuse of drugs than in dyspepsia; and in addition to the evil thence directly resulting in an increase of irritation, (though there may occasionally be a momentary relief from their exhibition,) this confidence in medicines diverts the patient's attention from regimen, by which the important indication of restoring the healthy tone of the stomach, must be principally fulfilled. "Here, unhappily, as in so many other cases, (as Dr. Holland has so justly remarked of regimen,) the simplicity of the means forms a hinderance to their sufficient application. What is obvious, can rarely be brought into successful competition with what is vague and obscure, in the treatment of disease."* A similar hinderance will, in all probability, be experienced, from the same cause, to the employment of a means so simple and so devoid of all mystery, as the continued application of heat and moisture.

It was my intention to insert some observations, at this place, on the use which I have made of heat

* Medical Notes and Reflections, p. 385.

and moisture, by means of the current apparatus, in other inflammatory and irritative diseases, as illustrations of their action in dyspepsia; but as the work has already nearly extended to the desirable limits, and there yet remain some details to be given, respecting the construction and management of the apparatus, I must confine my remarks within very narrow bounds.

The affections, the nearest allied to dyspepsia, are the numerous irritations of the mucous membrane of the intestinal canal, which are productive of, or concerned in, so many diseases of the sanguiferous system, and what are also a fertile source of those called, nervous and spasmodic. In the treatment of these affections, no remedy will be found more efficacious than continued heat and moisture.

The good effect of the same means will not be less conspicious in pectoral diseases of analogous character. In the inflammatory affections, either bronchitic or pneumonic, that so extensively prevailed last winter, in combination with hooping cough, and which proved so fatal amongst children; I am much mistaken, if any remedy was more unequivocally of advantage than heat and moisture, even when applied by the common means. It appeared to be as effectual on these occasions, as it is recorded by that acute observer, Huxham, to have been in his hands, when employed for pleurisy.*

In pulmonary consumption, chronic bronchitis, and senile catarrh, there is generally, as in dyspepsia, that

* Dissertation on Pleurisies and Peripneumonies, by J. Huxham, M.D.

combination of inflammatory irritation with debility, which calls for a remedy that will remove the vascular excitement, without farther lessening the strength. Heat and moisture are, therefore, especially indicated as an appropriate remedy; and but for the discomfort or distress which the usual modes of applying them so generally cause to the patient, already irritable from disease, they would, no doubt, have been more employed. Irritation and cough, that have not yielded to such doses of anodyne medicine as could be employed with safety, I have seen quickly subside under the use of continued heat and moisture; and I am disposed, therefore, to look upon these as deserving a high place amongst the remedies of bronchitis in all its varieties, and especially in that which attacks persons of advanced age. Even in pulmonary consumption, I believe that the use of such means will be found of the greatest importance; particularly, if employed in its earlier stages. It is the safest, and perhaps the most effectual, mode we possess of subduing the inflammatory irritation, from which the greater part of the mischief attending phthisis proceeds. Nor is it to the chest alone that such fomentation can be beneficially employed in phthisis. It is well known that the fatal termination of the disease is often much accelerated by ulceration of the intestines, and no measure, probably, could be more serviceable in preventing or checking this, than that under consideration. If, as Dr. Stokes says, a permanent cure is to be effected in phthisis by the natural means of cicatrization, (in which, with the illustrious Laennec, he

places much confidence,) whatever enables us to prolong life will give nature an extended opportunity of operation.* If we may indulge the hope of ever being able to cure phthisis, this will probably be effected by the invention of means by which inflammation will be repressed without increasing the general weakness, while nature ejects, or otherwise relieves herself of, the tuberculous matter that oppresses and eventually ulcerates the lungs.

But if the disease cannot be cured, its course may be suspended. When the tuberculous deposition has taken place only to a small extent, and the tendency to farther deposition has been checked by judicious medication and regimen, it will often happen that, by avoiding the causes of irritation, and checking it when it occurs by appropriate measures, the tubercles, if not absorbed, will long remain in what has been termed, their latent or unirritating state.

