

Functional diseases of women : cases illustrative of a new method of treating them through the agency of the nervous system by means of cold and heat : also an appendix containing cases illustrative of a new method of treating epilepsy, paralysis, and diabetes / by John Chapman, M.D.

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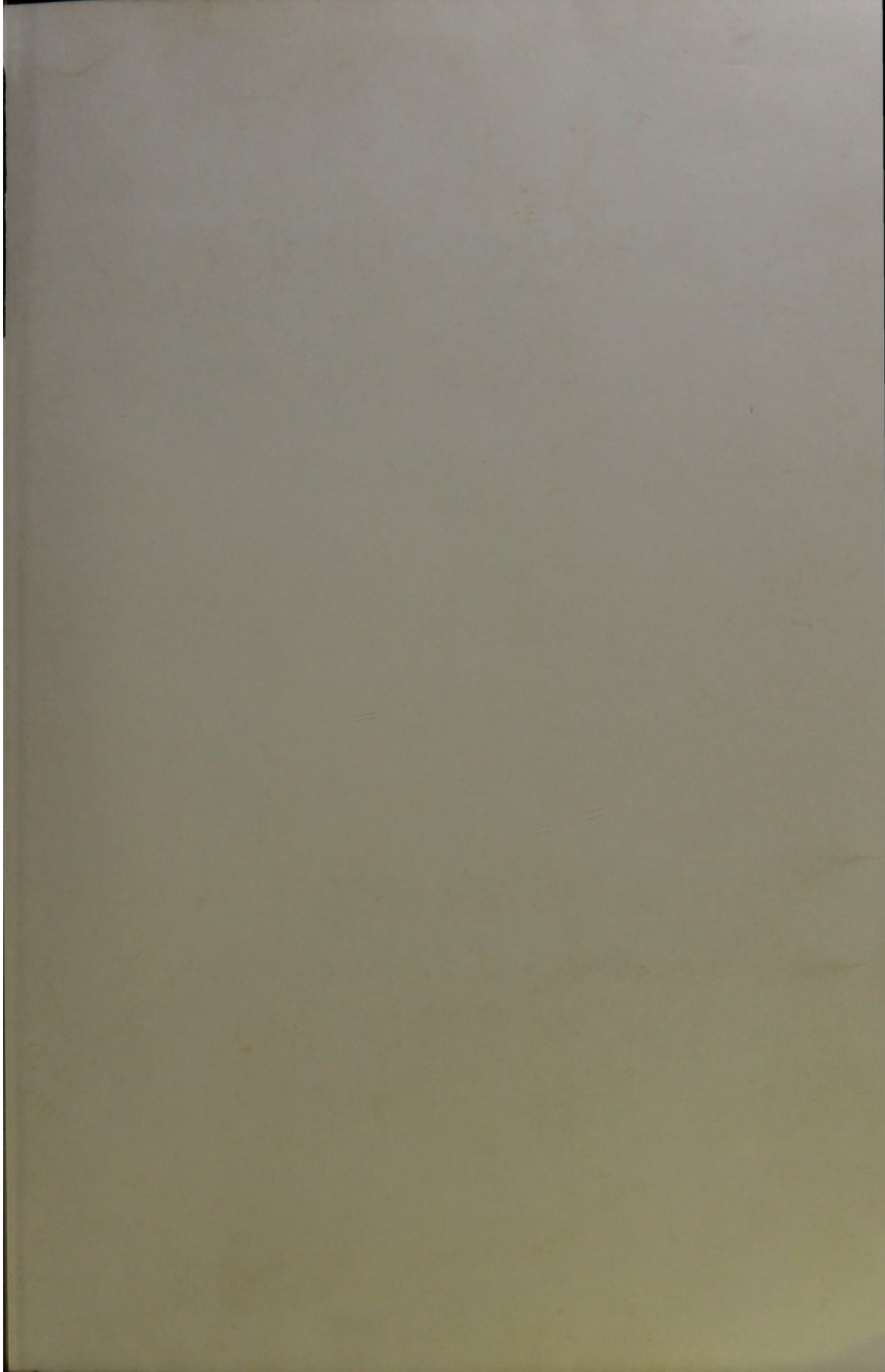
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*Proposed J. H. Bennett, M.D.
with the author's Comments.*

FUNCTIONAL DISEASES OF WOMEN:

A

NEW METHOD OF TREATING THEM.

‘I CONSIDER that the knowledge of the effects of the paralysis, and the irritation of the sympathetic nerve, opens a new and most important field in physiology, in pathology, and in therapeutics.’—
DR. BROWN-SÉQUARD: *Lectures on the Physiology and Pathology of the Central Nervous System*, page 140.

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FUNCTIONAL DISEASES OF WOMEN:

CASES ILLUSTRATIVE OF

A NEW METHOD OF TREATING THEM

THROUGH THE AGENCY OF THE NERVOUS SYSTEM

BY MEANS OF

COLD AND HEAT.

ALSO

An Appendix

CONTAINING CASES ILLUSTRATIVE OF

A NEW METHOD OF TREATING

EPILEPSY, PARALYSIS, AND DIABETES.

BY

JOHN CHAPMAN, M.D.,

M.R.C.P., M.R.C.S.

LONDON:

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MDCCCLXIII.

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FUNCTIONAL DISEASES OF WOMEN:

BY

A NEW METHOD OF TREATING THEM

THROUGH THE AGENCY OF THE NERVOUS SYSTEM

BY

JOHN EDWARD TAYLOR

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PREFACE.

It is probable that the more the diseases and functional derangements of animals having a nervous system are investigated, the more they will be found to originate primarily in altered conditions of that system. The following record of cases constitutes a remarkable proof that the circulation of the blood in the womb is subject to the controlling influence of the sympathetic nervous system; that the so-called functional diseases of that viscus are in reality abnormal conditions of the nervous ganglia which control it; and that those diseases are most safely, most easily, and most effectually remedied, by acting, not on the womb itself, not by medicines presumed directly to influence it, but by decreasing or increasing the quantity of blood in those nervous centres, by which its blood-vessels are governed.

The treatment here recorded is only one among countless applications, of which the principle on which it is based will, sooner or later, be proved capable. For a brief exposition of that principle, the reader is referred to the paper already published by me in the 'Medical Times and Gazette,' and now reprinted, as Section A, in the Appendix to this pamphlet.

After I had thought out the theory practically exemplified in the cases recorded in the ensuing pages, my attention was for the first time arrested by the following observations of the late Dr. Todd, in his clinical lecture on a case of

locked-jaw, which proved fatal :—" Our patient, Franklin, was treated, in addition to other means, by the application of cold over the region of the spine. Cold has a powerful effect in depolarizing the spinal cord. I have tried it with great advantage in this hospital in tetanus, in laryngismus, and in the convulsions of children. The best plan for its employment is, to fill a bladder with some broken ice, and apply it directly to the spine ; the ox gullets, from their length and cylindrical form, answer best ; an intense degree of cold may be thus obtained in a very short time, and its effects on the circulation will soon be manifest, since cold has a very powerful influence in diminishing both the force and frequency of the heart's action ; for this reason you must not apply it for too long a time, or over too great an extent of surface ; you must watch your patient, and remove and reapply it as his condition shall indicate. In the cases in which I have tried it, I have found it manifestly beneficial in diminishing the intensity of the spasms."

This remarkable passage, while showing that had Dr. Todd followed up the track on which he had entered, he would probably have arrived at the discovery which I have made, proves not only that he had no adequate conception of the nature of the influence which cold applied to the back exerts, but that, so far as the general circulation of the blood is concerned, he misconceived the nature of that influence, believed it to be the exact reverse of what it is, and, proceeding on that misconception, prescribed a method of applying ice to the back contrary to the dictates of physiology, and sure, in the majority of cases, to fail of therapeutical success. He implies that, when cold is applied to the back, its effects on the circulation will soon be manifest "in diminishing both the force and frequency of the heart's action." Cold applied to the head, or to any considerable part of the body, *except the middle of the back*, will produce the effect ascribed to it by Dr. Todd ; he therefore naturally inferred that the same effect will be produced by its appli-

cation to the back; but, according to the physiological exposition which I have given of the effects on the circulation of the blood of cold thus applied* it increases that circulation; and I affirm with a confidence which, in the presence of the deservedly high authority of Dr. Todd, both as a physiologist and physician, only a large experience can justify, that, as a general rule, cold applied to the back "has a very powerful influence," not in diminishing, as Dr. Todd says, but in *increasing* "both the force and frequency of the heart's action." I may add that *heat*, applied to the back, and especially if so applied as to influence the circulation of the head, will *lessen* "both the force and frequency of the heart's action." I am aware how thoroughly paradoxical these statements will at first sight appear to the profession as well as to the public, but they are simple records of nature's own revelations, and will therefore bear any amount of examination without being impugned. I have often verified them, and can confirm them by much more evidence than is subjoined here.

The effect of Cold to the Back in raising the Pulse.

George Parkes, an epileptic, aged 14, was admitted into St. Thomas's Hospital early in July last, and was allowed to remain about a week without treatment. During this period his pulse varied from 62 to 65. July 20th he was ordered to have ice applied along the whole length of his back during two hours and a half three times a day. This treatment was continued, and his pulse rose simultaneously as follows:—July 24th, 66; 25th, 70; 27th, 76; 29th, 86; 31st, 78; August 2nd, 92. Excepting a few slight oscillations, it remained at 92 until August 24th. A few days before this date, viz. Aug. 18th, the amount of the boy's food was lessened—the half of his previous supply of bread and two eggs being subtracted from his hitherto daily allowance. As a consequence the pulse fell to 84,

* See page 2, and Section A of the Appendix.

and remained at this number until the middle of September, when the patient left the hospital. Cold to the back, by increasing the circulation, causes the rapidity of the transformative processes to be increased, and if food be not supplied in proportionately increased quantity, the increased rapidity of those processes, and consequently of the heart's action, the rate of which is determined by them, cannot be sustained.

I have said above, that, *as a general rule*, cold applied to the back increases both the force and frequency of the heart's action: if, however, before the ice is used, the pulse is abnormally high, owing to nervous excitement, or irritation caused by disease, it will fall to nearly its normal standard after ice has been used for a short time; having so far descended, it will be sustained there as long as ice is used, provided the patient be well fed. This fact is illustrated by four of the cases hereafter given. In Case I., before treatment the pulse was 120; shortly afterwards, it descended to 84, and then, ice being still used daily, it gradually rose to 95, and continued at that rate. In Case IV. the pulse was 104 before treatment; ice being used 9, 12, and even 15 hours a day, the pulse descended to 86 and remained there. In Case IX. the pulse was 80 before ice was applied, afterwards it speedily rose to 96, and oscillated between 88 and 100, being generally nearer 100 than 90, during three months of treatment. In Case XI. the pulse was 78 before ice was applied: after treatment during seven days it had risen to 92. But if the frequency of the heart's action be below the normal standard of any given patient before ice is applied, it will steadily increase under the use of ice until it exceeds that standard, and if the patient be well fed, and his general health carefully attended to, the increase will be maintained throughout the period of treatment. In Case VI. the pulse has continued at 88 from October 10th to December 4th, ice being used seven hours and a half daily throughout the period. In

Case VIII., during the application of cold to the back, from March to July, the pulse ranged between 90 and 100. In Case XX. the pulse remained steady at 96 all the time ice only was used. Indeed it must be obvious that if the temperature of the entire body be raised by means of ice to the back, the circulation of the blood, and therefore the action of the heart, must have been correspondingly increased also.

The effect of Heat to the Back in lowering the Pulse.

Thomas Richardson, aged 20, an in-patient of Guy's Hospital, has suffered for five years, except during short intervals occasionally, from intense and burning headache. His feet were always cold. He has had eight fits; his pupils were very large; he staggered in his gait; and was sometimes delirious at night. Ice was applied, according to my suggestion, to the lumbar and lower dorsal region during three hours three times a day: by this treatment his feet were soon rendered permanently warm. This step in the direction of deriving blood from the head having been taken, I requested heat, by means of a double column of hot water in an india-rubber bag, to be applied on each side of the cervical and upper dorsal vertebræ, in order to lessen the diameters of the cerebral blood-vessels, ice being applied to the lower part of the back meanwhile. Mr. Raine, the clinical clerk in charge of the case, informed me that by the time the heat had been applied an hour on each occasion the pulse had fallen from its usual average height of 94 to 80. This fact he verified several times over; and my experience in other cases confirms it. I have recently treated a case of pleurisy by means of heat applied continuously between the scapulæ, the result being a wonderfully rapid subsidence of the inflammation, a corresponding diminution of the pain felt during inspiration or pressure over the affected part, a remarkable sensation of comfort, complete

freedom from headache,* several hours' sleep each night after the heat was first applied, a rapid cleaning of the previously furred tongue, a change in the urine from the high colour of inflammation to the paler hue of health, and within three days a fall of the pulse from 90 to 62. The only medicine taken was an aperient pill. Numerous facts which I have ascertained justify my conviction—induced in the first instance by theoretical considerations only—that heat, applied to the back, will be found to be at once a delightful, wholly beneficent, and effective subduer of inflammation.

If such are the effects of cold and heat applied to the nervous centres along the back, it is clear that Dr. Todd was not only ignorant of the truth in this matter, but both believed and taught a doctrine concerning it opposed alike to established knowledge of the existence and functions of the vasic nerves, to logical deductions from that knowledge, and to experimental facts. Indeed, only the existence in his mind of such a thorough misconception and his consequently erroneous doctrine can account for the merely occasional and faltering way in which Dr. Todd made use of ice as a therapeutic agent: had his theory of its action and effects been correct, he would have used it systematically and confidently in the treatment of a large proportion of his patients. Instead of doing this, he cautioned his pupils against applying it over too large a surface of the spine at once, or for too long a time, and recommended its frequent removal and reapplication; whereas the fact is, it may be borne along the entire spine during the whole day for weeks together in certain cases, not merely with impunity, but with positive benefit to the patient. The case of trismus on which he was lecturing when he made the statement quoted above concerning the use of cold was one in which the continuous application of ice to the spine would have been likely to prove peculiarly beneficial; but,

* The patient had previously suffered extremely from pain in the head, and had been delirious at night.

although in his general remarks on cold he says the patient "was treated, in addition to other means, by the application of cold over the region of the spine," yet in the history of the case the use of cold to the spine is never mentioned; it must therefore have been so slight and temporary as to have formed no essential feature of the treatment. Because Dr. Todd, while believing that the beneficial effects of cold, when applied to the back, consisted in what he called "depolarizing the spinal cord," also maintained that it diminished both the force and frequency of the heart's action, he was logically precluded from using ice continuously in the *intervals* of the attacks of laryngismus and the convulsions of children, and therefore had no idea whatever of the remedial power of ice in changing those abnormal structural conditions of the nervous system which induce the false croup and epileptic fits of childhood. His theory prescribed a method of palliating the symptoms of those diseases by means of ice, but was wholly powerless to indicate how to remove their causes, and therefore to cure the diseases themselves.* Had he known the unspeakably important fact that cold, applied to the back, accelerates the circulation of the blood and the metamorphosis of the tissues, instead of, as he believed, retarding the one and the other, his precepts and practice in respect to the use of ice as a curative agent would have been wholly different from what they were, and would have been applied over regions of disease immeasurably more extensive than those to which he confined them.

Esmarch, who has distinguished himself by his advocacy of the systematic use of ice in surgery, has no conception of its power, when exerted through the agency of the nervous system, of increasing the circulation of the blood in any part of the body; his caution concerning its use is, however, as

* In the Appendix a case of laryngismus and one of infantile convulsions are given, which were cured by the applications of ice daily during several weeks.

applicable to my method of employing it as it is to his own. He justly observes,—“The stronger the curative power of a remedy, the more important is it that it should be judiciously and rightly employed, and the more dangerous will the consequences be of its injudicious application. All our most powerful medicaments are poisonous, if strongly administered; but no reasonable practitioner will expunge opium, for instance, from his list of remedies, because a too large dose of it may possibly kill a patient. This applies not merely to the remedies which we get from the apothecary’s shop, but just as well to those simple agents of nature, the effects of which modern medical art endeavours to turn more and more to use. If, cold, then be one of the most powerful among these, every injudicious application of it must necessarily be dangerous. But we must attribute the bad consequences by which its use is followed in such cases, certainly not to the remedy itself, but to its improper application.”* These remarks, I may add, apply as forcibly to heat as to cold, when used through the agency of the nervous system, and still more emphatically to both, when specially employed to modify the circulation of the blood in the brain.

If the reports of cases given in this pamphlet are reliable; if in recording my observations I have not, as charitably suggested, been lured into exaggeration by enthusiasm, the power made manifest in the experiences here described claims a thorough examination both by surgeons and physicians. Though I discovered it while studying how to exert a greater remedial influence over epilepsy and paralysis than any already known, and though it is perhaps pre-eminently applicable to diseases of the nervous system technically so called, its applicability to a large number of other diseases is, in my opinion, indubitably established.

* ‘On the Use of Cold in Surgery.’ By F. Esmarch, M.D., Professor of Surgery in the University of Kiel. Translated by Edmund Montgomery, M.D., Demonstrator of Morbid Anatomy at St. Thomas’s Hospital. Published by the New Sydenham Society, London. 1861.