The possibility of the absorption of tuberculous matter has been denied, wherever occurring, whether in the lungs or lymphatic glands; and undoubtedly, if it be true that this matter is deposited on the free surface of the mucous membrane or into the pulmonary vesicles, the assertion, so far as the lungs are concerned, may be correct; though even then, as Sir James Clark has observed, the matter may be ejected by coughing or vomiting. This opinion, however, of the seat of the deposition requires confirmation; and as respects tuber-

* Cyclopedia of Practical Medicine, vol. II., p. 348.

culous matter elsewhere, (which both chemical analysis and microscopical observation would show to be identical with pulmonary tubercle,) I think the assertion that it cannot be absorbed, may be disputed. In the case of a child, where numerous scrofulous abscesses simultaneously occurred, and where there was much apprehension of severe irritation ensuing on the breaking of the abscesses, (for a practitioner of high authority in the profession had ridiculed the idea of their healing without breaking,) only two ulcerated, and the remaining seven gradually and entirely disappeared. It may be said, that only part of the contents of such abscesses is absorbed, and that the tuberculous matter remains in a latent state; or it may be alleged, that neither in abscesses of this description, nor in the greatly enlarged glands on the necks of the scrofulous, (which so often and so completely subside,) does tuberculous matter exist at all. The first explanation is rendered improbable, as respects the case related, by the fact, that five years have elapsed without any return of tumour or abscess; and the idea of the non-existence of tubercles in the localities specified, is equally untenable, although it would be tedious and foreign to our subject to bring forward the reasons against it. The opinion, moreover, that tubercle may be absorbed, is supported by analogy: we see numerous other depositions or adventitious products so removed; nay, even that which constitutes cancer, disappears under the mechanism contrived for the steady application of equable pressure. There may, besides, be several very distinct kinds of pulmonary tubercle, just as there may

be many kinds of inflammation, and some may be more removable by absorption than others. Or, tubercles, either wholly or in part, (that part which has resisted absorption,) may remain shut up, as it were, by the adhesion of the sides of the cavities in which they lodge, and be no longer a source of irritation. In the event of serous effusion into the cavity of the chest, the lungs would be compressed, and a better opportunity be thus afforded for such adhesion—a process, which, as I have said elsewhere, is perhaps not altogether beyond imitation by art.* In addition to these possible modes of natural cure or suspension of the disease, the opinion of M. Andral may be mentioned, that, when after the absorption of the rest of the tubercle, only a cretaceous matter remains, irritation may not be excited by it.

These remarks are made with a view of opposing the idea too commonly entertained, and which discourages all exertion, that alleviation of suffering is the most that the patient afflicted with phthisis can expect from the art of medicine. Although he can, even in the earlier stages, (granting that the existence of the disease can then be ascertained beyond all doubt) have little expectation of being so fortunate as to obtain a perfect cure, he may reasonably hope, that under judicious management, he will not only avoid suffering, but that his life will be much prolonged.

* See *Medical Gazette*, August, 1844.

SECTION III.

ON THE CONSTRUCTION AND MANAGEMENT OF THE CURRENT APPARATUS.

During the five years in which I have employed this apparatus, it has undergone many changes and improvements, suggested by circumstances occurring in the cases in which it has been employed; and though still, no doubt, susceptible of improvement, it may be regarded as free from any defect that would materially interfere with its utility.

Whoever has read the preceding Sections of this work, will not be surprised at the pains which I have taken to bring the Current Apparatus to its present comparatively perfect state. Impressed with the idea, that a means of applying Heat or Cold with perfect uniformity, and of otherwise bringing these agents under complete control, would be a most important addition

to therapeutics,—a supposition that repeated trials soon strengthened into conviction,—I conceived that the time I devoted to this subject, could not be better or more usefully spent, And being well aware how apt medical practitioners are to be embarrassed by encountering unforeseen difficulties in the use of instruments or apparatus of any kind; and how necessary it is to prevent these embarrassments, if it be wished that such means should come into general use; I have spared no endeavours in contriving that the apparatus may be as easily managed by others as it has been by myself. Simple as the idea may be of confining a current of water to any particular part, I have found the perfecting of the means by which this idea was to be carried out, a tedious and irksome task:—but having no wish that the reader should participate of this trouble,—nor that he should be wearied with a history of other but inferior plans which I have tried for accomplishing the same purpose, or with the reasons why certain contrivances in the Current Apparatus have been preferred to others,—I shall immediately proceed to a description of what I consider the best construction of the apparatus, and the proper mode of using it.