Dr. Todd believed that medical science, and the suffering poor who are constrained to claim medical charity, would alike be benefited by setting apart in each large hospital a ward for the special reception and treatment of patients afflicted with diseases of the nervous system: whether such a plan would prove permanently desirable may admit of question; but I am persuaded that it would be so until they are more thoroughly taught and studied, both theoretically and practically, as a part of medical education, than they have been hitherto. When an intimate knowledge of those diseases, which I am disposed to regard as the *fons et origo* of almost all others, shall be more generally acquired by the profession, by means of the peculiar opportunities of studying them which wards especially devoted to them would afford, that knowledge will probably reflect new light on the essential nature of many diseases now practically regarded as having no direct relation to the nervous system; and then, the period of differentiation, and, consequently, more profound analysis, having been passed through, a more comprehensive generalization and synthesis of disease may be reached, and special wards, or special hospitals, always in some respects evils, may no longer be desiderata.

This suggestion is justified by my own experience. Working more especially, as I have been for a considerable time past, at diseases of the nervous system, I have learnt not only how to treat a large proportion of them more successfully than I could do by means of the knowledge and methods previously available, but that also, as intimated above, by acting on the nervous system, many other diseases can be most effectually subdued. Among the maladies which can be thus influenced, but which hitherto have not been treated as disorders originating in either the cerebro-spinal or ganglionic nervous system, the group which forms the main subject of these pages, stands conspicuous. Others, however, are not less remarkable: the most striking, perhaps,

is diabetes ; but the most important, on account both of its frequency and consequences, is habitual and obstinate constipation ; another wide-spread, and often nearly life-long malady is coldness of the extremities, especially of the feet.

As is shown in the Appendix to this pamphlet, by assuming diabetes to be a disease of the nervous system, and treating it as such, I have certainly discovered how to control and lessen that disease more rapidly and steadily, and with less distress to the patient, than has been possible before ; and by these results am strongly encouraged to hope that when the remedy I used has been completely tried, it will be found to transfer diabetes from the incurable to the curable class of diseases. Numerous cases of long-continued and extremely obstinate constipation of the bowels, which by medicines could only be temporarily overcome, I have found completely amenable to treatment through the nervous system, the intestinal functions continuing to be healthily and regularly performed after all treatment has ceased. Case IV., and the cases of W. E. and E. R., given in the Appendix, are good examples of these effects. When the blood circulates imperfectly in any part of the body, consequent local phenomena of an abnormal kind are observable—phenomena describable with reference to their cause by some one of the terms *anæmia*, *plethora*, *congestion*, *inflammation*, or by some phrase denoting intermediate states ; physicians give these states, running through the numerous degrees from extreme vascular deficiency to extreme vascular excess, different names, according to the different parts of the body, or the different structures in which they occur ; moreover, while one of these states occurring in one part is designated as a disease, it may nevertheless occur in another without being dignified by that title ; thus, defective circulation in the female reproductive organs is recognized according to its degrees and results as *amenorrhœa* or *dysmenorrhœa* ;

but the same condition existing in the extremities, is named simply cold hands, or cold feet. Strictly speaking, however, one is as much a disease as the other, and while generalizing them as originating in one and the same cause, I have proved them remediable by one and the same treatment.

On behalf of medical science, and therefore of suffering humanity, I should rejoice in seeing the establishment of a department in each of our large metropolitan hospitals, where diseases of the nervous system could be especially studied, and where their limits and relations to other diseases, as well as the best methods of treating them, could be ascertained.

I avail myself of this opportunity of expressing my sincere thanks for the encouraging invitations which I have received to exemplify and test my methods of treatment at St. Thomas's and at Guy's Hospitals. For these invitations I am indebted to Mr. John Simon, Surgeon, and to Dr. Bristowe, Physician to St. Thomas's Hospital; also to Dr. Wilks and to Dr. Owen Rees, of Guy's. While kindly consenting to treat certain in-patients according to my suggestions, and allowing me to watch them and note their progress, these gentlemen have evinced a discriminating interest in my alleged discovery, and a desire to have its value ascertained, which are not less creditable to them as promoters of medical science than gratifying to me.

London :

25, Somerset Street, Portman Square, W.,

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FUNCTIONAL DISEASES OF WOMEN.

SECTION I.

Defective and Painful Menstruation : their Cure by means of Ice.

THE characteristic and novel feature of treatment adopted in the cases described in this section consists in the application of ice, or iced-water, to the back. In cases where suppressed, defective, or painful menstruation occurs as the principal malady, I limit the application of cold to the part of the back extending in length over the three or four lower dorsal and all the lumbar vertebræ, and in breadth about two inches on each side of a line passing along the vertebral spines. Theoretically, the cold ought to be applied in two columns, about three-quarters of an inch apart, the space between them being the central line over the spinal cord so far as it extends; practically, however, this division is not usually necessary, and in the majority of cases the patient derives benefit from the application of ice over the spinal column as well as on either side of it.

Of the six patients whose cases are reported in this section, four were epileptic and two paralytic: of course the treatment in each case had reference also to the principal disease from which the patient suffered, and was modified in each case accordingly. But, so far as the correction of the menstrual derangements was concerned, my immediate object in applying cold to the back may be thus briefly

stated :—*First*, to exert a sedative, or semi-paralysing influence on the ganglia of the sympathetic nervous system lying on each side of the vertebral column. *Secondly*, by means of the partial paralysis thus effected, to lessen the nervous currents in the vaso-motor nerves emerging from the ganglia acted upon, and distributed to the muscular fibres surrounding the arteries of the reproductive organs and of the lower extremities. *Thirdly*, by thus lessening the nervous currents emitted to the muscular bands of the arteries in question, to lessen the contractile energy of those bands, and by doing so to facilitate the dilatation of the arteries which they surround. *Fourthly*, by thus inducing in these arteries the condition of facile dilatability, to ensure that the blood will force its way into them in greater volume and with greater rapidity than before. When this series of conditions has been established, the structures amid which the arteries acted upon ramify become proportionally better nourished, more vigorous and healthy, and of course, therefore, their functions are proportionally more perfectly performed.

The *modus operandi* of ice applied to the back in inducing or increasing menstruation is, by the above statement, rendered easily intelligible; but how ice applied in the same way annuls uterine pain is perhaps not so easy of explanation. Of course, it is well known that animal structures in an unhealthy condition are commonly painful, and that when they are restored to health the pain ceases; but what, in the case of the womb, is the proximate cause of the pain, and how ice applied as above described removes that cause, I confess myself unable to say. Observations of analogous cases may increase our knowledge, and may help to define our conceptions, though they may fail to suggest any satisfactory hypothesis explanatory of the facts in question; in this relation it may therefore be useful to advert to the peculiar tenderness and painfulness of the limbs which often occur when the circulation in them is

defective. It is a common complaint of persons afflicted with diseases of the nervous system which affect the circulation of the blood, that they are rheumatic; the alleged "rheumatic" pains are experienced chiefly in the extremities, and especially in the muscles. Pain in the forearm and the upper part of the muscles of the calf is, perhaps, most frequently felt. A remarkable case of this kind came under my observation a few months ago: in the beginning of this year the patient was troubled for the first time with "waves of pain" passing through the back and base of his brain; sometimes these waves recurred in almost continuous succession for days together, sometimes only at occasional intervals during the day, and sometimes only two or three times a week. Simultaneously the left foot often felt as if immersed in dry sand; formications were experienced over the right hip; and almost always, when the patient awoke out of sleep, he found the ring and little finger—sometimes of one hand, sometimes of the other, and sometimes of both together—quite numb. The abnormal sensations extended more or less up the arms, especially on the ulnar side. An interesting feature of the case was, that the maximum degree of numbness was evidently coincident only with sleep: invariably as the waking state was gradually resumed, circulation and sensation in the fingers were correspondingly re-established. At first, the patient doubted the evidence of his still half-slumbering perceptions; but vestiges observable throughout the day of the abnormal conditions induced by sleep, rendered his testimony as to their existence indubitable. Moreover, he is a careful observer, and took a scientific interest in his own somewhat remarkable case. He accustomed himself to keep a sharp look-out on his own physical experiences during the period between sleeping and waking, and avers that he has repeatedly found himself sufficiently asleep for the peculiar symptoms he describes to continue, and sufficiently awake to become conscious of, and capable of noting them. He states

that his fingers, even those which were not numb, were certainly swollen, and capable of being indented, or pitted for a very short time, as if œdematous; that he had a peculiar feeling in the forearm, especially throughout the flexor muscles, as if the flow of blood were obstructed, and even reversed, and as if there were revulsions and oscillations of the currents. Whatever might be the actual condition of the circulation producing these experiences, certain it is that some remarkable disturbance occurred; for, during the days following the nights when the experiences had been the most impressive, the patient's hands and arms continued painful, especially if subjected to pressure; and on some occasions, when merely from scientific curiosity, or in the course of medical examination, the arms have been subject to only very gentle palpation to test their tenderness, the area of each part pressed upon became dark-coloured, as if bruised by a blow.

This curious case, as well as the more usual instances adverted to of patients having some disease of the nervous system who complain of rheumatic pains, affords convincing evidence that mere functional disorders of the circulation of the blood will give rise to great pain; and I may add, as I know from observation in this case, as well as in many others, that when those disorders are remedied, the pain and tenderness which they cause are annulled. There is good reason to believe that in these cases the abnormal condition of the circulation preceding, and perhaps causing the pain, is one of congestion: arguing from analogy, it is reasonable to infer that a like condition may induce the uterine pains of unhealthy menstruation; but, at present, I doubt if adequate data exist on which to ground a reliable opinion concerning this interesting and important question. However, it is satisfactory to know that, though the problem is not yet solved, we have no longer to wait its solution before attaining the power of relieving, in almost all cases, the suffering under consideration. That

this power is now at the command of the physician, I have, I believe, proved by experience. The following record of cases—almost a literal copy of the notes which I wrote when seeing the patients—will perhaps be held to establish its existence beyond the possibility of dispute.

CASE I.—*Feb. 24th*, 1863.—H. M., aged 17, an epileptic, whose fits began in her fourteenth year. Has “little fits” every day; is also much troubled by singing in the ears. She began to menstruate in her fifteenth year; catamenia recur monthly, but last only a day each time. They are preluded by general feverishness and headache, and accompanied with fearful “cutting” pain in the womb, and also extreme pain in the region of the left ovary, which is tender on pressure, and increasingly so immediately before the patient is ‘unwell.’ She complains also of pain in the right mamma, which is considerably larger than the left. The feet are habitually cold, the hands generally so. Complexion sallow; suffers much from headache; is depressed and melancholy.

She has been an out-patient at the Soho Hospital for Women during two years; then at the Middlesex Hospital upwards of a year; and, finally, about nine months at the National Hospital for the Paralysed and Epileptic. During the whole of this time neither the disorder of the menstrual function, nor the frequency of the “little fits,” has been lessened.

I ordered her to apply iced-water along the whole length of the spine, during half an hour three times a day; to wash all over every morning in cold water; to wear flannel drawers and armlets; to take abundant physical exercise; and if the bowels should be confined, to take occasionally, at bed-time, one or two of the pills prescribed as follows:—

℞ Hydrargyri Chloridi, gr. vi. Ext. Colocynthis Compositi, gr. xxxvi. Ext. Hyoscyami, gr. xviii. M. ft. pilulæ xii.

April 14th.—The little fits and the singing in the ears

have quite ceased. The patient feels and looks much better. Pulse 84; tongue clean; bowels regular. To omit the pills, and to continue the iced-water to the back as before. *May 12th.*—She has been steadily improving: the catamenia now continue nearly a week; they are no longer either preluded or accompanied by any pain; the tenderness and pain of the left ovary, as well as of the right mamma, are gone; the feet and hands are always warm; she has headache very rarely, and when it does occur, very slightly; the complexion is much brighter, and the expression much more cheerful. The epileptic vertigo, from which she has suffered daily during several years, and which in March ceased entirely, has never recurred.

CASE II.—*March 30th, 1863.*—Mrs. P., aged 42, is afflicted with paralysis of the four limbs, of the muscles which sustain the head erect, of the tongue and organs of voice. The bowels are very costive; catamenia regular, but extremely scanty.

A full report of the nature and treatment of this sad case is reserved for publication with others of a kindred character. The patient took medicines all the time I attended her; but none of them were given with the intention of influencing the menstrual functions, and none of them were of a kind likely to do so. Iced-water, or ice in an india-rubber bag, was applied to the back daily, in order to effect several objects, one of them being to induce a more copious and healthy menstrual flow. The changes from iced-water to ice, and from ice to iced-water, as well as the varied applications—sometimes to one part of the back, sometimes to another, were determined, of course, by the changing conditions and exigencies of the patient; but until free menstruation had been effected, the lower dorsal and upper lumbar regions were steadily acted upon, whatever might be the method and point of simultaneous application of cold to the upper parts of the back.

April 9th.—The patient began to menstruate on the 6th instant, and ceased to-day. *April 30th.*—She began to menstruate again last night. I ordered the application of ice to the back to be continued throughout the menstrual period. *May 3rd.*—She is now menstruating *profusely* for the first time during her long illness. She says she feels that the change is doing her good. Her nurse informs me that a mass of hard, fœcal concretions has also come from her,—“just as if from a woman after her confinement.” About 5 P.M., shortly after her left arm had been rubbed, a considerable amount of power was, to her great joy, experienced in the extensor muscles of the left forearm. I could feel their contractions beneath my hand, for the first time, distinctly. *May 7th.*—The menstrual flow has continued profuse during several days, and ceased to-day.

In this case it will be observed, that before treatment, the catamenia were normal in respect to their periods of recurrence, but defective in duration and quantity; that the application of cold induced their recurrence at the end of three weeks instead of a month as usual; and that when they did recur they continued seven days, the flow being copious nearly all the time.

CASE III.—*April 29th, 1863.*—Mrs. B., paralytic. She began to menstruate when eighteen years old; menses copious, but accompanied with much suffering. She is in pain during two days before they occur; and throughout the whole period has “dreadful pain down the back, and over both hips;” during the first three days it is most severe.

Cold in one form or another was applied to this patient's back, several hours daily, during the whole of May and June.

June 29th.—She began to menstruate on the 23rd instant, and ceased yesterday. Had no pain whatever preceding menstruation; “had very trifling pain down the back the first couple of days,” and afterwards had no pain at all.

CASE IV.—*June 30th*, 1863.—C.A., aged 28, has suffered from epilepsy ever since she was two years old. Her mind is very much impaired: she is quite childish, and has long periods of “sulkiness,” or semi-stupor, when, her mother says, “she is sickening for her fits.” She did not begin to menstruate until she was twenty-one, when the fits became much stronger. She has never been ‘regular,’ either as to time or quantity: has often gone two months without being ‘unwell;’ during the last half-year the menses have recurred about every six weeks, and have lasted about three or four days—the discharge being very slight, “often a mere show.” She suffers extremely during at least two days immediately before and during the whole of each menstrual period: her mother says she is “doubled up with pain.” In the hope of deadening the pain, and bringing on or increasing the discharge, her mother gives her hot gin-and-water on each occasion. The bowels are constipated habitually: she takes “bilious pills.” She has never menstruated without having a considerable number of violent fits, which either prelude, accompany, or close each period. She always suffers from cold feet.

This patient was ordered to have ice applied along the whole length of the back three times a day, three hours each time; to cease entirely taking gin-and-water and “bilious pills,” and to take,—

Potassii Bromidii, gr. iv.; Ammonii Bromidii, gr. vi., in a wine-glassful of water twice a day.

July 18th.—She began to menstruate. The applications of ice ordered to be increased to five times a day. *Aug. 11th*.—She began to menstruate again on the 5th instant. Is much better in every respect. Bowels open once a day very regularly. To omit the medicine already prescribed, and to take Ammonii Bromidii, gr. v., ex aquâ, ter die. *Aug. 25th*.—Her mother says, “Her feet are nice and warm: there’s no occasion to put them in hot water now.” To add to each dose of the medicine last prescribed, Potassii Iodidi,

gr. ii. *Sept. 1st.*—She began to menstruate again on the 26th, and continued to do so until the 29th ult. Had very much less pain during menstruation than ever before, and no fits. The feet and hands are always warm, and the bowels are open every day. To diminish the ice-applications to three daily, and to continue the medicine as last ordered. *Sept. 29th.*—She began to menstruate again on the 23rd instant, without any pain whatever, and has had none since. The menses recurred *Oct. 26th*: they continued several days, were copious, and were neither preluded nor accompanied by any pain at all.

This patient's malady is not only very grave but very complex,—including, as it does, epilepsy, paralysis, and insanity, as well as the visceral derangements above described. The general improvement wrought in her by the treatment adopted is strikingly great. Before long, I hope to publish a full account of the case, and meanwhile refer to it only for evidence of the power with which imperfect and painful menstruation may be corrected. In this aspect it may be thus summarized:—Before treatment, the menstrual function, which began when the patient was 21 years old, did not recur oftener than every sixth, seventh, or even eighth week; the discharge was always extremely defective—"often a mere show;" it was preluded during two days and accompanied throughout by excessive suffering—the patient being "doubled up with pain;" and it never appeared without being attended by a considerable number of violent fits. During the four months of treatment she menstruated five times; during the third time she had very much less pain than ever before, and during the fourth and fifth times none whatever; the fits gradually became less in number, very much shorter and less severe; and on the third occasion the patient, for the first time in her life, menstruated without a single fit.

CASE V.—*Aug. 7th, 1863.*—W. E., aged 18, an epi-

leptic, who began to menstruate when fifteen years old. The discharge recurs every three weeks, and lasts about four days, but is very scanty—"poor." Preceding and during the whole period she suffers extreme pain—"cutting, griping pain," and backache. "I can't stand," she says, "because in such dreadful pain." Is also troubled with "whites," which are increased by warmth, or a violent access of epileptic jerks.

The treatment in this case—a full report of which is given in the Appendix, Section B.—consisted solely in the application of ice to the back.

The patient began to menstruate *Sept. 11th*, when the sanguineous secretion was as usual scanty; but on the 13th and 14th "a great deal of white stuff" was discharged. No pain was felt on this occasion. She began to menstruate again *Oct. 8th*, and continued to do so four days, the secretion being healthy: she had no pain either before or during the period, and the white discharge has ceased.

CASE VI.—*Sept. 29th*, 1863.—G. A. M., aged 22, an epileptic, who has about three fits a month. She menstruates monthly during three days; the secretion is scanty. Usually has "pinching, drawing pain" during the whole period of menstruation, and generally during one or two days previously. The feet are habitually cold.

Ordered to apply ice along the entire length of the spine three times a day, two hours and a half each time, and to take the following,—

Ammonii Bromidii, Potassii Bromidii, ā ā gr. v., in a wine-glassful of water twice a day.

Nov. 2nd.—The patient began to menstruate on the 25th ult., and continued so, as usual, three days; but during the first and second day the flow was much more copious than heretofore, while the pain experienced was very much less than usual. The feet are now always warm. It is now six weeks since the date of the last fit.

Dec. 4th.—She began to menstruate again in the night of the 29th ult., and continued to do so until last evening, or during nearly four days. She had no pain before the discharge came on; as soon as it had appeared she had pain during two or three hours only, and none whatever afterwards. She had no fit. Always, except on the last two occasions, she had had fits during the menstrual period.

The foregoing cases will probably be regarded as constituting an adequate body of proof that the circulation of the blood in the female reproductive organs may be increased by the application of cold to the nervous centres which preside over them. The idea of inducing or prolonging menstruation by applying ice to a woman's loins, sometimes for days together, and even throughout the menstrual period, is so entirely unprecedented, and so opposed to all established physiological views, medical theories, and medical practice, that perhaps nothing short of the faith of a discoverer in the truth of his theory could inspire a physician with courage enough to practise it for the first time in the face of that great body of experience, immemorial tradition, and seemingly scientific doctrine, expressed in the universal belief that the application of intense cold to the lower part of a woman's person during the menstrual period is fraught with extreme peril. But now that a collection of indubitable facts—facts capable of verification—are adduced in evidence both of the truth of the theory, and of the safety as well as efficacy of its practice, physicians will not be slow, I hope, to afford to millions of suffering women the relief which the discovery here explained and elucidated, by examples of its power, enables them to confer. The direct benefits, especially in the abolition of monthly-recurring pains, which women will derive from the judicious use of ice, are unspeakably great; but the extent of the indirect advantages which it will ensure to them are immeasurably greater, and can only be appreciated

by the thoroughly informed and thoughtful physician: he only knows how many diseases from which women suffer originate in those unhealthy conditions of the reproductive organs denoted by painful, defective, or suppressed menstruation.

Referring to Esmarch's observations, already quoted, on the danger attending the unskilful or injudicious use of the most valuable remedial agents, I will conclude this section by recording a fact, which shows at once the justness of his remarks, and the wonderful power of ice in producing the menstrual flow. A lady, aged 55, whose menstrual functions had ceased upwards of a year before, was suffering from habitual and obstinate constipation; I ordered ice to be applied to the lower part of the dorsal and to the lumbar region, and the abdomen to be fomented: during the applications she began to menstruate, and continued to do so for two days.

SECTION II.

Leucorrhœa, vicarious of Menstruation: its Cure by means of Ice.

In the report of Case V. it is stated, under date of August 7th, before the patient was submitted to treatment, that she "is also troubled with 'whites,' which are increased by warmth, or a violent access of epileptic jerks." It is further stated,—“The patient began to menstruate Sept. 11th, when the sanguineous secretion was, as usual, scanty; but on the 13th and 14th 'a great deal of white stuff' was discharged.” With the close of this menstrual period the white discharge ceased; the patient menstruated healthily in October, and when (Nov. 5th) she was dismissed from the Hospital (St. Thomas's), it had not recurred.

If this case stood alone, I should not perhaps be justified in affirming that ice applied to the back is capable of curing leucorrhœa; but my experience, recorded in the re-

port below, constrains me to recognize its wonderful remedial efficacy in the treatment of this disease, as well as its power of ending the collateral sufferings which too often characterize it.

CASE VII.—*June 7th*, 1863.—Mrs. M., aged 35, is afflicted with an extremely profuse and continuous white discharge; is always obliged to wear napkins. She has much backache, drawing-down pain, and a sort of “cutting pain” habitually. She complains of great and general weakness: feels as if she must drop down, and has fallen “many a time.” She has headache all day long. Her sight is very feeble and dim: she cannot tell the time by the church-clock which is close to her house; and one object often appears to her, she says, as several. Her feet, legs, and belly are swollen; her complexion sallow; countenance depressed; appetite bad.

She has now passed nine weeks without menstruating, the white discharge being all this time exceedingly profuse. She began to suffer from it and *prolapsus uteri* simultaneously, soon after the birth of her first child, seven years ago. She has had three children; after the birth of each, the coming-down of the womb and the white discharge seemed to increase. The womb has often come “quite out” of the vaginal orifice, generally after she has used any extra physical exertion. She has many times passed seven or eight weeks without menstruating, the leucorrhœa being meanwhile much increased. She has also suffered from profuse menorrhagia—what she calls “flooding,” on several occasions.

Treatment: ice applied to the lower dorsal and upper lumbar regions continuously, from morning until night.

June 25th.—The white discharge from the vagina is very much lessened; the abdominal swelling is nearly gone; the swelling of the feet continues about the same; the uterine parts are much strengthened, the womb coming down much less in extent and frequency; the “cutting pains”

have ceased, and all the feelings in the back have lessened; has headache "very rarely now;" vision quite clear and normal; appetite very good; feels altogether much stronger; complexion and expression immensely improved.

Early in July she menstruated freely; after the menses had ceased, the leucorrhœa did not recur; the swelling of the feet and of the abdomen subsided entirely, and all other troublesome symptoms disappeared. I saw her on the 18th of November, when she assured me that since the early part of July she has not been troubled with any white discharge, *prolapsus uteri*, bearing-down pains, headache, giddiness, or dimness of sight; that with one exception, when she became 'unwell' earlier than she ought to have done, she has since menstruated at the normal intervals, and that in all respects she is quite well.

SECTION III.

Coldness of the Feet: its relation to Functional Diseases of the Womb, and its Cure by means of Ice.

In temperate and cold climates, coldness of the extremities, but especially of the feet, is perhaps the most universal, though commonly regarded as the least important, malady from which human beings suffer. In men, its consequences are comparatively slight, they therefore look upon it as little more than a troublesome but tolerable companion; and in a large proportion of cases, both men and women, believing its presence constitutional, acquiesce in it as inevitable. Women, however, suffer far more generally than men from this evil, and, as millions of each generation of them have learnt from painful experience, embodied in traditional teachings which have become almost instinctive, its consequences in them are too often of the gravest character.

If one hand be put in cold water, the temperature of the

corresponding hand will fall: * one of my patients, a very intelligent and nervously sensitive lady, assures me that when one of her legs is rubbed, in order to make it warm, the other becomes so spontaneously. The physiological law revealed by Dr. Brown-Séquard's exceedingly interesting and pregnant discovery, and which serves to explain the fact he observed, has suggested to me the nature of the relation between the temperature of the feet and the menstrual function, and affords, I believe, a rationale of the *modus operandi* of heat, when applied to the feet, in facilitating menstruation, and of cold when thus applied in stopping it.

The fact that when one hand is placed in cold water the temperature of the other diminishes, is thus accounted for:—It is assumed that the impression which is made by the cold water, and which is followed by a contraction of the superficial blood-vessels of the limb acted on, is conveyed from those blood-vessels by afferent nerves to the nervous centre into which they converge, and is there reflected by nerve-cells through efferent vaso-motor nerves on to the blood-vessels of the opposite limb, causing them to contract also; in like manner, it is presumable that when the heat generated by friction causes the blood-vessels of the rubbed limb to dilate, the impression of warmth and dilatation is conveyed to the nervous centre controlling the diameters of those vessels, and is thence reflected to the opposite limb, causing its vessels to dilate also, and consequently the limb to become warm. If an impression made on one limb is capable of being so modified by the nervous centre whither it is conducted as to cause the latter to induce a change in the opposite limb, it may be inferred, *à fortiori*, that a like reflex influence will be exerted over the blood-vessels nourishing the deep-seated structures of the same limb to the surface of which cold or heat was applied.

* This fact was discovered by Dr. Brown-Séquard by means of experiments made by him and his friend Dr. Tholozan.

Such being the sympathetic influence through reflex action of the blood-vessels of one limb upon those of another, it seems to me an inevitable conclusion that a like sympathetic influence must exist between the blood-vessels of limbs and viscera, if the vaso-motor nerves of both sets of vessels are related to one and the same nervous centre, or to a group of centres in one and the same region, intimately united by commissural fibres.

I have proved by therapeutical experiments repeatedly performed that the nervous centres which control the blood-vessels of the lower extremities, and those which control the blood-vessels of the reproductive organs, occupy the same region of the back; and hence it comes to pass, as I believe and venture to suggest, that influences exerted primarily on the feet are reflected on to the womb and its appendages: while, conversely, influences exerted primarily on those organs are continued by reflexion to the feet. Hence it is that the menstrual flow is often suddenly stopped when the feet become suddenly cold, that it is facilitated by putting them in hot water, and that when the menstrual functions are defectively performed—the uterine vessels being inadequately dilated—the unhealthy influence pervading them is propagated by reflex action to the feet, causing their blood-vessels to become unduly contracted, and the consequent malady—coldness of the feet.

When cold is applied to the feet, it immediately contracts the vascular ramifications over their surface, and lessens the quantity of blood circulating through them; the impression made by the cold on the afferent nerves of the blood-vessels affected is conducted to the nervous centres presiding over them, and is thence reflected on to the uterine vessels, which thus, also becoming constricted, impede or obstruct menstruation. Heat applied to the feet causes their blood-vessels to dilate and generates a nervous influence, of a kind opposite to that produced by cold, which, carried along the afferent nerves to the sympathetic

ganglia, and through them reflected on to the reproductive organs, causes their vessels to dilate also, and thus inducing an increase of blood in them, increases the tendency to menstruation as well as the activity of the process itself. Conversely, when the vascular system of the ovaries and womb is subject to unhealthy influences from the nervous centres, the vessels become unduly contracted, menstruation becomes suppressed or inadequately performed, and an impression, originating in the abnormally contracted state of the uterine vessels, is carried to the sympathetic ganglia, where it is modified and reflected as a contractile influence on the blood-vessels of the feet, which therefore become cold.

It must, however, be admitted as an indubitable fact, seemingly not accordant with the theory here advanced, that often when the uterine vessels are unduly dilated, as in profuse menorrhagia, the feet of the patient are decidedly cold. But it is probable that in these cases the action of the normal reflex influences is much lessened, or even suspended, owing to the loss of blood. Owing to the same cause, even if that action should continue in full force, the supply of blood to all parts of the body being defective, the general temperature of its surface must fall; and as the temperature of the feet is more rapidly changed than that of any other part of the body by changes in the external temperature, they necessarily become cold first. Moreover, there are, of course, many other more or less subtle conditions of the nervous system, having either a mental or physical origin, which derange or supersede the healthy sympathetic actions of the nerves of "organic" or "vegetative life," and which baffle the analytical, and therefore the descriptive power of the physiologist or physician. The normal reflex actions are also modified by structural differences in different individuals, the existence of which is often made known by their physiological manifestations, while the most skilful anatomist fails to discover them. Though we are all fashioned according to one common

type, we differ wonderfully in our several degrees of approximation to it: the general cast is the same, but in details and finish the variety is infinite. The nervous arcs through which impressions are received and reflected extend over areas of different magnitudes, relate different parts to each other, and conduct the nervous influence with different degrees of intensity in different persons. In one person a certain impression on the uterine nerves may induce pain in the breasts, in another sickness, in another morbid appetites, in another local flushings or cold feet; one woman suffers from vomiting throughout the whole period of pregnancy, another during a few weeks only, another not at all; one pays her acknowledgments of maternity on each occasion by forfeiting a tooth, another merely suffers toothache, a third is favoured with a dispensation from both one and the other. The protean aspects of hysteria are explicable as phenomena of abnormal reflex action. One of the most curious instances of nervous aberration with which I am acquainted occurs in one of my own patients, whose statements I am enabled to trust most implicitly: if a bell rings, or any noise is made suddenly within his hearing, his attention to the sound is often first arrested by a peculiar thrill shot with the seeming rapidity of lightning through his arms—most strongly through the left one. This experience is much more vivid in some states of his health than in others, but at all times the surprise of the sensation precedes the conscious recognition of the sudden sound which caused it. The numerous and complex influences and structural varieties which induce such modifications and aberrations of the nervous currents, enable us to infer that the excito-motor relations of the nerves of the blood-vessels distributed to the womb and the lower extremities respectively, must be peculiarly liable to disturbance. It is also conceivable, on the principle that “extremes meet,” though scarcely probable, that inasmuch as mental irritability and headache accompany both cerebral

anæmia and cerebral plethora, so each opposite condition, when in the extreme, of the vascular system of the womb and its appendages, may cause reflex actions producing one and the same result, viz. contraction of the blood-vessels of the feet.

Fully recognizing the exceptional influences just adverted to, I feel assured nevertheless that common experience, physiological experiment, and my discovery of the effects of ice on the circulation of blood in the womb and in the feet, prove beyond the possibility of doubt that inadequate performance of the menstrual function, and coldness of the feet, stand in a mutually causal relation—being alternately cause and effect of each other, and afford strong grounds for the hypothesis here advanced, that that relation is constituted by the convergence of certain afferent nerve-fibres from the blood-vessels of the womb and of the lower extremities to one common centre, and by the divergence of certain efferent nerve-fibres from the same centre to those blood-vessels. This hypothesis fully explains why cold applied to the feet impedes the menstrual flow, why heat thus applied facilitates it, and why women suffer far more than men from coldness of the feet, although many other constitutional and social conditions doubtless contribute largely to intensify the difference in question.

Three of the cases already given afford convincing evidence that defective menstruation and coldness of the feet are generally associated, and that the cure of the one is simultaneous with the cure of the other. In so far as they elucidate this point only, the following is a summary of these cases:—

CASE I.—The menses lasted only a day, were preluded by general feverishness and headache, and accompanied by “fearful cutting pain” in the womb, as well as extreme pain in the left ovary: the feet were habitually cold. By the use of ice the menstrual functions were rendered normal,

and the feet "always warm." CASE IV.—Menstruation did not begin till the patient was twenty-one. It was never "regular," either as to time or quantity; the periods were from six to eight weeks apart, and the discharge was very slight,—“often a mere show.” The patient suffered intense pain during at least two days before as well as during the whole time of menstruation, and her feet were always cold. After treatment, the menstrual flow became copious, the menstrual pain ceased altogether, and simultaneously the feet became “nice and warm;” there being “no occasion,” as her mother says, “to put them in hot water now.”

CASE VI.—Menstruation was scanty, and much pain was experienced during each period. The patient's feet were extremely and habitually cold; her sister, who sleeps with her, has often been awoke by the cold she has felt when accidentally touching them, and, fearing the patient might be dead, has got up in the night repeatedly and procured a light, in order to see whether her fears were justified. Very shortly after ice was applied to the back the feet became warm, and have continued so each night ever since; and during the two menstrual periods which have occurred since the treatment began, the flow was increased and the pain diminished.

The following case is one in which the treatment was not systematically carried on, and in which (probably in consequence) the improvement in the menstrual functions, though decided, was not so remarkable as in the cases already reported; the rise in the temperature of the feet was, however, both speedy and permanent.

CASE VIII.—W. G., aged 17, an epileptic, was seen by me for the first time, February 9th, 1863. At this date she was pale, anæmic, and troubled with habitual and obstinate constipation of the bowels; the catamenia were regular but very scanty, and the hands and feet were always cold. The treatment externally consisted in the applica-

tion of iced-water in the first instance, and of ice afterwards, to the back, as in the cases already reported. I have no record of the exact date when her limbs were first observed to be warm; but on March 10th they had already become thoroughly so, and the patient was much better in all respects. Though, from want of continuous treatment, the defective menstruation has not been wholly corrected, it has become much more healthy and copious than before; the bowels have ceased to be constipated, and are open daily; the patient's general health is much improved; she looks extremely well, has gained flesh, and her hands and feet have continued always warm.

Coldness of the feet in all the cases already given was associated with disorder of the menstrual functions, or rather, as I think it more correct to say, with disorder of those nervous centres which preside over the circulation of the blood in the ovaries and womb. There are, of course, a vast number of cases of habitual coldness of the feet in women which are not thus associated; but so far as I can recollect, I have never met with a single case, in either male or female, in which the patient did not suffer from impaired health of the nervous system in some form or other, more or less pronounced. If a patient were brought to me with an assurance that she suffers constantly from coldness of the feet, that her menstrual functions are healthy in all respects, and that she is not afflicted with epilepsy, chorea, or hysteria—diseases accompanied in a very large proportion of cases with coldness of the extremities, I should still feel confident of finding some nervous derangement as either cause or consequence (most frequently the former) of the malady complained of. Headache, backache, tenderness of the spine in some part or parts when pressed upon, cramps, pains in the limbs, tenderness of their muscles when pressed upon, liability of the skin to be easily bruised—even by pressure of the finger, local anæsthesia or hyperæsthesia, are among the symptoms of an abnormal condi-

tion of the nervous system, some one at least of which will be generally found in patients suffering from coldness of the feet when no serious nervous disease is present. But whatever may be the origin and abiding cause of coldness of the feet, unless it be due to some degree of disorganization of the nervous centres related to the nerves of the blood-vessels of the lower extremities, the malady may always be cured by means of ice applied on each side the lumbar and lowest dorsal vertebræ. Subjoined are a few illustrative cases.