The principle of the Current Apparatus has already been briefly explained—(page 38;) and this explanation, together with a reference to the Plate, will at once enable the reader to understand the following details.

GENERAL DIRECTIONS FOR USING THE CURRENT APPARATUS.

In placing the cushion for the application of cold, that

part of it from which the water is to issue, must be the highest part, in order that the whole of the heated water may escape. In warm applications, on the contrary, the waste tube or tubes must proceed from the lowest part of the cushion.

When a water cushion of some depth is employed, as when it is required to surround the chest, it should be partially confined to the part, or supported, by a piece of covered sheet lead bent into the proper form, or by a trough, or "supporter" of wood, tin, or other resisting material.

When, in addition to the regulation of temperature, pressure is to be made, as in ulcers and certain diseases of the skin, it is necessary that the cushion or bladder should be completely confined to the part, by a bandage or a supporter; the waste-pipe must be partially closed by its screw-stopper; and the reservoir of water be raised until it gives the appropriate degree of pressure. But when it is intended only to alter the temperature, as in applying cold in certain affections of the head, or of the eyes, and after surgical operations; or heat with moisture in affections of the lungs, stomach, or bowels; care must be taken that the cushion shall not become distended. To prevent this, the open end of the waste-tube should be fixed to the sliding rod of a stand, on a level with the desired height of the water. On many occasions, however, where it is wished that the operation of the apparatus should be restricted to the change of temperature, it will be well, in order to ensure that the cushion shall always contain a sufficient quantity of water, to apply it as if for the purpose of causing gentle

pressure, as a slight degree of this will not, generally, be objectionable.

Interruption of the stream will usually be found to proceed from the vulcanized rubber tube being pressed upon, or bent at too sharp an angle; from the channel where the tubes enter the cushion being obstructed by the twisting of the cushion or bladder, or its pressure against their openings; or from some substance in the water obstructing the tubes. If air obstructs them, it can be pressed out by a greater weight of water, or by squeezing the rubber tube.

Should the current be interrupted from any other cause not easily removable, the water can still be withdrawn from the cushion and again supplied to it, at short intervals, through either of the tubes. A simple and useful apparatus, on this principle,—consisting of a small can for water, a cushion or bladder, and a long and wide flexible pipe connecting them,—is adapted for the treatment of pectoral and abdominal diseases in children, whose restlessness often impedes the operation of the current apparatus; and it may be used in other cases, as for pressure exclusively, or where only a limited supply of water can be obtained. This modification has been termed, the "Intermitting Current Apparatus." The cushion may be made so that another tube may be attached to it afterwards, if convenient, in order that the current may be established.

In the treatment of diseased joints and other affections of the extremities, by equal fluid pressure, it is generally an advantage to support the lower part of the limb by

a common bandage. Sudden transitions of temperature ought to be avoided, both at the beginning and end of the application of the Current Apparatus.

A thin or prepared bladder will form the best cushion, when it is important that it should remain in close contact with an irregular surface, as in applying the equal and uniform pressure of water to eczema and other cutaneous affections of the face, or in the treatment of certain wounds or ulcers. Such a membranous cushion is also to be preferred, where a great degree of cold is desired. But for most purposes, thin macintosh cloth is the proper material. It is particularly so where very large cushions are required, as for the removal of the morbid degree of heat in cases of ardent fever; for causing revulsion to the extremities by heat; and in the treatment of certain diffused and obstinate diseases of the skin. It has already been mentioned, that the inside surface of the cushion should, in general, be moistened before application; or the cushion may be inclosed in a wet flannel case.

CONSTRUCTION OF THE CURRENT APPARATUS.

THE RESERVOIR.

WHERE it is of importance that the pressure of water in the cushion shall always be the same, (as it is in every case in which the remedial application of *equal* pressure is desired,) or that the stream of water

shall be uniform, the reservoir must be constructed on the principle of the fountain bird-glass, or ink-glass; having an opening, nearly an inch in diameter, close to the raised bottom, with a pan in front, about three inches deep, and having a stop-cock, about an inch below the opening in the body of the vessel. The reservoir is of japanned tin, and contains about four gallons of water. When it is used for warm water it must be covered by thick flannel or some other non-conducting substance, or a small lamp may be placed under it.

The reservoir for the "Intermitting Current Apparatus" is a can, containing about six pints, with an opening near the bottom for the stop-cock.

THE WATER CUSHION OR BLADDER.

A thin or prepared bladder will form the best cushion, when close contact with the skin is desirable. The pieces of brass for connecting it with the supply and waste tubes, are made with a neck, to prevent the slipping of the bladder; they are made as light as possible; and that part which projects into the bladder should have holes in the sides, as well as that through the centre.

The particular kind of macintosh cloth principally used for water cushions is, that which is called "zephyr cloth" by the makers. It is thin, yet sufficiently strong and durable. The practitioner might prepare the

cushions himself, and with the cans of dissolved India-rubber there are directions given for its employment for such purposes; but it will generally be more convenient to procure them from the manufacturer. For the Current Apparatus, each cushion must have at least two brass connecting-pieces fixed in it, and in situations appropriate to the purpose for which it is used. In the cushions employed in the treatment of dyspepsia, for instance, one piece is inserted about a third from the corner in the *long* margin, and another in the middle of the *short* margin. When the "intermitting apparatus" is used, that in the long margin is alone sufficient.

The cushions must be of various forms, adapted to their several uses. That commonly used in dyspepsia, the dimensions of which have already been given, (page 79,) is of a convenient size, and answers for various other parts of the trunk, the joints, &c,; but when the whole chest is to be covered, one of much larger size is required, and double the number of tubes may be advantageous. For the head, the cushion must resemble a double nightcap; and for the limbs, it may be made like a double glove, or stocking.

Cushions of macintosh cloth are very durable; and when they leak, they can be easily repaired by detaching a bit of the outer from the inner layer, after moistening it with oil of turpentine; then cutting this off, and replacing it by another bit of cloth covered with caoutchouc varnish.

THE SUPPLY AND WASTE CONDUITS.

The recent invention of vulcanized India-rubber affords the best material for these. If made of this, they should be thick and have a bore of at least $\frac{3}{8}$ths of an inch. The supply-tube is about four feet in length. One end is fixed to the stop-cock of the reservoir by a brass stopper, like that of a bottle, and has a small cork or stopper suspended from it, by which it may be closed, when it is removed from the reservoir; the other end receives one of the connecting pieces of the cushion, or is screwed to it. The waste tube may be of various lengths, suitable to the distance of the waste vessel from the patient, and it receives at its outer end, especially when pressure is to be made, a brass screw to act as a stop-cock. When the end of the waste tube rests on a stand, it receives a piece of pewter tube, instead of the brass screw.

THE SUPPORTER.

This constitutes a very essential part of the apparatus; its purpose being to prevent the weight of the water dragging or pressing on morbid parts, or on the yielding cavities, and to keep the cushion in close contact with the skin. A convenient supporter for the cushion used in dyspepsia is, a piece of sheet lead covered with calico, and of rather smaller dimensions than the cushion. For the head, a similar piece of lead is bent into the form

of a sort of trough, and a circular piece of calico is sewed to its covering all round, to support the top of the cushion. For the thorax and abdomen, I have occasionally used a sort of wooden trough, the sides of which may be brought nearer the centre by means of ranges of holes in the piece constituting the bottom, and corresponding plugs in the side pieces. The large cushions used for surrounding the chest or abdomen, often require to be tied with tapes to these supporters, to prevent the floating of the patient's body.

Other contrivances are preferable for certain purposes, as supporters. That which was first used in a case of diseased ankle, and which is described in the Appendix to my "Essay on Therapeutical Enquiry," was a sort of boot, made of tin, opening lengthways by hinges; it fitted the limb closely above and below the diseased joint, but was much larger in the middle.

MISCELLANEOUS PRACTICAL OBSERVATIONS RESPECTING THE MANAGEMENT OF THE CURRENT APPARATUS.

During the earlier part of the period in which I have used this apparatus I was in the habit of recording points respecting it, as circumstances directed my attention to them in practice. Some of these I shall now transcribe from my note book; others have been incorporated with the preceding observations. However conversant the practitioner may be with the principles of hydraulics, he will find that a knowledge of these is not alone sufficient to enable him to

apply this apparatus properly. There are various minutiæ that must be attended to, which could only have been learned by using it. Some of the following are of that description; others relate to medical points.