CASE IX.—*April 23rd*, 1863.—S. S., aged 14, an epileptic, has not yet begun to menstruate. Among her numerous symptoms, this girl had excessive and continuous coldness of the four extremities. The left leg was the worse: it was so weak that, as her aunt says, she has sometimes “gone quite lame,” and “so cold all through, and so painful in the calf and round the ankle, that often she could not sleep on account of the pain.” In this case ice was applied along the whole length of the spinal column. By the 13th of May all pain in the left leg had ceased, and this limb had become as strong, and could be used as well as the right one. The feet and hands had also become thoroughly and continuously warm.

CASE X.—*May 27th*, 1863.—S. M., aged 20, an epileptic. Usually menstruates monthly, but on the last two occasions has done so at the end of the third week. The discharge is profuse and continues six days. During the first day it is accompanied with great pain. The bowels are habitually costive, and the feet constantly cold. The treatment adopted had reference chiefly, of course, to the fits from which the patient suffered, but it included the use of ice, which at the first consultation was ordered to be applied along the whole length of the back, during two hours and a half, four times a day. She was also ordered

wet friction over the entire body, each morning. When I next saw her (June 15th), she said, "the bowels have been more open lately, and my feet are now quite warm." The treatment already prescribed was ordered to be continued. June 22nd, she reported that the bowels had become quite regular, the feet "hot," the hands being "neither hot nor cold." The same treatment was again ordered to be continued, and the ice to be kept applied throughout the whole of the next menstrual period. July 13th, she began to menstruate exactly at the end of a month from the beginning of the previous period: she says she never passed a menstrual period with so few and such slight fits as on this occasion, and does not know when she felt so well as now. Bowels open, feet warm, pulse eighty.

CASE XI.—*Oct. 20th, 1863.*—C. M. A., aged 22. Complains of pain in the back, which came on rather suddenly about a fortnight ago an hour after rising. Since that time she has gradually become weaker, nervously excitable, and incapable of any considerable physical exertion. Bowels regular; tongue clean; menstruates monthly, the discharge lasting six days; pulse seventy-eight; hands and feet habitually cold—the feet always so cold, she says, that if she sits before a "roasting-fire" immediately before going to bed, and wraps her feet up in flannel, when getting into bed they immediately become cold again. If she sleeps alone, and does not use a hot-bottle, they remain cold all night. There is decided tenderness along the greater part of the spine, but especially between the scapulæ and over the lower dorsal vertebræ. The application of ice was ordered along the back from the middle of the cervical to the middle of the lumbar vertebræ, and the following medicine:—*R Quinæ Disulphatis, gr. i.; Acidi Sulphurici diluti, ʒ vii., ex aquâ, bis die.*

Nov. 19th.—The patient reports herself quite well. She used the ice during only seven days; by the second or

third night after she began to apply it her hands and feet became warm. During the period since leaving off the ice they have continued decidedly warmer than formerly, but not so warm as during the latter half of the week when the ice was used. The pain in the back gradually lessened, and is now quite gone; the spine is, however, still tender on pressure. Appetite improved; tongue clean; bowels regular; pulse ninety-two. To apply the ice again in the same manner as before.

CASE XII.—*June 20th, 1863.*—S. M., aged 28. When a child was troubled with weakness in the back, and a pricking sensation in the hips; these symptoms subsided, but about three years ago recurred. She now complains that she has pricking sensations, sometimes in one hip, sometimes in the other; and sometimes only a sense of heat and aching in various parts of the back. The pain is not fixed, but changes from one part of the spine to another; when she is tired, the heat and aching in the back are chiefly felt. There is tenderness on percussion between the scapulæ, and slight tenderness, if touched in the same place, has been perceived during the last year. Stands firmly on each leg, but the right leg and foot are a little smaller and weaker than the left. Before the symptoms now complained of recurred, the eyes and head ached when reading; cannot now read for more than fifteen minutes together without pain. Feels the two points of the *Æsthesiometer* on the left cheek at ten lines apart, on the right at twelve; on the left palm at four lines apart, on the right at six. Sleeps well; bowels open daily; catamenia normal. Feet always cold in winter; often so during the day in summer, and usually at night.

This patient was ordered to apply ice, the bag being enclosed in flannel, twice a day along the back, as in the previous case, and to take *Potassii Bromidii*, *Ammonii Bromidii*, $\bar{a} \bar{a}$ gr. v., bis die. The ice was used as ordered

during twelve days; subsequently iced-water was applied during about twenty minutes three times a day for three weeks; and, finally, ice again during half an hour twice a day for about a fortnight. Only a dose or two of the medicine was taken. The pricking sensations and the backache have not been lessened. The feet have, however, become decidedly warmer; they are now always warm at night; while her tactile sensibility is more acute and normal. She now feels the two points of the *Æsthesiometer* on left cheek at eight lines apart, and the right at nine; and in *each* palm at four lines apart.

The two immediately preceding cases, contrasted with each other, are very instructive. The symptoms are in several respects alike: in each case pain and weakness of the back were the chief things complained of; in each the bowels were regular, and the catamenial functions normal; and each patient was troubled with coldness of the feet. Nevertheless the treatment which subdued all the symptoms complained of in the one case, proved powerless over all but two in the other. In one respect only these patients were alike benefited: whereas the feet of both were usually cold before treatment, they were in each case warm afterwards. The seeming anomaly may, perhaps, be thus partly explained. All experience in treating disease concurs in proving that the longer it has existed the more difficult is its cure, and the longer the time necessary for effecting it. This is especially the case with diseases of the nervous system. Now the symptoms complained of had continued only a short time in the patient who was speedily benefited, but had lasted three years in the other patient, had been experienced in childhood, and were, in respect both to duration and extent, of a graver nature. I confess, however, that this explanation is far from adequate; for if the different results were due to the difference in the length of time during which the malady in each case has lasted, at

least a greater degree of benefit than has been experienced should have accrued to the patient who has suffered the longest. The fact that headache and impairment of the mental functions denote alike cerebral anæmia and cerebral plethora, affords a strong presumption that while the several nervous centres or segments constituting the spinal cord may be in each of these opposite states, these states may also manifest themselves by groups of symptoms so nearly alike as to be mistaken—the one for the other. The knowledge that precisely opposite vascular conditions of the nervous centres may produce similar phenomena is of vital importance in determining the nature, and therefore the treatment, of functional diseases of the brain, and may throw much light on the nature, and influence proportionably the treatment, of certain diseases of the spinal cord. I will close this section with a history of the symptoms and treatment of a case exceedingly remarkable as an illustration of the power of cold, not only to warm the extremities, but the entire body.

CASE XIII.—*June 11th, 1863.*—Mrs. E., aged 60, suffers from cramp in the thighs and legs; never passes a night without getting up, at least twice, to rub the limbs; has “always been a crampy subject.” Two years ago she suffered from “neuralgia” in the ball of the eye; since then frequently from neuralgia in the face, recently for two months continuously: it ceased a fortnight ago. She has now aching pain at the top of the neck when in bed. About three weeks ago the lower jaw closed involuntarily, and so violently as to wound the lip: this trouble has been repeated about four times a day since it began. Often in the night she sees a very bright light—“brighter than any Bude light I ever saw,” she says; also “a feeling of thorough terror and distress” very frequently troubles her, inducing her to get out of bed and pray to be relieved of it. She complains of excessive lassitude and sleepiness in the daytime;

has become thinner; has very poor appetite; sleeps very little at night, and even when disposed to sleep is often prevented by the cramps already mentioned. She says that for more than twenty years she has always been cold to the touch, even over her shoulders and bosom, although she is warmly clothed; her feet are habitually and extremely cold. She complains that her sight is often dim. There is decided tenderness between the scapulæ.

I ordered this patient to apply ice to the whole length of the back during two hours and a half three times a day, and again when going to bed, the ice-bag being clothed in flannel; and to take the following:—

℞ Hydrargyri Chloridi, gr. i.; Ext. Colocynthis Co., gr. $ii\frac{1}{2}$; Ext. Hyoscyami, gr. $i\frac{1}{2}$; M. ft. pilula alternis noctibus sumenda.

℞ Infusi Calumbæ, \mathfrak{z} i.; Ferri et Quinæ Citratis, gr. vii., bis die.

June 17th.—She has now scarcely any cramp whatever: she has not got up once to rub her legs since using the ice; the feet are already continuously warm—warmer, she says, than she has ever felt them in her life. The involuntary closing of the jaw, and the pain at the top of the neck, have ceased. She has not once seen the “Bude light,” and all the distressing mental feelings in the night are gone. Her vision is much clearer than it was a week ago.

July 15th.—The patient continued the use of the ice as prescribed, but without medicines after June 17th, during three weeks altogether. Since the cessation of the treatment she has continued, with the exception of an attack of diarrhœa, perfectly well, and wonderfully warm all over. She is so astonished with the change in the temperature of her body, and by the subsidence of every symptom from which she suffered, that she called to-day simply to show herself in evidence of the efficacy of cold as applied in her case: certainly, considering the temperature of her body before the treatment commenced, the various symptoms of

which she complained, the short time during which the treatment continued, and the length of time the surface of the body has continued warm since it was left off, the result is astonishing. The skin is healthily moist as well as warm, and the patient is quite sure that she sees "very much clearer indeed" than she did before the treatment began.

SECTION IV.

Menorrhagia and Menorrhagic Pain : their Cure by Means of Heat.

I have explained in the first paragraph of Section I. how cold, applied to a certain part of the back, induces menstruation, and increases it when defective; heat applied in the same way produces, of course, precisely opposite conditions to those produced by cold, both in the nervous centres directly acted upon, and in the uterine blood-vessels influenced through their agency. The temperature of the sympathetic ganglia on each side of the spinal column being raised, the flow of blood to them becomes more copious, and consequently their functions become more energetic; their nervous effluence passes in fuller and more powerful streams along the nerves emerging from them, and ramifying over the blood-vessels of the reproductive organs, the muscular bands surrounding those vessels are stimulated by this increased nervous afflux to contract with more than their usual force; they therefore diminish proportionately the diameters of the vessels themselves, and in doing so necessarily lessen the amount of blood flowing through them. Indeed, it is probable that while the nervous ganglia in question are made to emit their maximum of energy, many of the terminal branches of the blood-vessels acted upon become completely closed. By this method uterine hæmorrhage may be restrained or arrested without violence or peril to the patient,

and with a certainty which, though not absolute, is unparalleled by any power hitherto conferred by medical science.

It would be difficult either to enumerate or to estimate the advantages which will accrue to women from the power of arresting or regulating the flow of blood from the womb: certainly the number of diseases indirectly caused by that condition of anæmia to which many women are reduced by habitually profuse and too frequent menstruation is very great; in a large number of instances it is, I believe, the parent of consumption; it enfeebles the physical and mental energies and impairs the constitution, and thus provides a favourable nidus for the development of disease in general, and especially of any disease to which the patient may be predisposed. Apart from the consideration of the amount of actual disease from which many women may be saved by the power here explained and illustrated, the mere comfort which it is capable of conferring upon them is immense: if women who are in the habit of being subject to a sanguineous discharge during a third of their time can be so far relieved from it as to be troubled with it during only four days a month, the beneficial change they will thus experience will be very great indeed; while the soothing, pain-annulling influence of the treatment in question is not less remarkable. According to the general testimony of the patients, they feel soothed in a wonderful manner very shortly after the first applications of heat have been made. Indeed, *à priori*, this result might be expected: the circulation of blood in the womb is lessened, not by the direct application of cold, which acts as a shock, compelling those parts of the organ, including its blood-vessels, with which the cold comes most in contact to shrink and contract, thus also inducing different degrees of contraction in different parts; not by medicines mixed with the blood, and exerting an astringent force at the cost of changing the quality of that fluid throughout the body from its normal standard, but by a power acting exclusively through the

agency appointed by nature herself—the nervous centres, and the lines of communication established between them and the parts over which they preside. This subtle power, from its mode of action, might be said to partake rather of the nature of persuasion than of force: its beneficial effects are not wrought by causing violent revulsions, or sudden stoppages of the sanguineous currents, but by inducing a gradual diminution of the volume and rapidity of those currents; and the fact that the changes in the diameters of the blood-vessels are gradual, and subordinate only to the gentle influence of the ganglionic nervous system, may enable us to understand how it is that the action of heat in restraining uterine hæmorrhage is so peculiarly grateful to the patient.

There is however another reason, I believe, why in cases of profuse menstruation heat applied in accordance with the principles explained above exercises a powerful soothing influence. The undue loss of blood is commonly accompanied by a sense of weariness, and a continuous aching of the back. The sense of weariness is, of course, partly due to the fact that the brain is inadequately supplied with blood; but I venture to express the conjecture, that the backache is due to a deficiency of blood in the spinal and ganglionic nervous centres of the affected part; that the pain is analogous to that form of headache due to exhaustion or insufficient nourishment of the brain; and that it is removable by the same method as that by which the form of headache in question is removable, viz. by increasing the supply of blood to the nervous centres which are the seat of the pain. If this hypothesis should be hereafter confirmed, it will afford an adequate explanation how menorrhagic pain is annulled by heat applied to the back.

In applying heat I have tried a variety of methods, as will be seen in the following reports; but I have, at length, satisfied myself that the best is the one which physiological considerations suggested in the first instance, and which I

now always adopt: I use two columns of hot water, about an inch apart, in an india-rubber bag, this bag being enclosed in a flannel one, and being separated from the side of it which is applied to the back by two or three layers of flannel, first dipped in boiling-water, and afterwards wrung out.

CASE XIV.—*July 16th.*—Mrs. F., who has long been in the habit of becoming ‘unwell’ every third week, and continuing so a week, complains that she is now suffering from a more than ordinarily profuse menstrual flow. It began in the evening of the 12th inst. I ordered the lumbar region to be fomented with flannel dipped in hot water during fifteen minutes several times a day, and a cloth dipped in cold water to be afterwards applied for a second on each occasion. The patient felt these applications remarkably soothing, and “quickly went to sleep.” In the morning of the 17th she found the discharge “was all but stopped.” As it did not stop completely, the hot flannels were applied again during the evening of the 18th, and on the morning of the 19th it had wholly ceased. On this day she reported herself as feeling much better than she has usually been at the end of her catamenial periods.

Sept. 12th.—The patient became ‘unwell’ in the evening of the 7th inst.; she applied a hot-water bag to the lumbar region on the 10th and 11th inst., and on the 11th wrote to me as follows:—“I used the bag as you directed, and found that it greatly moderated the flow; the latter, indeed, is now very inconsiderable.”

The first of these catamenial periods appears to have been about as long as they usually continue with this patient; the length of the second is not recorded. On both occasions, however, the discharge was considerably less than usual, and the remarkably soothing, soporific effects of the heat, observable in other cases, were very manifest in this. On the first occasion, the use of heat was

omitted from the evening of the 16th till the evening of the 18th, as the flow was "all but stopped" on the morning of the 17th: it is probable that, had the hot applications been continued during that day, it would have stopped altogether two days earlier than usual. In this and other cases experience has taught me what, *à priori*, would appear probable, viz. that it is not enough merely to stop the flow; the sanguineous determination to the womb must be made to cease by frequent or long-continued applications of heat to the nervous centres.

CASE XV.—Mrs. H. suffers from epilepsy, from mental aberration occasionally during short periods, and from menorrhagia. Is 'unwell' from seven to ten days each period, and the flow is exceedingly profuse. In the evening of July 18th, 1863, I was requested to see her. She had already had one fit since dinner. Her head and four extremities were cold, and the menstrual discharge was extremely copious. She was seized with a fit in my presence; then followed a period of mental aberration, which was terminated by another fit, at the close of which she recovered her normal consciousness. The fits were characterized by powerful tonic spasms; and the dorsal muscles being especially affected, her body was bent backwards in the shape of a bow.

On this occasion I applied myself exclusively to stop the menstrual discharge; and as both she and her attendant wholly disbelieved in the efficacy of my proposed measures, I remained with her several hours, in order to carry them out myself. I derived blood to the legs and feet by keeping them wrapped in flannels dipped in hot water while she lay in bed; increased the circulation in the arms and hands by vigorous friction; and then, during nearly two hours, applied heat over and on each side of the lumbar vertebræ. She was not less astonished by the soothing effect of the measures adopted than by its extent, and the

quickness with which it had been induced. On the following morning the flow had completely stopped, and she expressed herself as feeling better in all respects. I do not know how long she had been unwell on this occasion.

Aug. 13th.—She had two fits and two “swoons,” and in the morning of the same day the catamenia recurred. On the 14th she became aberrant, and in this state played the piano during two hours, and afterwards had tea. The same evening I ordered the lumbar region to be fomented in the manner previously adopted; she experienced great comfort from the fomentation, but while in bed had either a “swoon” or a small fit, she does not know which. *Aug. 15th.*—I ordered her to be again fomented as before, at eight and eleven P.M. *Aug. 16th.*—The patient informed me that the flow was almost wholly arrested, and added,—“I cannot tell you, doctor, the great relief and delightfully soothing effect which the fomentations last night produced.” She has had no additional fit, her head is quite clear and free from pain, and she describes herself as altogether better. Ordered the fomenting to be continued at intervals throughout the day. This was done during ninety minutes in the morning, twenty minutes in the afternoon, and forty-five minutes each on two occasions in the evening: the flow continued abated. During the night of the 16th, and throughout the 17th, it was so slight as scarcely to colour the napkins used; and on the morning of the 18th it had absolutely ceased. The patient has never been ‘unwell’ so short a time since her marriage, which occurred six years ago.

Her next menstrual period was passed in the country, and while frequently travelling. She endeavoured to comply with my injunctions respecting the treatment of herself, and to keep notes for me of the result. She was unable to do either completely; but her experience, so far as recorded, is very instructive, and yields an additional proof of the power of heat to restrain uterine hæmorrhage. She

began to menstruate Sept. 11th, at five P.M., and lost a large amount of blood during the evening and the following day, when she had twelve fits. *Sept. 13th.*—Had her back fomented during ninety minutes in the afternoon, and the same length of time at night. *Sept. 14th.*—Continued the fomentations twice an hour each time, and during two hours in the morning of the 15th: in the evening of this day the flow ceased. The fomenting was not continued, and in the evening of the 16th the flow recurred. The fomenting was renewed on the 17th, but no record was kept of the result, or of when the discharge finally stopped.

Nov. 5th.—The menses recurred at seven P.M. During the 6th and 7th the flow was extremely profuse. On the morning of the 8th a hot-water bag in two columns, with flannel wrung out of hot water intervening, was applied about an hour and a half; it was re-applied in the afternoon two hours, and again in the evening four hours: the flow was already very much lessened. On the 9th there was scarcely any discharge; but one napkin was used, and that was only slightly moistened. The bag was applied during half an hour on two occasions. On the morning of the 10th the discharge had ceased. The patient was thus unwell only four days and a half, or about half her usual period.

CASE XVI.—*July 25th, 1863.*—Mrs. M. is suffering from excessive menstruation; has been ‘unwell’ a fortnight, and is still so profusely so, as to have soaked the back part of her outer dress with blood while sitting in the waiting-room. Is pale, anæmic, and exceedingly weak; feels giddy, and reeled as she entered the room. During several days previously she has been taking Quinæ Disulphatis, gr. i.; Acidi Sulphurici diluti, m.x., bis die.

Ordered to continue the medicine, and to apply heat to the lumbar region several times a day, about twenty minutes each time, by means of a thick fold of flannel, about

six inches long and four broad, saturated with water as hot as it can be borne.

July 29th.—The patient looks wonderfully changed for the better; she has a fresh colour in her face, and, though carrying her child, entered the room with a firm elastic step. She says she really does not need the medicine prescribed, and has not had it made up. The following is the substance of her report:—

On the 25th, at two P.M., she began to have her back fomented; the fomenting was continued, with occasional intervals of ten minutes, until five P.M., when, her husband having come home, she ceased until nine P.M. She was then again fomented a full hour; the fomentations being thus prolonged because she found the sensations induced by them “so agreeable.” On the morning of the 26th the flow had already greatly lessened. During the day she was fomented three times, about fifteen minutes each time, and on the following morning the discharge had quite ceased.

Sept. 14th.—The patient, according to her own statement, continued “quite well and quite ‘regular’” from the time when she was fomented until the 12th inst. In the evening of this day, after a week of unusually hard work, the menses recurred, at the end of a fortnight from the time they had previously ceased. She suffered great pain. On the 13th, at noon, she was fomented as before during half an hour; afterwards she went to sleep. Once in the course of the afternoon, and at six P.M., she was again fomented during fifteen minutes. The pain was greatly relieved by each application. The next morning the discharge had entirely ceased, and she felt perfectly well.

CASE XVII.—*Aug. 6th, 1863.*—Mrs. R., aged 29, began to menstruate when fifteen; at sixteen felt a bearing down of the womb. This gradually increased, until, in her twentieth year, she suffered on three occasions from com-

plete *prolapsus uteri*. At that time she used to be 'unwell' nearly a fortnight together; had great pain in the back and over the pubis, and, only during the catamenia, began to have three or four fits daily for several days in succession, each fit lasting from fifteen to twenty minutes. They ceased about three years and a half ago—nine months after marriage, until the 1st inst., when she had one fit.

She now complains of extreme weariness and weakness both of body and mind, is still troubled with the "bearing down," and the menstrual flow is more profuse than ever. It begins every fourth week, and continues so about fourteen days: she is thus afflicted during a full half of her time with a sanguineous discharge. It is preluded by extreme pain in the back, hips, and hypogastric region during about two days, and she continues to suffer in like manner about two days after it has appeared.

She began to menstruate again last evening, the 3rd inst. She was ordered to apply heat to the lumbar region, in the manner already described, on the fourth day of menstruation, and to continue to do so at intervals until it should cease. *Aug. 10th.*—On the 7th inst. the patient was fomented eight times, on the 8th four times, and on the 9th eight times, during about fifteen minutes each time. On the 8th the flow was already "very much lessened," and she felt "much better in herself altogether." On the 9th the flow was so slight as to necessitate the use of only one napkin throughout the day, that being "scarcely coloured." To-day the flow has absolutely ceased, the patient using no napkin at all. She says it is so long since she was 'unwell' so short a time as she has been on this occasion, that she cannot remember when it was. During the fomentations, on the first as well as on subsequent occasions, the pain she experienced was greatly and rapidly diminished.

I saw her frequently during August and September, when she reported herself much better in all respects. In the morning of Oct. 1st she again began to menstruate, and

in the evening of the 3rd had her back fomented as before. The next morning the flow was very much lessened, and she felt herself much better than during the previous day. At two P.M. her husband wounded his hand seriously, and lost much blood, by breaking a bottle; she was "quite upset" by the accident, and became very ill. She ceased to attend to herself, and the flow recurred in the evening and during the next day, the 5th, as abundantly as at first. On the 6th she called upon me. She was extremely weak and depressed, and the flow continued extremely copious. I placed a hot-water bag on the lumbar region, and requested her to keep it there, renewing the water from time to time until the flow should cease. She found the bag uncomfortable, and used it only until the first supply of water became cold; but on the following day the flow had ceased.

CASE XVIII.—C. M., aged 47, has long suffered from too frequent and too profuse menstruation. It usually recurs, about every three weeks, and of late years has usually been preceded, the patient says, by a "terrible pulsation" all over her. She began to menstruate September 19th, 1863, and applied a hot-water bag to the lumbar region on the evening of the 21st. On the 26th she wrote, "I think the flow has been at least a third less than usual."

She again began to menstruate on the morning of the 16th of October, twenty-six days and a half from the time of becoming so before; on the 17th, in the evening, she applied the hot-water bottle four hours and a half, and during an hour and a half the following morning. On the 19th, in the morning, the discharge had already quite ceased. It had thus continued only three days and three nights, and was not accompanied with any pain. The patient remarks,—“The discharge was quite a third less than usual, perhaps more than a third.”

CASE XIX.—*Nov. 20th, 1863.*—Mrs. S., aged 35, suf-

fering from paralysis. Her menses recur every third week, and last a full week. During the first four days the discharge is extremely profuse: "quite large clots come from me," she says, "as if I were confined." Believing that I shall be more likely to treat her paralysis successfully if her strength is first husbanded by restraining her excessive menstrual discharge, I ordered heat to be applied to the back on the evening of the second day of menstruation, the application to be continued throughout the third day, and afterwards until one day has elapsed after the flow has quite ceased.

She began to menstruate Nov. 22nd, at bed-time. In the evening of the 24th she applied a hot-water bag, as directed, once, and again twice only on the 25th and 26th. During the 26th the flow was checked, and in the evening of the 27th it ceased. Though the applications of heat in this case were very inadequate, the menses stopped two days before their usual time.

SECTION V.

The Development of the Mammæ influenced by Cold and Heat applied to the Back.

In the report of Case I. the patient is said to complain of "pain in the right mamma, which is larger than the left." She was also troubled with "extreme pain in the region of the left ovary," which was tender on pressure, and increasingly so each month immediately before she began to menstruate. Whether the pain in the right breast was caused by a reflex influence from the left ovary, or *vice versâ*, or whether both were due to a common cause, it is perhaps impossible to determine; I incline to believe that the pain in the breast was primary, because the patient says that up to the time when I began to treat her she had had it as long

as she could remember. But whatever may have been the causal relation of the pain in each organ, it is certain that in each it subsided simultaneously. The other symptom complained of in respect to the breasts, viz. that they were of unequal size—the right being larger than the left—continued for a considerable time after the epileptic vertigo and all pain had ceased, and the menstrual functions had become normal. Subsequent to the last date given in the report of the case in question, I ordered ice to be applied to the back twice a day during two hours and a half each time. It was thus used pretty regularly from May 26th until the end of July, when the difference in size of the two mammæ was scarcely discernible. After this date ice was applied irregularly and much less frequently, and Aug. 25th was discontinued entirely. The mammæ then appeared to be quite equal. I saw this patient again Nov. 20th, when I examined them carefully; neither she nor I could observe that the right one was in the least degree larger than the left.

I have obtained evidence in another case of the influence of cold applied between the scapulæ in developing the mammæ; but the most remarkable experience I have had in this respect was in the case which I will now describe, and which is not less remarkable as an illustration of the power of ice to render pupils of unequal size equal, while subduing, at the same time, a considerable group of anomalous symptoms.

CASE XX.—*June 15th, 1863.*—M. R. J., a girl, aged 13. Complains of headache, which comes on when she rises in the morning, and lasts nearly half the day about four days out of seven. The pain is chiefly in the temples. She has often great pain also at the bottom of the back, down the front of the right thigh, and in the right knee. Has frequent cramps in the hands and feet; they are the worst on the right side, and are increased in the hands when

the patient holds small things, especially the scissors. The common extensors of the hands and feet are spasmodically contracted. She has very disturbed, restless nights; often starts, and habitually talks nonsense in her sleep. She used to walk in her sleep, the eyes being open, and quite fixed meanwhile. On these occasions she guided herself perfectly; she has sometimes, after having been several hours in bed, gone down-stairs with a candlestick in her hand. If led gently back to bed again without being awake, she rose the following morning as well as usual; but if awake became extremely agitated, trembled violently, had a dreadful headache the next morning, and continued poorly for several days afterwards. The left pupil is considerably the largest. Bowels regular; feet habitually warm; pulse ninety-six.

The patient's mother has suffered from epilepsy: her sister does so now; and one of her brothers had "dreadful fits" while he was cutting his teeth, and has also walked in his sleep.

I ordered ice to be applied along the whole length of the back during three hours morning and evening, and prescribed the following medicine,—

R Potassii Iodidi, gr. ii.; Ammonii Bromidii, gr. iii., ex aquâ, bis die.

June 22nd.—She has had headache less frequently during the last week, and when she has had it it has gone away earlier in the day than formerly; has had no pain whatever in the back, thigh, or knee, and no cramps in either hands or feet throughout the week. Her nights continue about as restless as before. The appetite is improved, and the pupils have become nearly equal. Continue the ice and medicine as before.

June 29th.—She has had no headache at all, no cramps, and no pain anywhere during the whole week. She has also talked less nonsense, and started less in her sleep. A person who did not know which of the two pupils had

been the largest, and who was asked by me to examine them, can detect no difference in them. I can still see, however, that the left is very slightly the largest. Her appetite still improves. Bowels open daily; tongue slightly furred; pulse ninety-two. To continue the ice and medicine as before.

July 13th.—She remains free of all pain, and in all respects feels quite well. Her restlessness, and the amount of nonsense she talks in the night, steadily lessen. Her mother says,—“She is merrier and better, a great deal.” She was now ordered to have her ice-bag enclosed in flannel, and, with this exception, to continue the same treatment as before.

Aug. 4th.—“She talks very little nonsense now,” continues free of all other symptoms formerly complained of, and her appetite is “wonderfully improved.” She now complains, however, of a rather hard, painful swelling in the left breast. When her dress was opened, I saw, for the first time, that though the left mamma was very considerably developed, the right one was, as her mother said, “a mere piece of skin—quite flat.” I ordered the medicine to be discontinued; the ice to be used as before, but to be inclined to the right side of the spine between the scapulæ, and the corresponding part on the left side to be fomented several times a day.

Sept. 1st.—The left mamma is still painful, and larger than the right. She has nearly ceased to talk in her sleep. To continue the ice-bag on the right side of the dorsal region as before, and to apply a hot-water bag to the opposite side three times a day.

Sept. 7th.—The patient says the hot-water bag is soothing and very agreeable, and that the pain and tenderness of the left breast are lessened. “The nonsense,” her mother says, “is all but over.” Continue as before.

Oct. 13th.—The pupils are now equal, and the mammæ, chiefly by the development of the right one, are so nearly

equal, that the difference between them is scarcely distinguishable. The left one is no longer either hard or painful. The patient now passes many nights without talking in her sleep, and in all other respects is in perfect health.

Conclusion.

Among the cases given in the preceding pages, there are a few which, if standing alone, might not be held to afford any conclusive proof of the existence of the power of increasing and of decreasing the circulation of the blood in different parts of the body by modifying the temperature of the nervous centres along the back; but when those cases are considered in connection with the others, the probative value of which is, I apprehend, unquestionable, they acquire a special significance as parts of the cumulative evidence here tendered of the truth and practical importance of the discovery of which they are an application. Moreover, the existence of the power in question is proved by an additional array of facts,—facts illustrating its remedial agency in various diseases affecting various parts of the body. A few examples of these facts are given in the Appendix to this pamphlet. I venture to affirm, with a confidence justified by experience, that, though modifying the temperature of different parts of the back in accordance with the principles explained in the Appendix* will not effect a cure of all cases of epilepsy and paralysis so treated, yet that the remedial efficacy of cold or heat, or both, thus applied, is greater, and more extensively applicable, in the treatment of these diseases, than all other previously known remedies put together; and that in respect to diabetes it promises to be so also.

It may, perhaps, be alleged by sceptical critics void of experience in this matter, that while the facts which I ad-

* See Paper marked A.

duce may be indisputable, they are susceptible of an explanation which does not necessarily involve a recognition of the hypothesis that they are caused by effecting a dilatation or contraction of blood-vessels through the agency of the nervous system. When I shall have published the evidence which I possess of the power now within reach of the physician of controlling the circulation of blood in the brain, such scepticism will, I know, be finally silenced. Meanwhile, I may state that the sanguineous currents of an anæmic brain may now be augmented, and that those of a hyperæmic one may be lessened by changing the temperature of certain ganglionic nervous centres, and without the use of medicine. The bearing of this discovery on the treatment of cerebral diseases, both functional and organic, will be at once obvious to every reflecting person. Over and over again I have verified its reality in a few minutes. The following is an example of an often-repeated experience:—*Nov. 23rd.* I visited a lady who is liable to epileptic attacks, and who was then suffering from an exceedingly severe, burning, and long-continued headache. The forehead was extremely hot, the face also, and intensely flushed. At 6.45 P.M. I applied a double-columned hot-water bag, enclosed in flannel, to the lower cervical and upper dorsal region. At 7 P.M. the pain was lessened, the forehead was perceptibly cooler, and the patient felt drowsy. At 7.15 P.M. she was asleep; and at 7.30 P.M. she awoke quite free from headache. The forehead had then become remarkably cool; the cheeks had almost wholly lost their flush; and the hands, previously dry and cold, had become moist and warm.

Leaving theoretical considerations aside, and regarding the cases I have given by way of illustration of a new method of treating certain functional diseases of women from a practical point of view, the reader will find that the results arrived at may be thus summed up:—*First.* Menstruation may be induced or increased by the application of

ice to a certain part of the back. *Secondly.* By the same treatment the dreadful "cutting," "grinding" spasmodic pains which many women suffer during menstruation, and especially before and during defective menstruation, may be annulled. *Thirdly.* By the same treatment the most profuse form of leucorrhœa, viz. that vicarious of menstruation, may be speedily cured. *Fourthly.* By the same treatment habitual coldness of the feet, from which a large number of persons of both sexes suffer, but to which women are peculiarly liable, may be not less speedily remedied. *Fifthly.* Profuse menstruation may be restrained or arrested by the application of heat to a certain part of the back. *Sixthly.* By the same application the wearying, aching pain of the back usually accompanying menorrhagia may be annulled. *Seventhly.* Heat, and probably cold, applied between the scapulæ, will annul certain pains in the mammæ; and, *Eighthly,* The same agents, applied in the same way, will modify the development of those organs—the action of heat being to lessen, the action of cold to enlarge them.

In due time I hope to show by examples how several affections peculiar to women may be most effectually controlled by methods of practice dictated by the principles of which these pages are an illustration; meanwhile, I venture to offer a few suggestions for the consideration of obstetric practitioners.

(1.) There are sometimes cases of anæmic women, in whom, during parturition, the womb becomes exhausted before the process is accomplished: it is reasonable to suppose that in such cases an additional afflux of blood in the uterine walls would renew the strength and contractile force of the organ; if so, ice applied on each side of the lower dorsal and upper lumbar vertebræ would probably endow it with fresh energy. I say *on each side*, because if applied *over* the spinal cord, it might unduly lessen its excito-motor power, which becomes increasingly necessary during the later stages of labour, when the expulsive power

of the abdominal muscles is called into play. I make this suggestion with great diffidence, inasmuch as the physiological conditions on which uterine contractions depend are, as yet, far from being completely understood. I believe, however, that the power now exemplified of influencing the uterine circulation will at least serve as a valuable guide to the successful investigation of those conditions; and that as the efficacy of the ergot of rye, in producing uterine contractions, depends, probably, on its power of lessening the amount of blood in the sympathetic nervous centres,* it is justly presumable, *à priori*, that by exerting a sedative influence on those centres by means of ice, the same effects would be produced, but without the hitherto inseparable evil of administering a poison to the patient.† I am confirmed in the opinion that ice, applied as suggested, would thus act upon the womb, by finding in several cases that when the expulsive power of the bladder had been greatly impaired, or almost destroyed, I was able to re-invigorate that viscus by applying cold to the back; and that by the same means, in many cases of obstinate constipation, strength and functional activity has been restored to the bowels.