The degree of remedial heat generally most appropriate to dyspepsia, has been mentioned towards the end of the preceding section; and the same degree is appropriate to the applications of this apparatus in other affections of the great cavities. The proper degree of cold has also been elsewhere mentioned, but the subject may be briefly repeated here. The patient's sensations are in general the best guide. In an interesting case, lately under my care, of irritable and most painful ulceration of the leg from varicose veins, and where the current apparatus was kept constantly in operation for several days, the temperature which at first gave most relief was 65°; higher temperatures were gradually substituted as the pain subsided; but a range from 70° to 75° was generally that used, whilst the inflammation continued. Although not immediately arising out of the subject, it may be mentioned that this patient slept more soundly every night she used the Apparatus, than she had done for weeks before. The embarrassment from it was as nothing, compared with the freedom from pain.

The rapidity of the current must be regulated by the size of the cushion, the degree of inflammation, and other circumstances. Larger tubes, or a greater number of them, and raising the reservoir, will, of course, increase its rapidity.

Although a slow current of water through the cushion or bladder, might be deemed equivalent to a higher temperature of the water in the cistern, inasmuch as the water becomes warmer by its longer contact with the body, no reliance must be placed upon this in regulating the temperature. In a case of very sensitive inflamed breast, to which this apparatus was applied, the patient complained of a painful sense of coldness close to where the supply tube joined the bladder. A moderate current, or a fast dropping of the water from the end of the waste tube, will be sufficiently rapid, in cases where the cushion used is small; but when it is very large, a larger tube than that usually employed, or several tubes, may be required.

In using the intermitting apparatus there is advantage from a large quantity of water in the cushion, as it retains the heat longer, and does not, consequently, require to be so often renewed. In a large cushion used with this view for hot applications, the warmer particles of water must ascend, to replace those which have cooled from contact with the body; and the contrary takes place in cold applications; different adaptations being, of course, required for these ends. In this manner a current is established inside the cushion itself; and on the same principle, with the appropriate vessels and pipes, a circulating apparatus might be constructed.

The pressure of the cushion in ulcers, chronic inflammations, diseased joints, &c., must be regulated by the sensations of the patient. It will generally be that which

is produced by an elevation given to the reservoir of from 10 to 20 inches.

In applying a bladder of water to ulcers, &c., it answers well, when it is of small size, to cover it with a bit of cloth, which must also surround the body or limb. The brass pieces which connect the bladder with the supply and waste tubes, must pierce this cloth, and where they pierce it, they should be tied to it, in order to prevent the twisting of the bladder, and consequent obstruction of the channel.

Care must be taken, by the tightness of fittings, and by preventing the reservoir from being at any time quite emptied, that no air shall enter the cushion with the water.

When the apparatus is not employed to produce pressure, the end of the waste pipe should not be depressed and made to act as a syphon.

The floating of the body on a cushion placed under the back or hips, may sometimes be useful, in preventing injurious pressure on morbid parts; but generally, it will be necessary to prevent the accumulation of the water at the bottom of the cushion, whether applied to the body or limbs, by using one that does not open beyond a certain extent, or by fixing it to the supporter, as already described.

When long vulcanized rubber tubes are employed, the patient is scarcely under more constraint while the apparatus is being applied, than he would be without it; he can alter his position without impeding its action; and if he wishes to rise, he can himself easily separate the supply tube from the reservoir. As it is very

necessary, however, that the waste pipe should issue either from the highest or lowest part of the cushion, according as the application is of cold or heat, the cushion must either be shifted when the position is altered, or a cushion having more than one waste tube connected to it must be used—an arrangement especially convenient in using this apparatus, in cases of determination of blood to the head.

In affections of the head, it should be contrived that the water may be drawn off from the lowest part of the cushion, in the event of interruption of the current from the restlessness of the patient. If there be no tube already fixed to this part, one of the upper tubes may be continued in a manner, to the bottom of the cushion, by unscrewing it, and inserting a bit of metallic pipe through the connecting piece. And it is desirable, also, that the reservoir should not be higher than is necessary to produce a current, in order to prevent any pressure on the head from its casual stoppage. I am more particular in my remarks on the use of the Apparatus in diseases of the head, as in none can it be employed with greater advantage. I attribute the recovery of several cases of acute hydrocephalus to the use of this measure in the earlier stage of the malady; and in fevers of various kinds, and certain varieties of mania, no remedy is of greater importance. The ice-bag, hitherto employed in such cases, has two great defects: it is of too low a temperature; and from having no "supporter," it remains in contact with but a small part of the head.