(2.) In cases where the "pains" recur with unwonted rapidity, before the outlet has had time to become adequately relaxed, their intensity may probably be abated by applying heat to each side of the spinal cord, so long as

* Dr. Brown-Séquard, in his Lectures on Paralysis of the Lower Extremities, observes:—"Ergot, like belladonna, produces a contraction in the blood-vessels of the spinal cord and its membranes, and therefore diminishes the amount of blood circulating in these organs." If this be the case, it is probable that ergot also diminishes simultaneously the amount of blood circulating in the sympathetic ganglia.

† "It is now very generally admitted that the administration of ergot of rye during labour endangers the life of the fœtus; and that this depends on the poisonous action of the drug, as evidenced by its effects on the action of the heart, both of the mother and the child, is shown in a valuable report by Dr. Hardy in the twenty-seventh volume of the first series of the 'Dublin Medical Journal.'—*Medicines: their Uses and Mode of Administration.* By J. Moore Neligan, M.D., page 215.

the contractions are confined to the womb only, and when they involve the abdominal muscles also, by applying simultaneously a thin column of ice over the cord itself. I confess, however, that the simultaneous use of cold and heat, side by side, and near together, is attended with much practical difficulty, as the column of hot water must be effectually separated from the column of ice by some available substance which heat traverses with difficulty. I have not yet been able to devise any satisfactory apparatus of this kind: I do not despair, however, of doing so.

(3.) "Flooding," when the womb fails to contract after expelling its contents, and, indeed, uterine hæmorrhage from all causes, will probably be restrained or stopped most effectually, and certainly most agreeably, if at all, by the application of heat in the lumbar region on each side of the spinal column. I have given evidence sufficiently decisive of the remedial power of heat in menorrhagia, and in soothing the patient meanwhile, to assure obstetricians that they may safely, and probably successfully, test the efficacy of this agent, applied as suggested, when they are called upon to prescribe in cases where health, or even life, is imperilled by loss of blood from the womb.

(4.) The tendency to abort, which prevails in many women during the early months of pregnancy, may not improbably be lessened or counteracted by the application of heat to the lower part of the back. In certain women, otherwise healthy, the tendency to menstruation, or uterine hæmorrhage, seems so strong ~~as~~ without any obvious cause, to overcome the adherent power of the ovum; such women not unfrequently conceive and abort several times in succession, each abortion seeming to increase the predisposition to its repetition. In cases of this kind, it seems reasonable to infer that the power which is efficacious in lessening or arresting the menstrual flow is also capable of so diminishing that determination of blood to the womb, which, in many instances, is probably both the forerunner

and cause of abortion, as to prevent its occurrence. I am aware, of course, that a prolific source of abortion is the syphilitic taint, and that where this obtains the abortion which it is apt to induce is not likely to be prevented by merely lessening the force of the sanguineous flow to the womb; but even in such cases, if the taint and consequent tendency to abort be only slight, it is not improbable that that tendency may be often controlled by the means here indicated.

(5.) I am sanguine enough to hope that that terrible affliction of a large proportion of pregnant women, viz. sickness, more or less continuous throughout the whole period of gestation, but especially troublesome in the early months, may be either remedied, or greatly alleviated by applications of ice to the appropriate segments of the spinal cord. There can be no doubt but that this "sympathetic" functional disturbance is a reflex action originating in impressions made on the uterine nerves by the growing ovum, and having its seat in the spinal cord, which transmutes that impression into an impulse, and transmits it to the stomach and alimentary canal. Now, as I have evidence that in other cases the activity of the excito-motor functions of the spinal cord—especially of those segments which are related to the male reproductive organs—may be subdued by means of ice, I am encouraged to believe that a like method may remedy the sickness in question.

(6.) It is probable that as the development of the mammæ may be hastened or retarded by modifying the temperature of the dorsal region, so the functions of those organs may be influenced in like manner. I believe experience will prove that the secretion of milk may be increased by means of ice, and that it may be lessened by means of heat, applied between the scapulæ; and also, that in cases of inflamed breasts induced by non-suckling when there is an abundance of milk, or by other causes, heat so applied will be at once the most effectual and most agreeable remedy. A lady

who is attended by one of my medical friends, and who, being unable to suckle her child, was troubled with a great enlargement of the mammæ, and an abundance of milk, has had heat applied between the scapulæ for several hours during several days and nights. She *feels* as if the heat so applied were doing her good, and finds it agreeable: certainly, the pain and swelling of her breasts are subsiding. Whether this result is due in any degree to the heat, or wholly to the opening medicine she has been taking, or to both, it is of course impossible to say. Only a very large experience can decide what the actual power of heat in this respect is.

APPENDIX.

A.

A New Method of treating Disease by controlling the Circulation of the Blood in different parts of the Body.

[Reprinted from the 'MEDICAL TIMES AND GAZETTE' of July 18, 1863.]

It has long been known that the sympathetic nerve, called by Bichat the nervous system of organic life, presides over those processes by which the body is developed and sustained. It stimulates and controls the action of the heart, alimentary canal, genito-urinary organs, and all those processes of growth, repair, and removal of effete materials on which the continuous vitality and health of the animal organism depend. During recent years, important additions to our knowledge of the functions of the sympathetic nerve have been made, chiefly by Professor Claude Bernard, Dr. Brown-Séquard, and Dr. Augustus Waller, with reference to its power of controlling the action of blood-vessels, or what have been termed its vaso-motor functions. But as the sympathetic and cerebro-spinal nervous systems are intimately related, and, indeed, in some parts, inextricably and indistinguishably blended, both in structure and function, the nervous influence, whether healthy or not, which is exerted over the several organs of the body, is twofold; hence, when that influence becomes abnormal, either in kind or degree, the most potent method of restoring it to its healthy condition would be by a dual action at once on the sympathetic and cerebro-spinal nervous systems. The physician who acquires the power of directly controlling these great controllers of the organic functions would immediately obtain the mastery over a large number of diseases.

I scarcely dare write the words, "I have done this,"—so momentous are they if true; and yet I believe I have.

I have discovered that a controlling power over the circulation of the blood in the brain, in the spinal cord, in the ganglia of the sympathetic nervous system, and, through the agency of these nervous centres, also in every other organ of the body, can be exercised by means of cold and heat applied to different parts of the back. In this manner the reflex excitability, or excito-motor power of the spinal cord, and the contractile force of the arteries in all parts of the body, can be immediately modified.

In order to lessen the excito-motor power of the spinal cord only, I apply ice in an india-rubber bag about two inches wide along that part of the spinal column containing the part of the cord on which I wish to act. On the same principle, the vitality of the spinal cord may be increased by applying hot water and ice alternately, each in an india-rubber bag, if very energetic action be required; if less vigorous action be necessary, I apply ice, or iced water only, using it several times a day, for a short time on each occasion, with a long interval between each application.

If it be desirable to increase the circulation in any given part of the body, this I have found myself able to effect by exerting a soothing, sedative, depressing, or paralysing influence (according to the amount of power required) over those ganglia of the sympathetic which send vaso-motor nerves to the part intended to be acted on. This influence may be exerted by applying ice to the central part of the back, over a width of from four to four inches and a half, and extending longitudinally over the particular segments of the sympathetic and of the spinal cord on which it is desired to act.

For example, intending to direct a fuller and more equable flow of blood to the brain, I apply ice to the back of the neck and between the scapulæ; increased circulation in and warmth of the upper extremities are induced in the same way; the thoracic and abdominal viscera can be influenced in like manner by applications to the dorsal and lumbar regions; while the legs and feet can have their circulation so increased, that they become thoroughly warm by ice applied to the lower part of the back.

The bags I use are of different lengths: of the width already named for adults, and of lesser widths, of course, for children. I have had them made both of india-rubber, and of linen with a

surface of india-rubber upon it: the former are the best. The width of the bags is equal throughout, except at the opening, which is narrowed to facilitate tying, and elastic to admit easily the lumps of ice. When the bag is full, I divide it, if a long one, into three segments: this can be done by constricting it forcibly with string; the ice of the upper part is thus prevented from descending, as the melting goes on, into the lower part of the bag. I am preparing a bag on a new principle, which will be a great improvement on those I now use; but as it is not yet complete, I abstain from describing it here. I sustain the bag in the position intended by means of ribbon or tape passed through loops at the back of it, then over the shoulders, and round the body.

Theoretically, I feel assured that by the methods I have described physicians will be able to exert a remedial influence over a large number of diseases; experimentally, I have already received numerous and wonderful proofs that this assurance is well founded. By thus acting, by means of cold or heat, or both alternately or combined, on the spinal cord and ganglia of the sympathetic, I have succeeded in completely arresting the fits of several epileptics, and in curing the following maladies:—Paralysis; long-continued and extreme headaches; prolonged giddiness; extreme somnolence; a feeling of want of firmness in standing and of security in walking; habitual hallucinations; loss of memory; weakness and dimness of sight; ocular spectra; inequality of the pupils; lateral anæsthesia; incontrollable spasmodic opening and shutting of the mouth; cramps of the limbs (in two cases of the hands, incapacitating the patients to continue their work); numbness of the fingers, incapacitating the patient to pick up small objects, or to use a needle; paralysis of the bladder; incapacity to retain the urine more than a few minutes (two cases recovered to a surprising extent); profuse and too frequent menstruation; scanty and irregular menstruation; extreme menstrual pains; profuse leucorrhœa, with a long-continued bearing down of the womb, and extreme pain of the back; habitual constipation; habitual diarrhœa; general coldness of the surface of the body, which has continued for many years; habitually, and hitherto irremediably, cold feet.

For the sake of brevity I abstain from discussing here the applicability of the method above described to the several diseases which the physician is called on to treat; but as many cases of

paralysis and a very great majority of cases of epilepsy have hitherto proved incurable, I will, in respect to these diseases, and especially in respect to epilepsy, make a few observations, and give the briefest outlines of a few cases, showing the results of my method of treating the last-named disease.

To cure paralysis primarily originating in a lesion of some part of the brain, or spinal cord, it is necessary to exert a curative influence, not only over the injured part, but also over the sympathetic nervous system to the extent of the distribution of its vaso-motor nerves throughout the paralysed limb: to how slight an extent this has hitherto been possible, either by internal medicines or external applications, is too well known to need description here. Assuming the general truthfulness of the doctrines of Messrs. Kussmaul and Tenner, Schroeder van der Kolk and of Dr. Brown-Séquard, respecting the essential nature of epilepsy, or the proximate cause of convulsive affections generally, we must become still more deeply impressed with the conviction of the necessity of influencing both the cerebro-spinal and the sympathetic nervous system, in order to exert any lasting curative power over that remarkable group of maladies. In Messrs. Kussmaul and Tenner's general summary of the results of their investigations concerning the nature and origin of epileptic convulsions, they say,—“It is probable that certain forms of epilepsy result from a spasm of the muscular coats of the cerebral arteries;” and elsewhere they observe, that if so, “the central point from which these (spasms) arise would consequently lie in the part where the vaso-motory nerves take their origin, and, therefore, if the results of Schiff's researches be correct, in the medulla oblongata. An excitement of this nervous centre would then be the first link in the chain of these processes, anæmia of the brain the second, and the epileptic attack the third.” Dr. Brown-Séquard, in his ‘*Researches on Epilepsy*,’ after giving his reasons for thinking that “Epilepsy depends in a great measure on an increased reflex excitability of certain parts of the cerebro-spinal axis,” proceeds to account for the successive phenomena of an epileptic attack, and, referring to one of the first of them—the paleness of the face—remarks:—“We consider it a most interesting symptom, as it leads to a very probable explanation of the loss of consciousness in epilepsy. After Professor Claude Bernard had discovered that the section of the cervical sympathetic nerve is followed by a dilatation of the

blood-vessels of the face, I found that when this nerve is irritated by galvanism there is a contraction of these blood-vessels, and I explained the facts discovered by the eminent French physiologist and myself, by considering the sympathetic as the motor nerve of the blood-vessels of the face. I found, also, that the branches of the sympathetic nerve which animate the blood-vessels of the face, originate from the spinal cord with the branches of the same nerve going to the iris. . . . When the excitation takes place in the spinal cord and the basis of the encephalon which gives rise to the fit, the nerve-fibres which go to the head are irritated, and produce a contraction of its blood-vessels. Of course this contraction expels the blood, and in consequence the face becomes pale. . . . We think that at nearly the same time, when the origin of the branches of the sympathetic nerve going to the blood-vessels of the face receive an irritation in the beginning of a fit of epilepsy, the origin of the branches of the same and other nerves, going to the blood-vessels of the brain-proper, also receive an irritation. A contraction then occurs in these blood-vessels, and particularly in the small arteries. This contraction expelling the blood, the brain loses at once its functions, just as it does in a complete syncope."

Though Professor Schroeder van der Kolk differs somewhat from Messrs. Kussmaul and Tenner, and Dr. Brown-Séquard, in maintaining that the abnormal changes constituting the proximate cause of epilepsy are more exclusively restricted to the medulla oblongata than is believed to be the case by those investigators, yet all these distinguished pathologists agree in recognising the very important part performed by the vaso-motor nerves in producing an epileptic fit; and, though they differ as to the relative frequency of the cases in which the medulla oblongata is the primary seat of the attack, they also agree that it is very often the originating centre of the malady. It may therefore be stated that they all concur in the opinion that the proximate cause of epilepsy is twofold, viz. an undue reflex excitability of the medulla oblongata, and an undue irritability of those branches of the sympathetic nerve which are distributed to the cerebral arteries, and which, in their abnormally excitable condition, induce spasmodic contractions of the cerebral blood-vessels, and the consequent loss of consciousness and fall, which usually usher in an epileptic fit. I agree with Dr. Brown-Séquard in believing that different segments of the spinal cord,

as well as the medulla oblongata, are not infrequently the primary seat of epilepsy; indeed, concerning the pathology of epilepsy, there is, so far as I know, only one point in which I differ from that profound physiologist and skilful physician, under whose guidance, at the Hospital for Diseases of the Nervous System, it has been my good fortune to study. It is true that that "one point" is an important one, since, by diverging in the direction I have taken, I was led by a logical process to conceive of the method of curing epilepsy, which, when months afterwards I was enabled to put it to the test of experiment, realized my expectations. For the sake of brevity, however, in this preliminary statement, I shall avoid discussing the point referred to. My immediate object in touching on the pathology of epilepsy at all at present, is merely to show that while, as I have said, "to cure paralysis primarily originating in a lesion of some part of the brain or spinal cord, it is necessary to exert a curative influence, not only over the injured part, but also over the sympathetic nervous system, to the extent of the distribution of its vaso-motor nerves throughout the paralysed limb," so, in like manner, to cure epilepsy it is necessary to exert a curative influence not only over the spinal cord, including the medulla oblongata, but also over the sympathetic nervous system, to the extent of the distribution of the vaso-motor nerves throughout the encephalon.

In treating paralysis according to the method above described, my first effort is directed to the cerebro-spinal centre, which I endeavour to restore to a healthy condition by increasing or diminishing the circulation of blood in it. I effect either of these results by directly modifying the temperature of the spinal and of the ganglionic centres on each side of it. Moreover, as fibres from the ganglia of the sympathetic are distributed to the sheaths and blood-vessels of the spinal cord, it can be influenced by cold and heat not only directly, but indirectly by acting on those ganglia. The restorative power which I have been able to exert in this manner is truly surprising, and, I believe, quite unparalleled by any influence ever exerted by medicine.

If the paralysed limb be cold, my next object is to increase the circulation in it; this I do, as already said, by lessening the vaso-motor power of those ganglia of the sympathetic which preside over the blood-vessels of the limb in question. In this manner I find that the circulation in it can be so increased as to

restore to it its normal warmth, and, in some cases, to make it even unpleasantly hot.

The condition of the injured part of the brain or spinal cord having been improved, and the circulation and consequent nourishment of the paralysed limb having been adequately increased, I then, and not until then, apply galvanism to the paralysed muscles, if this aid seems needful. When thus applied, after the brain or cord and limb have been acted on as described, the affected muscles prove far more rapidly responsive to the galvanic stimulus than paralysed muscles usually are, and recover their natural size and strength with proportionate rapidity.

I could support these statements by several illustrative cases, but shall only venture to extend this paper by giving a few facts in evidence of the power over epilepsy which my method of treatment places within the reach of the physician.

In order to cure epilepsy, care must of course be taken, in the first place, that all sources of eccentric irritation be removed; assured of this, as far as possible, I direct all my efforts to accomplish two objects: first, to lessen the excito-motor power of the spinal cord by lessening the amount of blood circulating in it; and, second, to prevent those spasmodic contractions of the cerebral arteries which induce the sudden loss of consciousness constituting the first phase of an epileptic fit. To achieve these objects, I order—

First, and most important, ice to be applied to some one part or to the whole length of the back, and from two to eighteen hours a day, according to the special character of the case under treatment.

Secondly, if the extremities be cold, to aid them in recovering their wonted warmth during the first day or two of treatment by frequently immersing them in hot water, and by friction, also, in winter, by clothing the arms, down to the wrists, and the legs, down to the ankles, in flannel.

Thirdly, as auxiliaries, (1) to take abundant physical exercise, and to use dumb-bells when practicable, or other special means of increasing the respiratory activity and of expending the energy of the spinal cord; (2) to exercise the brain daily and systematically in some healthy study, or, if this be impracticable, to ensure regular mental activity by means of some interesting employment; (3) so to cut or dress the hair that it shall not cover or keep warm the upper part of the back of the neck; and (4) to

take care that the dress along the centre of the back be light and cool.

If ice be properly applied to the back, the extremities, however cold, may be made quickly warm, so that in many cases the use of hot water may be wholly dispensed with; but in severe cases, where immediate derivation of blood to the extremities is urgently required, and more especially in winter, it is expedient to accelerate the influence of the ice applied to the sympathetic ganglia by the means just indicated.

The results of this method of treating epilepsy are exemplified in the following cases:—

CASE I.—A man, aged 42, began to have fits in 1854. During the twelve months previous to the beginning of my treatment (May 16th) he had, on an average, three fits of about twenty minutes' duration daily; since I began to treat him he has not had a single fit.

CASE II.—A girl, aged 17, began to have fits when between 13 and 14 years old. Has been accustomed since that time to have two little fits (*le petit mal*) daily. I began to treat her February 24th, 1863. These little fits immediately became less pronounced, then, having gradually lessened in number, ceased entirely at the end of the first week, and have never recurred.

CASE III.—A girl, aged 14. Has had fits, chiefly little ones, about six years. She becomes unconscious in each fit, but does not fall down. When I began to treat her (April 23rd, 1863) she was having fits at the rate of about four in each hour during the day, besides several each night. Each fit lasted from three to five minutes. The night fits ceased entirely in the middle of May, and the day fits, which now do not last above two or three seconds of time each fit, have declined at the following rates:—

Total number of fits during the week ending May 1					50
„	„	„	„	„	8
„	„	„	„	„	15
„	„	„	„	„	22
„	„	„	„	„	29
„	„	„	„	„	29
„	„	„	„	June 5	11
„	„	„	„	„	12
„	„	„	„	„	19
„	„	„	„	„	8

Total number of fits during the week ending June 26	5
" " " " July 3	6
" " " " " 10	2

NOTE.—During the week ending May 8, the patient suffered much from toothache, and at length had two teeth drawn. Hence, I believe, the fact that she had more fits that week than the previous one.

CASE IV.—A girl, aged 20; suffers from falling fits of the ordinary kind, lasting about three minutes each, from little fits, which she calls her "jerks," and in which she becomes unconscious, but does not fall down, and from a frequent quivering of the lips, which is a serious impediment to speech. Of the falling fits she usually has a large but uncounted number each month. In April last she had them continuously one after another throughout each day during a week. Of her little fits, or "jerks," she usually had ten in each of the six days of her catamenial period, and one during each day of the interval. The quivering of the lips is a constant trouble. I began to treat her May 27th: since that time she has had one falling fit, lasting about three minutes, and two lasting but an instant each; and since June 15th, excepting one little "jerk," without losing consciousness, she has had no jerking fit, no quivering of the lips, and no abnormal symptom whatever.

CASE V.—A boy, aged 13. During the last twenty months has suffered from falling fits, and what his mother calls "stagnation fits," in which he becomes unconscious, but does not fall. On an average he had, until I began to treat him, about fifty of each kind of fit during each month. He came under my care June 4th. Since that date he has had only one falling fit, which was induced by his brother, who made him angry, and has had no little fit whatever.

CASE VI.—A boy, aged 14, in the habit of having an average of twelve fits daily, each preluded by a shriek. I began to treat him June 11th. On that day he had four fits, but each of them without a shriek. Since that day he has not had a single fit.

B.

Case of Epilepsy, with Defective Vision, Constant Headache, Habitual Constipation, Leucorrhœa, Deficient and Painful Menstruation, cured by means of Ice.

In the account of the cases given in the preceding section the simple fact of the arrest of the fits is recorded, but three of them were complicated with other maladies, which were also cured. I reserve a full report of these, together with many other cases of epilepsy, for separate publication as soon as I shall have been able to prepare it. Meanwhile, however, I will give one remarkable example of the curative power of ice in a case which was peculiarly complicated, which had resisted the ordinary methods of treatment at three different hospitals during upwards of three years, and which, within two months from the date when the treatment began at St. Thomas's Hospital, was dismissed as quite well in all respects, the cure having been effected solely by means of ice.

July 28, 1863.—W. E., aged 18 (born at the end of the seventh month). Began to have fits when about three years old; the first lasted from fifteen to twenty minutes; the patient was much convulsed, bit her tongue, and foamed at the mouth. The second did not occur until she was five years old; it was like the first one. Since that time till about three months ago she has had a long severe epileptic fit about every fortnight; during the last three months has had no large fit.

About five years ago became attacked with "shakings," which consist of sudden and violent jerks, sometimes of her arms, sometimes of her legs, and sometimes of her whole body. They often throw her down as if electrified. The jerks, or shocks, seem to her to proceed "from the waist and head;" she feels many times a week as if she had a tight string round her head; when this seems to give way she falls down, and then feels as if grasped tightly round the waist. She falls down two or three times a day, but the number of jerks she has without falling is very great; she is most troubled with them early in the morning, when they often occur in continuous succession during an hour at a time. The jerks occur daily, except during the two or three days immediately following that on which she has had a large fit. During the jerks she generally retains her consciousness. She complains that her body and face are often swollen when

she is severely attacked by the "shakings." She has "terrible headaches every day, and nearly all day long," has almost continuous pain at the upper part of the ball of the right eye; with this eye she can only read test-type No. 3½.* The left eye feels quite well, but with it she can only read test-type No. 2½. She does not see clearly, and cannot distinguish objects or recognize persons at a moderate distance from her. If she reads, the eyes begin to run very much; and on a dark or dull day she cannot read at all. Both pupils are remarkably large, and contract very slightly in the presence of light. She complains that her eyes are getting gradually worse.

She began to menstruate in her fifteenth year; does so every three weeks; the discharge lasts about four days, but is very scanty, "poor." She suffers extreme pain during the whole menstrual period,—cutting, griping pain, and backache; she says she "can't stand, because in such dreadful pain." She also suffers from leucorrhœa, which is increased by warmth or a violent access of shaking. She always makes water during her strong fits, and habitually with abnormal frequency. The bowels are usually constipated; often confined three or four days together. She is generally very warm, often flushed, and troubled with what she calls "wet-heat;" the back and hands are especially hot.

She has been an in-patient of the Middlesex Hospital upwards of four months, an out-patient at St. George's several months, and also an out-patient at the National Hospital for the Paralysed and Epileptic between two and three years.

She was admitted at St. Thomas's Hospital, July 30, 1863, and on this day, after admission, had a large fit. Her treatment began August 7th. Ice was ordered to be applied along the

* (3½.) A useful aid in diagnosis of cerebral diseases, as well as of diseases of the eye, was published last year in the form of an octavo pamphlet, entitled 'Test-types for the Determination of the Acuteness of Vision,' by H. Snellen, M.D., Surgeon to the Netherlands Ophthalmic Hospital at Utrecht.

(2½.) The numbers used in the text refer to types of the same sizes as those denoted by the same numbers in Dr. Snellen's pamphlet. It is to be regretted that these numbers do not denote types of sizes identical with other test-types already in use, and denoted by corresponding numbers. Types as nearly as possible of the sizes which the patient could read before and after treatment, and corresponding to the numbers in the text, are used in printing three several parts of this note, in order to show exactly the extent of the improvement in sight which she experienced.

(1½.) I hope, ere long, to publish a report of my observations on the effects of cold and heat, applied to the ganglia of the sympathetic nerve, on the cerebral circulation and diseases of the brain. In that report I shall give several remarkable illustrations of the power of cold in improving vision by restoring health to the base of the brain.

whole length of the spinal column three times a day during three hours each time. During the period of treatment the ice was sometimes applied to the cervical and upper dorsal region only; sometimes to the lumbar region only; and sometimes it was used twice daily instead of three times, the application being varied according to the nature of the symptoms observed from time to time. Unfortunately, no record of these changes has been kept.

On Sept. 19th the ice was ordered to be omitted until the patient should be clothed in flannel; this being done, it was resumed Sept. 26th.

Results of Treatment up to November 5th, when the Patient left the Hospital.

LARGE FITS.—Aug. 12th, 1; Sept. 5th, 1; Sept. 25th, when ice was not being applied, 1.

JERKS.—Aug.	9	..	19	Sept.	1	..	7	
	„	10	..	35	„	2	..	11
	„	11	..	29	„	3,	no record.	
	„	12	..	15	„	4	..	10
	„	13	..	25	„	5 to 9,	none.	
	„	14	..	27	„	10	..	18
	„	15	..	9	„	11	..	29
	„	16	..	14	„	12	..	15
	„	17	..	11	„	13	..	28
	„	18	..	8	„	14	..	17
	„	19	..	10	„	15	..	16
	„	20	..	17	„	16	..	19
	„	21	..	12	„	17	..	13
	„	22,	no record.		„	18	..	7
	„	23	..	28	„	19	..	14
	„	24	..	7	„	20	..	8
	„	25	..	9	„	21	..	3
	„	26	..	10	„	22	..	6
	„	27	..	8	„	23	..	3
	„	28	..	5	„	24	..	6
	„	29	..	13	Total	230		
	„	30	..	12				
	„	31	..	7				
			<hr/>	Total				330

It thus appears that during the twenty-three days of August, after the treatment began, the patient had an aggregate of 330 jerks; and that during the twenty-four days of September, in which they still continued, she had 230. These numbers show that, although the jerks still continued in September, the patient had already become much better than she was in August; and in August she repeatedly said,—“I don’t have nothing like so many shakings as I had at home.”

She has had no fit since Sept. 25th, and not a single jerk since Sept. 24th. Her progressive improvement in other respects is recorded in the following notes:—

PULSE.—Aug. 10th, 112; 14th, 84; 19th, 80; 24th, 80; 31st, 84; Sept. 9th, 76; 12th, 74; 22nd, 76; 24th, 80; 29th, 80; Oct. 7th, 88, full and regular; 14th, 104; 22nd, 92; 28th, 108. [On the three or four last occasions only when I saw the patient she had just dined; hence her pulse is noted as higher than usual. I generally find that when under the influence of ice the pulse has gained its normal rate, that rate is steadily maintained. See Preface, page viii.]

HEADACHE.—Aug. 14th. Has had much less headache since using the ice, but has it now. 31st. Has much less headache than formerly. Sept. 22nd. No headache. After this date it never recurred.

EYES AND EYESIGHT.—Aug. 31st. The aching in the right eye has ceased. Sept. 9th. Both pupils seem more contractile; the patient thinks her sight is clearer. Sept. 22nd. The pupils are now contracted to the normal size. Sept. 24th. She can read test-type No. 2 (halfway between $1\frac{1}{2}$ and $2\frac{1}{2}$) fairly with the left eye alone, and can make out a few words of the same with the right eye alone, but can *read* it comfortably with both eyes *together*, and by means of both eyes together can also read, with difficulty, even a few words of No. $1\frac{1}{2}$. The patient says that her eyes feel stronger; that she can see distant objects much more clearly than formerly; and that “they don’t run now.” She adds, however, that trying to read the small type makes her head ache. Oct. 7th. The sight is decidedly clearer. Oct. 22nd. Pupils normally contractile. Oct. 14th. She can now read quite easily test-type $1\frac{1}{2}$ with each eye.*

THE BOWELS.—Aug. 24th. Confined (tongue slightly furred); Aug. 31st. Irregular (tongue clean); Sept. 9th. Open daily;

* See note to p. 57.

Sept. 22nd. Not open yesterday (has not used ice since the 19th inst.,—is waiting for flannel); Sept. 29th. Open regularly each day. After this date they continued so.

CATAMENIA.—Sept. 11th. Began to menstruate; the sanguineous secretion scanty, as usual; but on the 13th and 14th instant "a great deal of white stuff" was discharged. No pain was experienced on this occasion. Oct. 8th. Began to menstruate; continued to do so four days. Had no pain either before or during the period.

She has no longer any feeling of being swollen either in the face or body; the sense of constriction round the head and waist is wholly gone; and the flushing, as well as the "wet-heat," as the patient called it, of which she used to complain, have ceased to trouble her. Before leaving the hospital, she expressed herself as feeling in all respects quite well.

C.

Infantile Convulsions, with Congestion of the Brain, cured by means of Ice.

July 13th, 1863.—H. R., a boy, 5 months old; said to have had good health until the 11th ult., when he was seized with convulsions; the fit lasted about thirty minutes, and was followed by stupor during about fifteen minutes. Two hours afterwards a second fit occurred, and was followed by seven more the same day, the last of them continuing from 7 P.M. to 2 A.M.; the next day he had another, and then continued free from attacks until the 11th inst. He had three fits on that day, one last night, and another this morning. The attacks were of the usual type; they began by fits of coughing, the child seeming to be choked; these were followed by general twitching of the muscles of the face, loss of consciousness, and convulsions of the whole body, the face then becoming extremely livid—almost black. Since his birth he has frequently "started," especially in his sleep. About three weeks before being weaned he became frequently sick, and has often been so since. His eyes move about spasmodically; pupils dilated, and but slightly contractile. His head, especially the back of it, is extremely and continuously hot. His back also is very hot. His legs and feet are remarkably cold, and he cries continually, as if in great suffering. Of late

the bowels have been much relaxed. The tongue is furred, pulse very rapid, respiration hurried and difficult. He has been treated vigorously by means of calomel, and blisters to the back of the head.

I applied a bag of ice along the back, placing one end of it in contact with the base of the skull, and letting the other extend to the top of the sacrum. The child was instantly soothed. I ordered the ice to be kept applied in this manner during three hours three times a day—nine hours in all, and the upper part of the head to be kept cool by applying cloths dipped in iced-water. The following medicine was also ordered to be given:—

℞ Potassii Iodidi, Ammonii Bromidii, ā ā gr. $\frac{1}{2}$; aquæ ʒj, ter die.

July 15th.—No more fits. The heat of the head is lessened. To put the ice-bag in flannel; to fill it afresh with ice twice a day, and to keep it applied on each occasion until the ice has quite melted. To give the following powder, and to repeat it if the bowels should not be freely open:—℞ Hydrargyri cum Cretâ, gr. $\frac{1}{2}$; Pulveris Rhei compositi, gr. iii. M. ft. pulvis horâ somni sumendus. Apply cold to the head as before.

July 16th.—The cerebral congestion is still considerable; the eyes still roll about in an aimless way; the head, especially at the back, is still very hot; and the patient cries as if in pain. I ordered the spinal ice-bag to be limited to the lumbar region, and laid the child's head on a pillow of ice, enclosed in flannel, extending across the base of the skull from ear to ear. The little patient was immediately soothed as if by magic. The ice-pillow was ordered to be applied day and night, the top and front of the head being still kept cool by cloths dipped in iced-water.

July 17th.—The patient is much better; the fever has subsided; pupils actively contractile; respiration easier; bowels open; appetite good; pulse full and moderate; the legs and feet quite warm. To continue the application of the ice-pillow, and the ice-bag to the lumbar region, to repeat the powder, and to give the following:—℞ Liquoris Ammoniae Acetatis, ʒii; Potassii Iodidi, gr. iv.; Potassæ Bicarbonatis ʒi; Syrupi simplicis, ʒii; Aquæ destillatæ ʒxii. M. ft. Mist. cujus capiat ʒii, ter die.

July 18th.—The patient continues to improve; the bowels have been opened four times, the tongue is cleaner, and the feet keep warm, but the eyes are still spasmodically drawn occa-

sionally. To give him a warm bath to-night; to repeat the powder; to give the mixture four times a day, and to continue the use of the ice as previously ordered.

July 19th.—Decidedly better. To continue the treatment in all respects the same.

July 21st.—Still improves: he sat up to-day, recognized his mother, and showed other signs of intelligence. Bowels open; to keep them so by means of castor oil; the ice to be continued as before.

July 23rd.—Is slightly hoarse; “the unnatural look in the eyes still shows itself at times;” yesterday his cheeks were alternately flushed and pallid several times; his head has been tolerably cool, but thrown back; he sleeps a good deal, and without much starting, “taking long refreshing naps;” his feet continue warm. The saline mixture and the ice, as before, to be continued.

July 28th.—Appears wonderfully better, and sits up looking quite intelligent. The tongue is, however, still a little furred. To leave off the ice-pillow.

℞ Hydrargyri c̄ Creta, gr. i.; Pulv. Rhei co., gr. v. M. ft. pulvis h. s. s.

℞ Potassii Iodidi, gr. $\frac{3}{4}$; Ammonii Bromidii, gr. $1\frac{1}{2}$; Aquæ, ℥ii, bis die.

July 31st.—The nervous system continues to become more healthy, but the extremities are colder than normal. To omit the iodide of potassium, to reapply the ice twice a day along the entire spine, and to let his food consist of two parts of milk, and one of water, well sweetened with sugar.

August 6th.—Is generally very comfortably warm all over; the feet very seldom cold. The temperature of the head varies. Bowels relaxed. Sits up a good deal, takes a great deal of notice, laughs and crows, and is usually cheerful. His irritability is gone. Continue the spinal ice-bag, the bromide of ammonium, and use a cold-water pillow for the head.

August 12th.—His mother writes,—“He has picked up very much during the last few days, and is looking quite himself again.” After this date he continued so well that ice was used only occasionally; he steadily increased in health and strength. By September 30th, when his mother brought him to show him to me, he was looking wonderfully well—fat and rosy. He has never had even the threatening of a convulsion since I began to treat him.

Much has been written of late concerning the nature of infantile paralysis; but little, so far as I know, concerning the means of its prevention. Indeed, up to the present time, the preventive power conferred by medicine has been almost *nil*. I venture to predict, however, that the judicious use of ice on the principles and according to the methods exemplified in the foregoing case, will save thousands of children from the terrible malady in question. If from teething, or other causes, a child exhibits symptoms of disturbance of the nervous system, those symptoms may be allayed and their source removed, in the majority of cases, by an appropriate application of cold to the nervous centres. Moreover, if paralysis should suddenly supervene, there is, I am confident, no agent within the domain of medicine which can make any approach to the curative power over that disease which may be exerted by modifying the temperature of the back. I am not less confident that in all cases of club-foot the remedial efficacy of ice is infinitely superior to that of dividing the tendons of the contracted muscles, and that, excepting rare and peculiar cases, it will ultimately supersede tenotomy altogether.