A description of a peculiar water-cushion is given in

the "Essay on Therapeutical Enquiry," which may be repeated here, as the modification is preferable, in some diseases of the extremities, to those in common use. "A lady had been affected, for several months, with a diffused pain and tenderness in the forearm, preventing the use of it, and depriving her of sleep. The affection had been termed, and probably correctly, a diffused chronic inflammation of the cellular membrane. It had resisted a variety of remedies, amongst the principal of which was a bandage, applied with the greatest care. I wished to have an apparatus of Macintosh cloth prepared, for applying equal pressure, and regulating the temperature; but as the greatest anxiety was expressed that something should be done without delay, I substituted the following expedient:—Two tin collars, or bracelets, were procured, just large enough to slip over the arm; and a circular piece being cut out of both ends of two large ox bladders, they were firmly tied upon these collars, one over the other. Two pieces of tube were tied into the outer bladder, for the purpose of conveying liquid to and from the space between it and the inner one; and in order that this space should not be wider than was requisite, as well as for the purpose of giving strength, the bladders were covered with a piece of calico, in the form of a sleeve, which was likewise tied at both ends to the collars. The arm was now placed in its membranous case and the water admitted. The temperature of the water, which passed in a slowcurrent, was at first that of the body, but it was gradually reduced to as low a degree as the patient could

bear with comfort. The degree of pressure was regulated by the same criterion; it was generally that produced by keeping the end of the waste pipe about a foot above the arm. In less than two days so much relief was experienced, as to render the continued application of the apparatus unnecessary. Towards the end of the process a little water oozed from the bladders, which made it necessary to rest the arm in a sort of trough; but this inconvenience would not be experienced in the use of a more lasting material."

The same kind of apparatus was used in the case of the same person two years afterwards, but under different circumstances. These are interesting from their having extended the combination of fluid pressure, with regulation of temperature, to the treatment of diseases of the skin. The union of these remedies would have, from theory, appeared especially well adapted for this class of maladies, of which irritation and weakness are the prominent features—the latter demanding support, and the former prohibiting the bandage, or any other means of affording this, which is calculated to increase the heat—but it was only in a secondary degree from such reasoning, that the current apparatus was employed in them. Like many other improvements in medicine, this important application was mostly the result of accident. The lady mentioned above, who was then residing in London, was attacked with violent inflammatory eczema of the leg. Various remedies were tried during a period of three weeks, but with no relief. Incessant pain or sense of burning, and want of sleep, had reduced her (already much debilitated by other disease) to a

very miserable condition. Despairing of receiving benefit from any of the remedies usually employed for eczema, she wrote to me to ask whether the means which had been so successfully used for her arm, might not be tried for the relief of the present disease. Having never employed the apparatus in cutaneous affections, I expressed great doubt of any advantage, but was willing, if she obtained the sanction of the eminent physician, under whose medical care she then was, to try it. Upon his acquiescence, I visited her and had the apparatus applied. The water was kept at a tepid degree, and the pressure from the bladder was as great as could be borne without uneasiness. The result was much more favourable than could have been expected; immediate ease was afforded, and in three days, the eruption had entirely disappeared. A slight contraction of the knee was the consequence of its having been long kept in a bent state, but this soon yielded to gradual extension.

I have, since the above occurrence, applied this remedy in several cases of eczema; and although the cure has in none been so striking as in that related, the results have been very satisfactory. I have no hesitation indeed in stating, that I consider the combination of fluid pressure with the regulation of temperature, a speedier and more certain remedy for these complaints than any yet discovered. For eczematous affections of the face, which usually prove so obstinate and harrassing, this remedy is singularly well adapted, as there is no other means by which pressure can be equally and uniformly applied to so irregular a surface.

EXPLANATION OF THE PLATE.

FIG. I.—CURRENT APPARATUS. (See page 38.)*

a—Fountain reservoir, containing several gallons of water.

b—Waterproof cushion. The cushion is retained in contact with the body, and the weight of the water in it is supported, by a piece of covered sheet lead, or other resisting material. When it is intended, by means of this Apparatus, to apply the perfectly equal and uniform pressure of water, as a substitute for the unequal and varying pressure of a bandage, the "supporter," (or, when a small bladder is used, the cloth,) confining the cushion, must be placed so as to keep it in close contact with the body; and care should be taken, when the cushion does not surround the part, that the counter-pressure shall be pretty equally diffused. For these cases, a very thin cushion of vulcanized India rubber might probably be made, and of various appropriate forms.

c and *d*—The supply and waste tubes. They are made of vulcanized India rubber, and may be of any convenient length, as three, four, or five feet.

e—Vessel for the waste fluid.

* To prevent any impediment to the general extension of this Apparatus from the errors of instrument makers, I have placed a model of it in that useful repertory—the Polytechnic Institution. The modification exhibited is that especially adapted for the treatment of diseases of the joints and of the skin, ulcers, &c., but everything material about the general Apparatus is illustrated.

FIG. II.—INTERMITTING CURRENT APPARATUS. (See page 95.)

a—Small reservoir, containing less than a gallon. It may have a stand for admitting a lamp under it. A funnel may be substituted for the reservoir.

b—Water cushion.

c—Vulcanized India rubber tube. An appropriate pipe with stop-cock, fixed in lieu of the cushion to a tube of the requisite length, forms a convenient apparatus for the Douche and other similar purposes. Before using it, the air must be expelled from the tube by the water.

Fig. I.

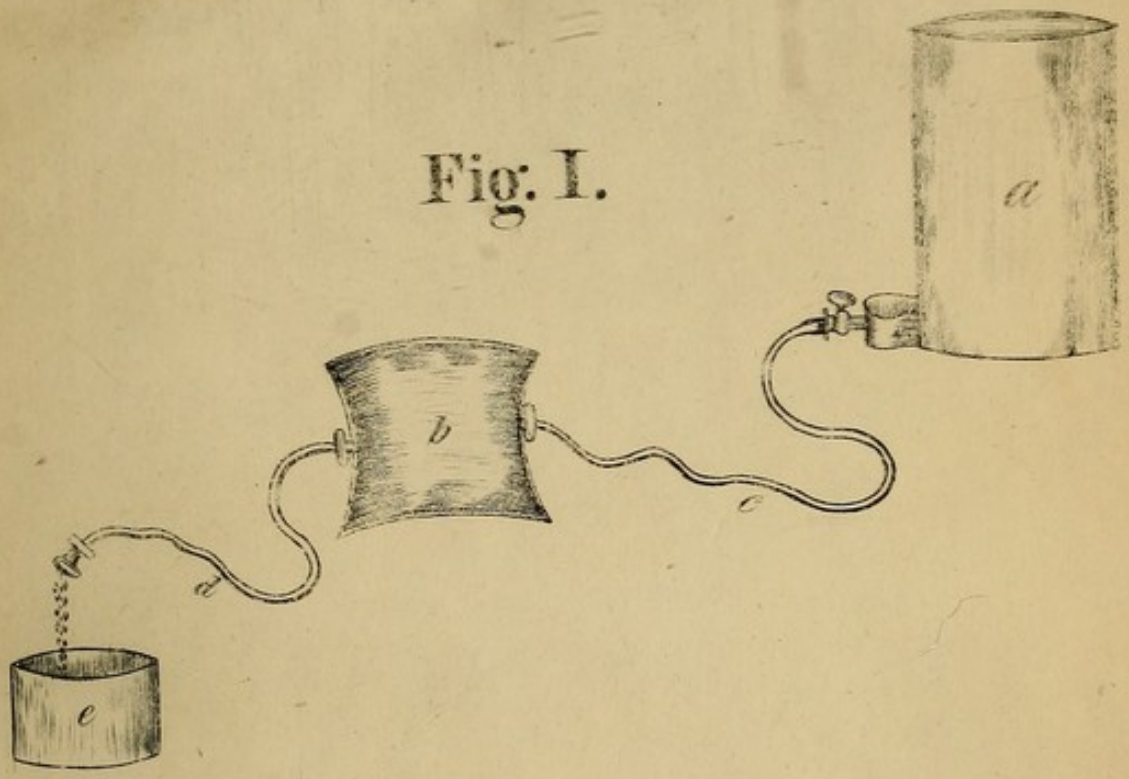

Fig. II.