D.

Laryngismus stridulus cured by means of Ice.

July 2nd, 1863.—X. C., aged 10 months. Suffers, his mother says, from "something in his breath." He is generally attacked in the night when asleep, but often in the daytime when anything he wants is not given him (!). "He loses his breath," his mother says, "just as though it was out of his body, then he struggles for to gain it." The fit consists of several crowing inspiratory efforts; his face becomes a "black-red;" he jerks up his hands and feet, generally at the beginning of the attack, which lasts about five minutes. He is sometimes attacked twice an hour during the day and night; sometimes he will go three or four days without an attack. He began in this manner for the first time about six weeks ago, but has had little spasmodic impediments to breathing ever since he was six weeks old. The right eye is turned inward. He is often sick during the days of attack; his bowels are regular in the interval of the attacks, but very relaxed during the attacks. To apply an ice-bag, wrapped in flannel, along the whole length of the spine during two hours and a half three times a day.

July 22nd.—The ice has been continued once or twice daily. Since the treatment began he has only been affected with the spasms, very slightly, three times. He was thin, and is now becoming plump. The brain bulged upwards through the anterior fontenelle; now it has ceased to do so.

August 11th.—Four weeks ago began to suffer from diarrhœa, which continued three weeks. During that time he had no convulsions, but wasted, and became so “dreadfully weak, he couldn’t sit up in the least.” The convulsive crow and affection of the hands, which are suddenly extended, have recurred during the last six or seven days three times a day. He vomits every day. To use an ice-pillow, and a cloth dipped in iced-water over the frontal region, so as to keep the head continually cool, and to apply ice to the spine if convulsions come on.

August 17th.—The diarrhœa has continued all the week; the head having continued cool, no ice was applied to it. The ice has been applied to the spine daily about three times, thirty minutes each. Appetite for solids gone, but likes milk and beef-tea. To have the ice to the spine in a bag folded once in flannel three times daily, two hours each time; also to have ℥ii. of lime-water three times a day in milk, and the following,—

Ext. Cinchonæ, ℥i.; Tinct. Cinchonæ co., ℥ii.; Aquæ Carui, ℥x.; Capiat ℥i., ter die.

September 14th.—Quite well, gaining flesh, and continues wholly free of laryngeal spasms.

E.

The Remedial Power of Ice as used in the treatment of Paralysis and Diabetes.

[Reprinted from the ‘MEDICAL TIMES AND GAZETTE’ of Oct. 17, 1863.]

Although experience justifies me in relying with great confidence on cold and heat applied to various parts of the back as remedial agents in the treatment of numerous diseases, I deem it expedient of course to avail myself of every possible aid, and therefore rarely avoid the use of medicines altogether. But in a scientific point of view it is obviously desirable that when a new remedy is brought forward, its efficacy should be tested by the only satisfactory method, viz. that of using it alone. This method has been adopted in the treatment of the cases reported

below. In the case of hemiplegia it will be seen that strength has been restored to the paralysed limbs; that, though they were generally cold before the application of the ice, they are now permanently warm; that the previously constipated bowels are now open daily; and that the headache, formerly habitual, has wholly ceased. Of the treatment of diabetes by means of ice, in one case during twenty-four days, and in the other during thirty-five, the results are not less satisfactory: without the use of medicine, and without tormenting the patients by any kind of restriction in respect of food, a simultaneous and rapid diminution of the daily quantity of urine voided, and of the sugar excreted with it, has been effected, while the health and strength of the patients have correspondingly increased.

Those readers who are not already acquainted with the principles of my discovery, that cold and heat applied to different parts of the back are capable of exercising a most powerful remedial influence over a large number of diseases, are referred to my paper published in the 'Medical Times and Gazette' of July 18th last. It is upon the discovery of the facts therein explained that my practice of applying cold or heat to some parts of the back as a curative process (which might be appropriately designated Vaso-motor Medicine) is founded.

In treating paralysis, as well as diabetes (which I regard as also a disease of the nervous system), my intention is to increase the flow of blood, and thereby the transformative and nutritive processes of the parts affected; this intention has been fulfilled in the cases reported below, by applying ice to the back in the manner described.

A boy, aged 13, afflicted with hemiplegia (left side), was brought to me June 1st, 1863. At this date I made the following notes of his condition:—Has a florid complexion, looks healthy, and is very intelligent. Complains chiefly of being unable to use his left arm. He cannot raise it above his head, as he can the right one—being unable to lift the hand higher than the face. The fore-arm cannot be completely extended, and is firmly fixed in the prone position. The wrist and hand are not only powerfully drawn to the ulnar side, but so firmly flexed on the fore-arm as to resist whatever extending force the patient can apply with his right hand. If by additional external force they be brought into a straight line with the fore-arm, immediately they are released from it they return to their abnormal

position. The metacarpal bone of the thumb is strongly adducted and held (immovable by the patient's will) in the palm of the hand. The four fingers are permanently bent inwards; the middle one being flexed over the end of the thumb and deeply indented by the thumb-nail. The third phalanx of the index finger bends backwards on the application of the slightest pressure, and is incapable of offering any resistance—that fasciculus of the flexor profundus digitorum, which converges into the tendon of this finger, being paralysed. The whole upper extremity of the left side is considerably shorter and smaller than that of the right. The left leg is also shorter and thinner than the right, although the arrest of growth has been less in the leg than in the arm. The patient cannot stand on the left leg, and when he attempts to extend it completely, he feels a stiffness at the top of the calf. If he places the heel on the ground, and then lifts up the fore part of the foot, it immediately drops—he cannot sustain it. He can bear no weight on the fore part of the foot, and cannot bend his toes either upwards or downwards, except in a very slight degree. The tendo-Achillis has been divided. The right pupil is slightly the largest; the tongue deviates to the left side. The patient suffers from frequent and long-continued headache, on an average three times a week; if he gets up with it, it lasts all day. His back is peculiarly sensitive: he bursts into hysterical laughter the moment it is touched. The whole of the left side is habitually cold. Bowels constipated: not opened oftener than every other day. The patient's malady originated, his father says, in a fall on his left side when he was six months old. From this time the elbow was observed to be slightly bent, and the fore-arm always pronated. In his twelfth month the weakness was first noticed in the leg. In his third year he was taken to l'Hôpital des Enfants Malades at Paris; then to "a private doctor," who bandaged the arm and hung a weight to it; he subsequently attended at the Orthopædic Hospital in London, where, in addition to other treatment by galvanism, etc., the tendo-Achillis was divided; and, finally, he was a patient during two years at another metropolitan hospital.

My prescription, June 1st, was, to wash the patient all over every morning in cold water; to clothe him in flannel down to the wrists and ankles; to apply ice to the whole length of the spine during three hours three times a day; to rub the back

vigorously several minutes each time the ice is taken off; to rub the left arm and leg frequently, and to make frequent and continuous efforts to supinate the fore-arm.

June 8th.—The patient's limbs have been rubbed very little; in other respects my injunctions have been complied with. His left arm and leg have become quite warm, and he has not had headache once since the ice was first applied.

15th.—Still no headache; the bowels are now open daily; the preternatural sensitiveness of the back is gone; and when the left heel is placed on the ground, the fore part of the foot can be held up during at least five minutes. To use only two bags of ice daily, one in the morning and one at night: in other respects to go on the same as before.

July 14th.—The power of the whole left arm, either for movement or lifting objects, has greatly increased; the hand is much less flexed and drawn to the ulnar side than formerly; the metacarpal bone of the thumb, which even a fortnight ago needed a good deal of external force to draw it from the palm, can now be abducted by the will of the patient himself; he can open the fingers, and can extend them completely; and the third phalanx of the index finger, formerly paralysed, he can flex strongly. His left leg also continues to grow stronger: he can stand alone upon it without support for a considerable time; the stiffness formerly felt at the top of the calf when he attempted to extend it is completely gone; he can hold up the fore part of the foot when the heel is on the ground as long as he likes; he can move the toes, especially upwards, much more freely, and, as he says, he walks "much better" than formerly. I ordered the extensor muscles of the fore-arm, especially those of the thumb, to be galvanized frequently; the treatment in other respects to continue the same.

28th.—When the hand is in a passive state it is now quite straight in relation to the fore-arm, and its grasping power is notably increased. The patient can walk on either the heel or toes of the left foot, and in ascending stairs can bear all his weight so completely on his left toes, as to be able to go up by advancing each foot a step alternately. The bowels continue to be opened daily; the left side continues remarkably warm, and during the two months of treatment headache has never been felt.

As the radial side of the fore-arm has been turned inwards

ever since infancy, it is probably held in that position, not only by the pronator muscles, but by adherent tissue developed between the immobile structures. Holding this opinion, I directed the boy to make continuous efforts forcibly to supinate the fore-arm, and already the rotating power has increased. If his left tendo-Achillis had not been divided, he would now walk, I believe, with only such a slightly perceptible limp as would be due to the difference in length of the two legs; there is more unevenness in his gait than that difference will account for, and I ascribe it to the operation which he underwent. Indeed, he could walk better, he says, before the operation than afterwards; and he is probably right, for he also says that before the operation the muscles of the calf were fully developed, whereas afterwards they gradually wasted.

In the 'British Medical Journal' for September 12th, 1863, Dr. Goolden has reported the results of his treatment of a case of diabetes in St. Thomas's Hospital, chiefly by means of the Turkish bath. He closes his report as follows:—

"Since the above report, the quantity [of urine] is reduced to four pints, and the specific gravity from 1022 to 1030; and this improvement followed the application of ice to the cervical vertebræ in an india-rubber bag, as suggested by Dr. Chapman."

As Dr. Goolden has published the case, I may without impropriety give a brief history of my part of the treatment of it, and thus correct the errors inadvertently made in the above-quoted statement. The first error is of course a clerical one, due to a transposition of the figures; the writer doubtless intended to say that the specific gravity was reduced from 1030 to 1022. The second will mislead: the ice is said to have been applied "to the cervical vertebræ." It was applied to the cervical vertebræ, but also to the dorsal: a bag four inches wide, filled with ice, was applied from the base of the skull along the neck and back as far as the lowest angles of the scapulæ.

The patient, William S., became conscious of being unnaturally thirsty in October, 1862, and was admitted into St. Thomas's Hospital, under the care of Dr. Goolden, February 10th, 1863. After admission, and up to February 21st, he made from ten to fifteen pints of urine daily, the specific gravity being from 1041 to 1043. At that date he was ordered a Turkish bath three times a week, and this treatment was continued till August 12th.

The quantity of urine passed daily was gradually reduced to five pints by June 3rd, and by June 6th the specific gravity was reduced to 1030. From June 6th to August 12th no further progress was made by means of the Turkish bath; the quantity of urine voided continued the same, viz. five pints, and during the same period the specific gravity averaged 1032.

August 12th.—The Turkish baths were discontinued, and I was invited to treat the patient by means of ice, applied as already mentioned. At this date I ordered two bags of ice to be used daily. After August 24th three bags were used. The results are as follows:—

Quantity of Urine voided Daily.

From August 12 to 19 inclusive	.	.	5	pints.
„ „ 20 to 31 „	.	.	4½	„
„ Sept. 1	.	.	4¼	„
„ „ 2 to 5 inclusive	.	.	4	„

Specific Gravity.

From August 12 to 14 inclusive	.	.	1030
„ „ 15 to 18 „	.	.	1029
„ „ 19 to 23 „	.	.	1029
„ „ 24 . . . . .	.	.	1026
„ „ 25 . . . . .	.	.	1023
„ „ 26 . . . . .	.	.	1028
„ „ 27 . . . . .	.	.	1026
„ „ 28 . . . . .	.	.	1022

Much to my regret, Dr. Goolden at this date ordered the Turkish baths to be resumed, the ice treatment being continued.

Specific Gravity.

From August 29 . . . . .	.	.	1023
„ „ 31 to Sept. 4 inclusive	.	.	1026
September 5 . . . . .	.	.	1023

On August 30th, the patient received a shock, two men having vomited blood in his presence. He said he felt “queer,” and continued so all the following day. This fact may account for the rise in the specific gravity between August 30th and September 4th seeing that the urinometer again indicated 1023 on the 5th. At this date, as Dr. Goolden wished to resume his trial of the Turkish bath alone, my treatment of the patient was discontinued.

Another case of diabetes is now being treated with ice, and after an adequate experience of the effects of it, I will publish a

report. Meanwhile, I may say that the patient has ordinary diet, eats what he likes, takes no medicine, that during the five weeks he has been under treatment the quantity of urine voided daily has been reduced from nineteen to eight pints and a half, and that the specific gravity has fallen from 1041 to 1030. The patient's skin is becoming moister and softer, and he reports himself as less thirsty and hungry, and, at the same time, stronger and better.

The following is a report of the case referred to in the preceding paragraph:—

September 3rd, 1863.—John Dawson, aged 20, farm labourer, suffering from diabetes. Is an in-patient at Guy's Hospital, under the care of Dr. Owen Rees, and, in his absence, of Dr. Wilks. He believes himself to have been quite well seven months ago, when he first noticed an increase in the quantity of his urine. From that time he has gradually become weaker, and has been losing flesh. He suffers much from cramps in the legs down to the toes inclusive. His feet, especially when he lies down, are usually cold. The skin of his hands is peculiarly hard and dry. Tongue beefy-red; bowels fairly regular; pulse eighty. During the five days before he was submitted to treatment, the average quantity of urine voided daily was eighteen pints, and the specific gravity on one occasion 1041, and on another 1033.

Dr. Wilks ordered the patient to be submitted to my method of treatment, and accordingly the application of ice in the manner already mentioned during about two hours and a half three times a day was prescribed. The results are as follows:—

Quantity of Urine voided Daily.

Sept. 4	17 pints.	Sept. 23 to 26, incl.	11 pints.
„ 5 and 6	17½ „	„ 27	10¾ „
„ 7	17 „	„ 28 to Oct. 1, in.	10 „
„ 8	16 „	Oct. 2 to 5, incl. . .	9½ „
„ 9, 10, and 11 .	15½ „	„ 6 and 7	10 „
„ 12	14½ „	„ 8	9½ „
„ 13	14 „	„ 9 and 10	9 „
„ 14 to 17, incl.	13 „	„ 11 to 14, incl.	8½ „
„ 18, no report.		„ 15 to 17, incl.	8 „
„ 19	12 „	„ 18	7¾ „
„ 20, 21, and 22	11½ „	„ 19	7 „

The specific gravity averaged during the month of October 1031.

The pulse during the period of treatment averaged ninety.

At an early period of the treatment the cramps of the lower extremities ceased entirely, and, by extending the ice for a time into the lumbar region, the feet became permanently warm.

It is much to be regretted that on the 20th of October this patient left the hospital, notwithstanding that the Sister urged him to wait until he had seen Dr. Rees or myself. His reason for going out, he said, was, that being so much better, it was no use for him to stay any longer.

In the dietetic treatment of diabetes systematically practised by Dr. Pavy, and in the treatment of it by Turkish baths adopted by Dr. Goolden, the symptoms of the disease are almost sure to be ameliorated. If the supply of starchy and saccharine elements in the food be withheld, it is obvious that however perverted may be the functions of the liver, however predisposed it may be to form sugar from the blood in abnormal quantities, its power of doing so must be limited; if the blood be kept poor in the elements of sugar, the amount of sugar produced by the liver, and returned to that fluid as a constitutional poison, must be proportionately small. Moreover, as the amount of the poison is thus diminished, the effort of nature to wash it away no longer needs to be so great as before, and hence the amount of fluid demanded as drink, and secreted by the kidneys, is lessened in the same ratio. But, as it appears to me, there is nothing in this method of treatment which affords any hope that the essence of the disease—the cause of the symptoms—is in the least degree touched; on the contrary, assuming, as I do, that the disease is in the base of the brain, I think it probable that by impairing the general nutrition to the extent likely to be effected by the rigid restrictions on the diet imposed in these cases, the cerebral injury is less likely to be repaired than it would be were the patient sustained by an abundance of agreeable food. The frequency with which such patients become the victims of phthisis in addition to diabetes seems to confirm this conviction. On purely *à priori* grounds I should be disposed to think much more favourably of the treatment by Turkish baths than of the dietetic system, because, while the baths help to wash away the excess of sugar from the blood, and thus relieve the kidneys of a part of their

enormous work, the patient is not necessarily precluded from enjoying a generous diet, which, by keeping up his general health, is likely to afford favourable conditions for nature's curative efforts.

But if without *directly* modifying the symptoms in any way—either by cutting off the supplies of food easily convertible into sugar, or by washing the sugar from the system as soon as formed—the sugar-forming process can be so arrested that the quantity of sugar formed and dissolved in the blood becomes gradually less, and consequently the need of fluid for drink and renal excretion in order to carry away the poison is also proportionately lessened, it is reasonable to suppose that by such a method the disease itself has been remedied to the extent denoted by the diminution of its symptoms. So far as experience in the foregoing cases may be accepted as an indication, such a method seems to have been realized in the treatment therein exemplified. The patients were restricted in respect neither to diet nor to the amount of fluid they might drink, and the renal secretion was not lessened by the vicarious action of Turkish baths, and yet in both cases there was a steady progress in the diminution of their symptoms until each left the hospital where he had been treated.

THE END.

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